Cityview Ridge Subdivision

Preliminary Servicing & Stormwater Management Report

GMBP File: 105172

August 2021

GUELPH | OWEN SOUND | LISTOWEL | KITCHENER |LONDON | HAMILTON | GTA
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CITYVIEW RIDGE SUBDIVISION

PRELIMINARY SERVICING AND STORMWATER MANAGEMENT REPORT

AUGUST 2021

GMBP FILE: 105172

1. INTRODUCTION

In support of the Draft Plan of Subdivision Application for Part of Lot 4, Concession 3, Division 'C' (Geographic Township of Guelph) and Part of Lots 30, 32 & 33 and all of Lot 34, Registered Plan 53 (Division 'C' – Geographic Township of Guelph), in the City of Guelph herein after referred to as Cityview Ridge Subdivision, GM BluePlan Engineering Limited has prepared this revised report to address the preliminary servicing and stormwater management requirements for the site and to address the comments provided by the City of Guelph (dated September 18, 2015, December 9, 2015, and November 1, 2017).

The servicing and stormwater management techniques for the Cityview Ridge Subdivision were derived from the recommendations presented in the following reports:

- Final Stormwater Management Design Report for the Southern Hadati Creek Watershed prepared by Schaeffus Consulting Engineers (May 1997).
- Stormwater Management Design Report Draft Plan 23T-96501 and 23T-99501 Martini/Valeriote Subdivision prepared by Gamsby and Mannerow Limited (March 2004).
- Clythe Creek Subwatershed Overview prepared by Ecologistics Limited (January 1998).
- Eastview Secondary Plan and Addendum prepared by Cosburn Patterson Wardman Limited (1991 and 1992).
- Environmental Impact Study prepared by North-South Environmental Inc. (July 2017 Amendment).
- Environmental Impact Study prepared by North-South Environmental Inc. (January 21, 2021 update memorandum)
- Hydrogeological Investigation prepared by Banks Groundwater Engineering Limited (November 2014).
- Geotechnical Investigation prepared by Naylor Engineering Associates Limited (February 2012).
- Slope Stability Assessment of East-Facing Slope prepared by Englobe Corp. (December 14, 2020).
- Slope Stability Assessment of South-Facing Slope prepared by Englobe Corp. (March 1, 2019).

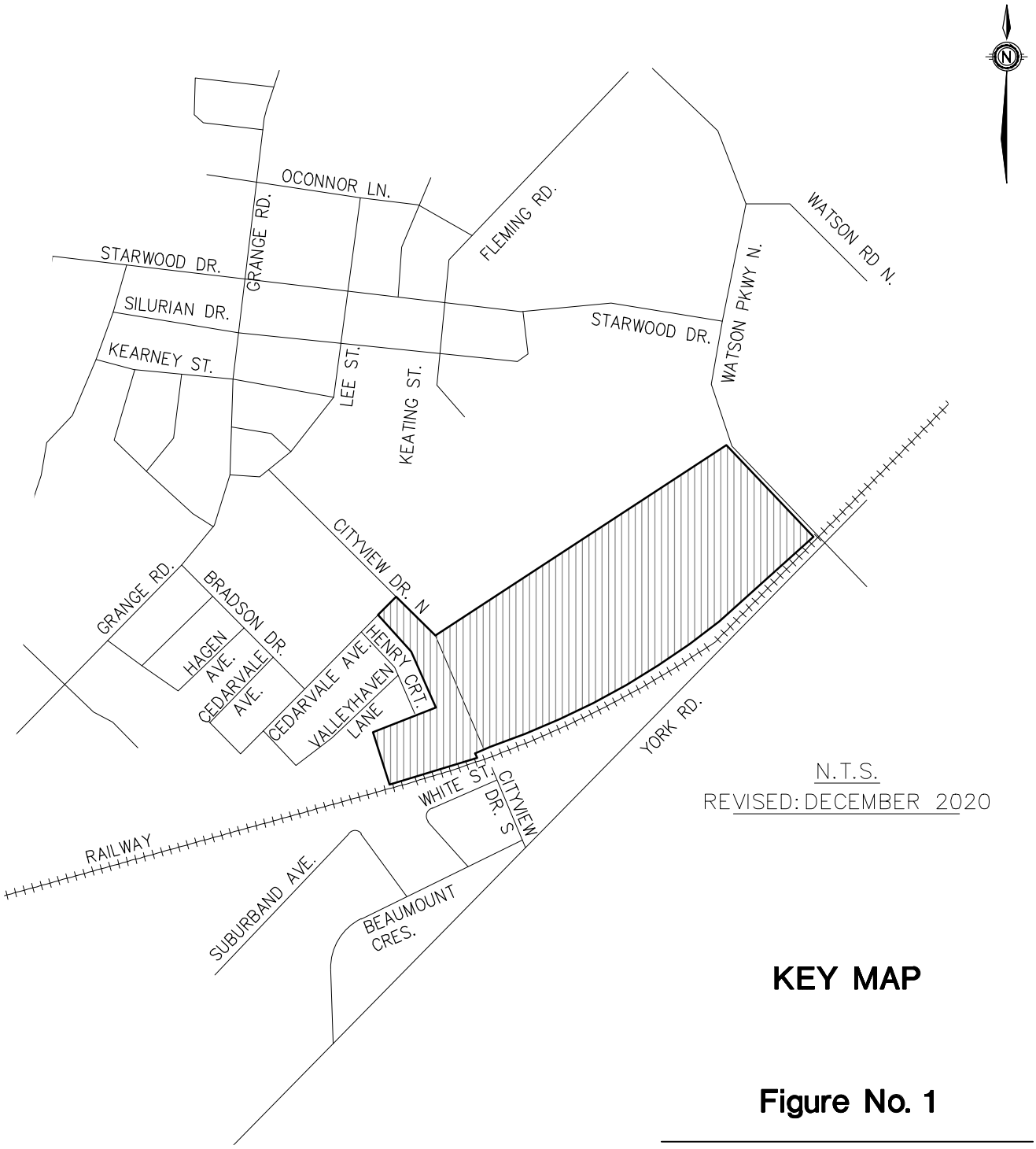
Together, these reports form the overview for the design and development of the Cityview Ridge lands. Please note that some of these reports pre-date the current draft plan, though the findings of these reports are not affected by the change.

The following sections will describe the grading, servicing and stormwater management design for the Cityview Ridge Subdivision. At a later date, further details of the Erosion and Sediment Control Plan and Monitoring plan will be provided in an Environmental Impact Report.

2. LOCATION

Figure 1 shows the location of the Cityview Ridge Subdivision and the surrounding area. The site is bound by lands which have been draft plan approved to the north, Watson Parkway to the east, CN Railway lands to the south and existing residential development (Valleyhaven Subdivision Phase 3) to the west.

PRELIMINARY SERVICING AND STORMWATER MANAGEMENT REPORT
CITYVIEW RIDGE SUBDIVISION
CITY OF GUELPH



N.T.S.
REVISED: DECEMBER 2020

KEY MAP

Figure No. 1

Gamsby and Mannerow
ENGINEERS

Plotted On: December 10, 2020 105172-FIG1.dwg

3. EXISTING CONDITIONS

3.1 Land Use

The existing land use on the site is vacant field and existing residential. Previously a portion of the site (east of Cityview Drive) was utilized as a Christmas tree farm with the remaining Christmas trees being harvested in 2006. The site has also been used as a borrow site for fill material in the past.

The lands to the north have currently received draft plan approval and are being developed for residential purposes. The lands to the east including Watson Parkway, are zoned to permit future commercial development. The lands to the south of the CN Railway lands have been developed for residential/commercial/industrial use. The lands to the west have been developed for residential use and include the Valleyhaven Subdivision Phase 3.

3.2 Topography

The westerly portion of the site, west of Cityview Drive, generally drains in an east to west direction towards Hadati Creek. The average gradient across the westerly portion of the site ranges from 3.0% to 12.0%. The central portion of the site, east of Cityview Drive, generally drains in a west to southeast direction towards the low-lying area and Clythe Creek. East of Cityview Drive, the southwesterly portion of the site drains towards Clythe Creek via the roadside ditch along Cityview Drive. The average gradient across the central portion of the site, which includes the slope of the drumlin, ranges from 3.0% to 20.0%. The eastern portion of the site, adjacent to Watson Parkway, generally drains in an east to southwest direction towards the low-lying area and Clythe Creek. The average gradient across this portion of the site ranges from 2.0% to 12.0%.

Under existing conditions there are two recognized historical drainage patterns through the site. The first is a former watercourse in the east of the site which runs north to south. This feature is identified in Figure 2 of Addendum #3 to the 2012 EIS by North-South Environmental Inc. During inspection of the watercourse in October 2016 by North-South Environmental Inc., there was evidence of surface runoff in the downstream end of the watercourse. This is not currently a recognized watercourse by the GRCA.

The historical drainage pattern is a drainage swale which runs through the middle of the site from the northwest to the southeast. During the preparation of the 2012 EIS by North-South Environmental Inc., this was not a recognized drainage pattern and no flows had ever been recorded in this area. Upon site inspection by North-South Environmental Inc., there was no evidence of a eroded channel in the area, until exiting the site area. Outside of the site, erosion has taken place and formed a channel which eventually discharges to Clythe Creek.

Along Cityview Drive there is an existing roadside ditch which conveys flows from the road and the southwest corner of the site to Clythe Creek via a culvert under the railroad tracks and a sewer which conveys flows under York Road. Under existing conditions a silt fence has been installed in the southwest corner of the site to discourage sediments from entering the drainage ditch and ultimately Clythe Creek. Currently flows are directed to a low point along the silt fence, where the silt fence has broken and sediment laden flows are free flowing into the roadside ditch.

3.3 Soils

The predominant surface soil type on the site is Guelph Loam (Soil Survey of Wellington County Report No. 35). Guelph Loam has a hydrologic soil classification of BC and generally has good drainage characteristics.

The Geotechnical Investigation by Naylor Engineering Associates Limited (February 2012) established the characteristics of the underlying soils for the lands on the east side of Cityview Drive. The boreholes identified the underlying soils as topsoil overlying silt tills for the majority of the property and as topsoil overlying sand and gravel for the low lying easterly portions of the site. The results of the geotechnical investigation are included in Appendix ‘A’.

As part of the Geotechnical Investigation, groundwater observation wells were installed. Groundwater measurements have been collected from 2006 to the present to establish seasonably high groundwater elevations. From the groundwater measurements and the Geotechnical Investigation, the seasonably high groundwater level is estimated to range from 0.10 metres to 6.70 metres below ground surface.

Permeameter testing at various locations throughout the site was completed in October 2020 by CMT Engineering Inc., further discussion regarding these testing results is discussed in Section 4.8.

Further discussion regarding the on-site soils can be found in Section 3.2 of the Environmental Impact Study completed by North-South Environmental Inc.

4. PROPOSED DEVELOPMENT

The Draft Plan of Subdivision prepared by Black Shoemaker Robinson & Donaldson Limited (May 25, 2020) (Figure 2) illustrates the proposed lot fabric and road network. Cityview Drive will serve as the main connection and access point for this development.

4.1 Site Grading

The site layout and internal roads are shown on the Preliminary Grading and Drainage Plans (Gamsby and Mannerow Limited Drawing No. 1, 2 and 3). The grade and elevation of the streets are controlled by the elevation of Cityview Drive and the major overland flow route to the existing municipal stormwater management facility and proposed stormwater management facility. The site has been graded to match the existing elevations along the property limits of the lands to the north and the CN Railway lands to the south. We note that no grading is proposed east of the total development setback from the easterly steep slopes. Additionally, there is no grading proposed within the natural features and the buffers of the natural features.

Under post-development conditions the former watercourse in the east of the site which runs north to south is to remain unchanged. This surface drainage feature is within the identified Natural Heritage System and is not within 100m of the closest lot line.

Under post-development conditions, the drainage swale which runs through the middle of the site from the northwest to the southeast will be removed. Surface runoff which may have discharged to this drainage swale will be routed to the stormwater management system, via the on-site storm sewers, ultimately discharging to the proposed energy dissipation structure prior to discharging to Clythe Creek. There will be no grading within the natural features and the buffers of the natural features with the exception of the following,

- Grading to permit construction of the cooling and energy dispersion structure.
- Construction of the trail.
- Encroachment during construction of the retaining wall at the rear of Lots 65-79.

To facilitate development of the site while minimizing impacts on the adjacent natural areas and in order to match existing elevations at the limits of the development, retaining walls have been proposed to reduce or eliminate grading encroachments into the natural areas. To minimize the construction footprint during the construction of the retaining walls, only small (ex. Mini excavator) equipment shall be used when adjacent to the protected natural areas. Additionally, prior to construction of the retaining walls, the natural areas will be flagged and a minimum of one row of heavy-duty silt fence will be placed along the boundary of the natural area to provide protection from sediment runoff during construction of the retaining walls.

At the southwest corner of the site, the existing silt fence has failed and allows flows from the site to discharge, freely to the existing roadside ditch. The additional discharge from the Cityview Ridge lands compounds the existing erosion and sediment issues on Cityview Drive. Prior to construction, it is recommended that the silt fence be repaired, a second layer of silt fence installed along with straw bales to reduce discharge velocities to the existing roadside ditch. Should any additional sediment and erosion control measures be required in this area, they should be explored during the detailed design of the reconstruction of Cityview Drive.

4.2 Streets

All streets will be constructed with a minimum slope of 0.5% to a maximum slope of 6.0%. An urban road cross-section with concrete curb and gutter will be used along all streets.

Street Nos. 1, 2 and 3 are proposed to have an 18.0 metre right-of-way width.

Cityview Drive has a 20.0 metre right-of-way.

The extension of the cul-de-sac on Henry Court has an 18.5 metre radius.

Concrete sidewalks, with a width of 1.5 metres, will be constructed along one side of each street.

4.3 Water Supply

As part of the municipal servicing of the Valleyhaven Subdivision Phase 3, a 150 mm diameter watermain was terminated at the current limits of Henry Court and a 150 mm diameter watermain stub was extended from the 200 mm diameter watermain which crosses the CN Railway lands and terminated within the limits of the existing municipal stormwater management facility. A 200 mm diameter watermain was also terminated at the intersection of Cedarvale Avenue and Cityview Drive as part of these works.

The extension of the existing 150 mm diameter watermain on Henry Court will provide water service to the residential lots fronting on to Henry Court.

The extension of the 150 mm diameter watermain southerly on Cityview Drive from the intersection of Cedarvale Avenue and Cityview Drive will provide water supply to the residential lots fronting onto Cityview Drive and the remainder of the Cityview Ridge Subdivision. A looped connection has been provided for Street No. 3, Street No. 1 and 2 will have a looped connection completed upon connection the to proposed watermain on the lands to the north

Water supply for Blocks 116 and 126 will be provided to property line via a connection to the proposed watermain in the adjacent rights-of-way.

4.4 Sanitary Sewer

As part of the municipal servicing of the Valleyhaven Subdivision Phase 3, a 200 mm diameter sanitary sewer was terminated at the current limits of Henry Court and a 200 mm diameter sanitary sewer stub was extended across the CN Railway lands and terminated within the limits of the existing municipal stormwater management facility.

The extension of the existing 200 mm diameter sanitary sewer on Henry Court will provide sanitary service to the residential lots fronting on to Henry Court.

Sanitary service for the lots fronting on to Cityview Drive and the remainder of the Cityview Ridge Subdivision (east of Cityview Drive) will be provided by the extension of a 200 mm diameter sanitary sewer from the existing 200 mm diameter sanitary sewer stub located in the existing municipal stormwater management facility, along the CN Railway lands to Cityview Drive.

4.5 Storm Sewer

All storm sewers within the Cityview Ridge Subdivision will be sized to accommodate the 5-year design storm event.

The storm sewers on Henry Court will discharge to existing municipal storm sewers, ultimately discharging to the existing municipal stormwater management facility constructed as part of the Valleyhaven Subdivision Phase

3. Storm sewers on the northerly reach of Street No. 3, and the westerly reach of Street No. 1 and Cityview Drive will outlet to a stormwater conveyance channel, ultimately discharging to the existing municipal stormwater management facility constructed as part of the Valleyhaven Subdivision Phase 3. The existing municipal stormwater management facility constructed as part of the Valleyhaven Subdivision Phase 3 was designed, approved and constructed to accommodate drainage from the western 11.1-ha of the Cityview Ridge Subdivision. The storm sewers along the remainder of Street No. 1 and the easterly portion of Street No. 3 will outlet to the proposed stormwater management facility.

Major storm runoff generated from the extension of Henry Court will be conveyed via the municipal right-of-way, ultimately discharging to the existing municipal stormwater management facility. Major storm runoff from Cityview Drive and the central portion of the site (lands located to the east of Cityview Drive) will be conveyed through the street rights-of-way to the stormwater conveyance channel, ultimately discharging to the existing municipal stormwater management facility constructed as part of the Valleyhaven Subdivision Phase 3. Major storm runoff from the remainder of the development will be conveyed through the rights-of-way to the proposed stormwater management facility.

The topography of the site will generally allow for sufficient cover on the storm sewer to connect house foundation drains. Where a storm service connection is not possible, foundation drainage will be provided by sump pumps discharging to the grassed side and rear yard surfaces.

4.6 Stormwater Management

Details of the stormwater management plan for the Cityview Ridge Subdivision are discussed in detail in Section 5.0.

4.7 Salt Management Plan

As per the requirements of the City of Guelph, the following Salt management Plan has been developed for the Cityview Ridge Subdivision. Although not in the Region of Waterloo, this plan has been developed using the Region of Waterloo's Curb The Salt and Smart About Salt Program, as these are well respected programs and guidelines for reducing salt usage and minimizing the concentration of salt in infiltration and runoff. A two-stage salt management plan is recommended as per the Region of Waterloo Curb The Salt and Smart About Salt Programs. Stage I of the salt management plan will address the ploughing of snow and the application of salt/sand within the limits of the right-of-way by municipal forces. Stage II of the salt management plan will include snow removal and placing of salt on private property by the homeowner.

The recommended best management practices for the removal of snow and application of salt/sand within the limits of the municipal right-of-way (Stage I) include the following:

- Ploughing of snow as required following snowfall events or as directed by the municipality to ensure safe passage for motorists.
- Application of salt/sand immediately following ploughing if required or as directed by the municipality. The application of salt/sand is not mandatory after each snow clearing operation.
- Monitor and document the application of salt/sand on municipal rights-of-way (i.e. frequency, concentration, etc.).
- Storage of all ploughed snow in an area appropriately designated for snow storage to minimize the impact of salt/sand on environmental features and to ensure that surface drainage is maintained. As part of the detailed engineering design, an appropriate snow storage area will be confirmed with the City.

Stage II of the salt management plan, which includes the removal and stockpiling of snow and application of salt/sand on private property, the recommended best management practices are as follows:

- Ploughing or shovelling snow on driveways and sidewalks immediately following a snowfall event to ensure the safe passage of motorists and pedestrians.

- Application of salt/sand immediately following ploughing or shovelling only as required (sand is recommended). The application of salt/sand is not mandatory after each snow clearing operation.
- Storage of all ploughed or shovelled snow in the front yards and boulevard areas (i.e. grassed areas) to a height which will not block the view of motorists and pedestrians and will not impede surface drainage.

As part of the two stage Salt Management Plan, an annual review of the plan shall be conducted by the Owner as a way to incorporate some adaptive strategies for continual improvement and reduction of salt concentrations in runoff and infiltration.

4.8 Permeameter Testing

As per the City of Guelph Development Engineering Manual, in-situ permeameter testing was completed on-site. The field investigation was completed by CMT Engineering Inc. on September 30 and October 1, 2020 and the report can be found in Appendix G.

Conservative infiltration rates were calculated for the soils at the bottom of the infiltration structure, and any different soils encountered within 1.5m of the bottom of the infiltration structures. As shown in the attached report, infiltration is not suitable for Lots 1-11 due to wet soil conditions, and for Lots 80-102 and Blocks 114-115 due to poor infiltration rates of 0.2-0.3mm/hr. Infiltration galleries have been proposed in the rear yards of the remaining lots and blocks for the infiltration of rooftop runoff. Further discussion on the site water balance is discussed in Section 4.9.

4.9 Slope Stability Assessment

Updated slope stability analysis' have been completed for the south and east facing steep slopes adjacent to the development, specifically, the slopes adjacent to the rail corridor and Lots 65 to 79. The results of the updated slope stability analysis' have been included in Appendix B. Three cross sections of the east-facing slope were analysed to determine the location of the top of stable slope with a factor of safety of 1.5. The total development setback of 7.0m from the top of slope of the east-facing slope is required. As shown on Drawing No. 2 of the Englobe Report and the Preliminary Grading and Drainage Plan (GP-2), no portion of the development is proposed to be within the total development setback of the east facing slope.

Four sections of the south facing slope were analysed to determine the location of the top of stable slope with a factor of safety of 1.5. The resultant total development setback is indicated on Drawing No. 1 of the report prepared by Englobe Corp. and the Preliminary Grading and Drainage Plan (GP-1). As shown on the Preliminary Grading and Drainage Plan (GP-1), no portion of the development is proposed to be within the top of stable slope, or the 6.0m setback from the top of stable slope.

4.10 Water Budget

Based on the Canadian Climate Normals for the Guelph Arboretum from 1971-2000, the average annual precipitation, for the area in which the site is located is estimated to be 923.3 mm. The potential for evapotranspiration for this area is estimated to be 555 mm for the drumlin and 495 mm for the low-lying easterly portion of the site. Therefore, 368 mm and 428 mm remain available for infiltration and runoff from the drumlin and low-lying areas, respectively.

From the Geotechnical Investigation (Naylor Engineering Associated Limited, February 2012), the surficial deposits across the majority of the site are described as silt tills, with sand and gravel across the low-lying easterly portion of the site. A copy of the Geotechnical Investigation has been included in Appendix 'A'. Typically, infiltration and runoff in areas mapped as tills is estimated to be 180 mm and 190 mm, respectively. For the low-lying easterly portion of the site, the average infiltration and runoff were estimated to be 380 mm and 50 mm, respectively. A copy of the Hydrogeological Investigation prepared by Banks Groundwater Engineering Limited has been included in Appendix 'D'.

Therefore, based on the annual infiltration rates, as shown on the Monthly Water Balance calculations attached in Appendix 'G', the existing annual average groundwater recharge occurring within the 18.28-hectare site is estimated to be 41,772 m^3. Under post-development conditions, the annual natural groundwater recharge occurring on-site is estimated to be 23,953 m^3.

Under existing conditions, the annual average runoff from the site is estimated to be 32,109 m^3. As a result of the proposed development the impervious area (rooftop and paved surfaces) of the site increases, the annual potential evapotranspiration for impervious surfaces decreases to 200 mm and the runoff from the site increases. The runoff from the site under post-development conditions is estimated to be 60,909 m^3 per year.

Enhanced infiltration has been proposed to reduce the difference between existing and post-development condition infiltration volumes. Enhanced infiltration for rooftop runoff under post-development conditions has been provided in the rear yard of as many lots as possible. The result of the rear yard infiltration galleries (0.5m deep, 2.0m wide and varying length) is an additional 11,121 m^3, of infiltration, bringing the post-development total to 35,074 m^3.

The estimated existing and post-development recharge and runoff volumes for the Cityview Ridge Subdivision are detailed in Table 1. In summary, the estimated recharge and runoff volume for the Cityview Ridge Subdivision are as follows:

Table No. 1: Summary of Recharge and Runoff Volume

	Existing Condition	Post-Development Condition	Percentage Change
Total Estimated Recharge	41,772 m^3	35,074 m^3	-16%
Total Estimate Runoff	32,109 m^3	60,909 m^3	+90%

As shown in the above table, the estimated recharge under post-development conditions is approximately 16% below the pre-development levels. We understand the City of Guelph wishes to have a balance of post and pre-development recharge levels. As discussed in Section 4.8, due to soils which are not suitable for infiltration at Lots 1-11, 80-102 and Blocks 114-115, a 16% post-development recharge deficit is as close as possible to matching pre-development recharge levels.

5. STORMWATER MANAGEMENT PLAN

In line with current practices and guidelines, the stormwater management plan for the Cityview Ridge Subdivision is a "treatment train" to attenuate post-development flows and to remove sediments prior to discharge to both Clythe Creek and Hadati Creek. Enhanced (80% total suspended solids removal) water quality control will be provided by the stormwater management system. Post-development runoff generated from the site will be attenuated to the existing condition level. The "treatment train" will include a combination of lot level, conveyance and end-of-pipe best management practices.

Lot level controls will consist of rear yard infiltration galleries along with rear and side yard swales.

Conveyance controls will include the use a stormwater conveyance channel and oil/grit separator structure to provide quality control treatment for a portion of the runoff discharging from the site, prior to discharge to both Clythe Creek and Hadati Creek.

End-of-pipe controls will be provided by an existing stormwater management facility constructed as part of the Valleyhaven Subdivision Phase 3 (Stormwater Quality Facility No. 2 and Stormwater Quantity Control Facility) and a proposed stormwater management facility.

As part of the overall stormwater management analysis and design for the Valleyhaven Subdivision Phase 3, a stormwater management system consisting of both quality and quantity control facilities was designed, approved and constructed along Hadati Creek upstream of the CN Railway Tracks.

The existing Stormwater Quality Facility No. 2 was designed to provide Basic (MOE, 2003) (Formerly Level 3) quality control treatment for a maximum drainage area of 29.6-hectares (based on a maximum imperviousness coverage of 42%).

The existing Stormwater Quantity Control Facility, consisting of a detention pond located on-line with Hadati Creek, a quantity control berm and an outlet structure connected to the existing CN culvert, was designed to attenuate peak flows from a Catchment area of 72.7-hectares to the release rates recommended in the Eastview Secondary Plan.

Of the 29.6-hectare and 72.7-hectare catchment areas for the existing stormwater management facilities, 11.1-hectares represent the westerly portion of the Cityview Ridge Subdivision. Therefore, quality and quantity control treatment of runoff generated from 11.1-hectares of the Cityview Ridge Subdivision has been accounted for in the design, approval and construction of the existing Quality Facility No. 2 and the existing Quantity Control Facility. The drainage catchments utilized in the design of the existing quality and quantity control facilities are shown on Figure 3.

To provide quality and quantity control for the runoff generated from the Cityview Ridge Subdivision, while also maintaining the existing drainage patterns discharging to both Hadati Creek and Clythe Creek, runoff generated from the westerly portion of the development (approximately 7.62-hectares), which includes Henry Court and Cityview Drive, will be directed to the existing stormwater management Quality Facility No. 2 constructed as part of the Valleyhaven Subdivision Phase 3.

Runoff generated from the central portion of the Cityview Ridge Subdivision will be directed to the proposed stormwater management facility. To minimize the impact of development on the adjacent lands, the stormwater management system has been designed to provide enhanced water quality treatment and to attenuate the post-development flows to the pre-development level. In addition, discharge from the proposed stormwater management facility will be dispersed over a large broad surface, ultimately sheetflowing overland towards Clythe Creek.

This combination of lot-level, conveyance and end-of-pipe controls will control the release of the runoff from the site.

5.1 Stormwater Management Criteria

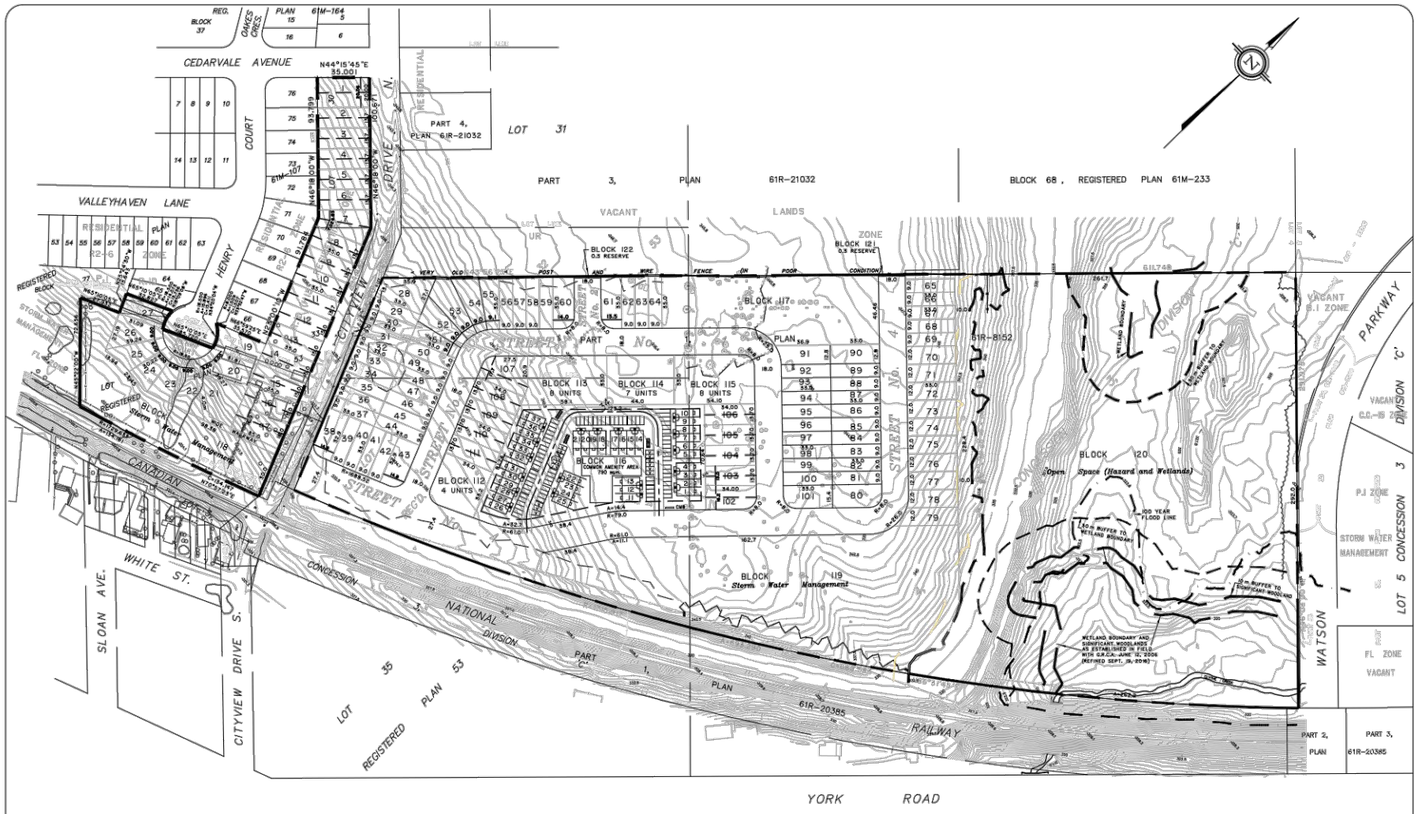
The studies, policies and guidelines used to develop the stormwater management plan for this development were as follows:

- Stormwater Management Planning and Design Manual, 2003
- Design Principles for Stormwater Management Facilities, 1996
- Eastview Secondary Plan and Addendum, 1991 and 1992
- The Interim Stormwater Quality Control Guidelines, 1991
- The Stormwater Quality Best Management Practices Manual, 1991
- The MTO Drainage Management Technical Guidelines, 1989
- The Ontario Urban Design Guidelines, 1987

The objectives of the stormwater management plan are as follows:

1. Provide enhanced (80% TSS) quality control by pre-treating the runoff prior to discharge to the receiving outlet.
2. Provide quantity control for a range of design storms.
3. Route the major storm to minimize flood damage to public and private lands.

PRELIMINARY SERVICING AND STORMWATER MANAGEMENT REPORT
CITYVIEW RIDGE SUBDIVISION
CITY OF GUELPH

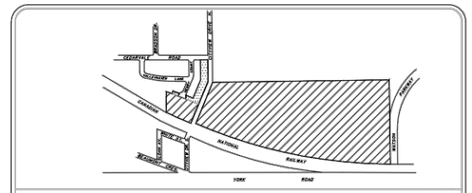


LEGEND:

- LIMIT OF CULTURAL PLANTATION, MAR. 2009
- 10m OFFSET TO CULTURAL PLANTATION
- LIMIT OF HEDGEROW MARCH, 2009
- LIMIT OF WETLAND AS ESTABLISHED IN FIELD WITH G.R.C.A. JUNE 12, 2006
- 30 METRE OFFSET TO WETLAND LIMIT
- DRIPLINE BY N/S ENVIRONMENTAL APRIL 2018

LAND USE SCHEDULE

SINGLE FAMILY RESIDENTIAL	LOTS 19–101	83 UNITS	3.032	HA.
SEMI-DETACHED RESIDENTIAL	LOTS 1–18 & 102–111	56 UNITS	1.396	HA.
ON-STREET TOWNHOUSES	BLOCKS 112–115	27 UNITS	0.617	HA.
CLUSTER TOWNHOUSES	BLOCK 116	59 UNITS	1.047	HA.
PARK	BLOCK 117		0.599	HA.
STORM WATER MANAGEMENT	BLOCKS 118 & 119		2.452	HA.
OPEN SPACE	BLOCKS 120		6.508	HA.
0.3 RESERVES	BLOCKS 121 & 122		0.001	HA.
STREETS			2.032	HA.
TOTAL		225 UNITS	17.684	HA.



KEY PLAN N.T.S.

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 (17) OF THE PLANNING ACT

51 (17) (a) – (c) AS SHOWN
(d) SEE SCHEDULE
(e) – (g) AS SHOWN
(h) MUNICIPAL WATER SUPPLY
(i) BURFORD AND GUELPH LOAM
(j) AS SHOWN
(k) MUNICIPAL STORM AND SANITARY SEWERS
(l) STORM SEWER EASEMENT AS SHOWN

OWNERS CERTIFICATE

WE HEREBY AUTHORIZE BLACK, SHOEMAKER, ROBINSON, AND DONALDSON LIMITED, ONTARIO LAND SURVEYORS, URBAN AND RURAL PLANNERS TO SUBMIT THIS DRAFT PLAN OF PROPOSED SUBDIVISION.

CITYVIEW RIDGE DEVELOPMENTS INC.
AND
CARSON REID HOMES LTD.

SEE ORIGINAL SUBMISSION
CARSON REID

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

SEE ORIGINAL SUBMISSION
KERRY F. HILLIS
ONTARIO LAND SURVEYOR

CITYVIEW RIDGE
DRAFT PLAN OF SUBDIVISION

OF PART OF
LOT 4, CONCESSION 3, DIVISION 'C'
(GEOGRAPHIC TOWNSHIP OF GUELPH)
AND PART OF LOTS 30, 32 & 33
AND ALL OF LOT 34, REGISTERED PLAN 53
(DIVISION 'C' – GEOGRAPHIC TOWNSHIP OF GUELPH)
CITY OF GUELPH
COUNTY OF WELLINGTON

SCALE 1 : 1500 (0 30 60 90 120 METRES)

METRIC
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

BLACK, SHOEMAKER, ROBINSON & DONALDSON LIMITED
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101-257 Woodlawn Rd. W. Guelph, Ontario N1H 7K1
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DATE: DECEMBER 8, 2020
DRAWN BY: KS
PROJECT 16-14-214-00-A

N.T.S.
REVISED: DECEMBER 2020

DRAFT PLAN OF SUBDIVISION

Figure No. 2

Gamsby and Mannerow ENGINEERS

Plotted On: December 10, 2020 105172-FIG2.dwg

4. In order to minimize sediment discharge to the wetland and/or lands adjacent to the working area, erosion and sediment control measures shall be incorporated for the entire duration of the contract.
5. Complete a Water Balance Analysis in order to evaluate total system water loss and identify measures to reduce those losses.
6. The method used to evaluate and design the stormwater management plan was as follows:

The City of Guelph design parameters were used to generate the mass rainfall data required to model the 2, 5, 25 and 100-year design storm events. The Regional Storm has also been modelled. The Chicago parameters and the total depth of rainfall for each storm are as follows:

Table No. 2: Chicago Rainfall Parameters

	2-Year	5-Year	25-Year	100-Year
a	743.0	1,593.0	3,158.0	4,688.0
b	6.0	11.0	15.0	17.0
c	0.799	0.879	0.936	0.962
r	0.400	0.400	0.400	0.400
Duration (min)	170	170.0	210.0	210.0
Rainfall Depth (mm)	33.816	46.775	69.476	88.83

The Horton Infiltration method was used in the post-development runoff calculations. The parameters used in the MIDUSS modelling are given in Table No. 3.

Table No. 3: Horton Infiltration Parameters

	Impervious Areas	Previous Areas
Maximum Infiltration	0.0 mm/hr	75.0 mm/hr
Minimum Infiltration	0.0 mm/hr	12.5 mm/hr
Lag Constant	0.05 mm/hr	0.25 mm/hr
Depression Storage	1.5 mm	5.0 mm

5.2 Stormwater Management Design

As part of the stormwater management system, a “treatment train” to remove sediments and thereby any absorbed contaminants prior to discharging to Hadati Creek and Clythe Creek will be provided. The “treatment train” will include lot level, conveyance and end-of-pipe management practices.

The best management practices (BMP’s) in the Stormwater Management Planning and Design Manual (2003) were screened. Those found to be applicable to this development are discussed in the following sections.

5.2.1 Lot Level Controls

Stormwater management practices recommended to provide lot level control on this site are as follows:

a) Roof Drainage to Infiltration Galleries

The driveways and front yards will drain to the street. The rear yard will generally drain to the rear of the lot. The runoff for any event large enough to generate flow to the swale system will be adequately filtered by the grass enroute.

The roof runoff will be directed to proposed rear-yard infiltration galleries. As roof runoff is generally considered to be “clean” runoff, no quality control treatment is required.

b) Rear Yard Swales

The lots will be graded to current City of Guelph Standards. Where practical, the length of the rear lot swales between catch basins will be increased to extend the contact time with the grassed surfaces.

To promote infiltration on the lots and in the swales, it is recommended that the average depth of graded topsoil be 300 mm.

c) Lot Level Infiltration Systems

In order to provide more infiltration under post-development conditions, lot level infiltration galleries have been proposed in the rear yards. These galleries are 0.5m deep, 2.0m wide and vary in length, they will be placed at a depth of 1.2m below ground in order to be operable year-round.

5.2.2 Conveyance Controls

The storm conveyance system for the development will consist of a stormwater conveyance channel and storm sewers. Conveyance controls will be achieved through the regular maintenance of the grassed channels and storm sewers as part of the City's annual maintenance program. Maintenance requirements will include the annual cleanout of the manholes, catch basins, to remove sediment, oil and debris deposited during rainfall events.

The stormwater conveyance channel will have the capacity to convey the 100-year design storm event flows from both the Cityview Ridge Subdivision and the proposed development lands to the north. The channel will be constructed along the northern limits of the CN Railway lands, to provide a link between the Cityview Ridge Subdivision and the existing Stormwater Quality Facility No. 2 constructed as part of the Valleyhaven Subdivision Phase 3.

5.2.3 Proposed Stormwater Management Facility

Runoff generated from the central portion of the Cityview Ridge Subdivision will be directed towards the proposed stormwater management facility for quantity and quality control prior to discharging to Clythe Creek. A multi-stage outlet structure consisting of a 90 mm diameter knockout, a 375 mm diameter outlet pipe and a 10.0-metre-wide overflow weir will attenuate runoff prior to discharging to the cooling trench and energy dissipation/ dispersion structure.

Quality control will be provided by a sediment forebay and the permanent pool of the Stormwater Management Facility. From Table 3.2 of the Stormwater Management Planning and Design Manual (2003), a wetland type facility designed for enhanced treatment (80% total suspended solids removal) requires 115 m^3/ha of storage volume for a contributing drainage area that is approximately 65% impervious. Of the 115m^3/ha required, 40m^3/ha of the required storage volume represents the extended detention storage volume, while the remaining 75 m^3/ha represents the permanent pool storage volume. Therefore, 134m^3 and 251m^3 of storage are required in extended detention and permanent pool, respectively. The proposed facility has been designed with approximately 3,426.2m^3 of extended detention below the weir and 715.2m^3 of permanent pool storage.

5.2.4 Cooling Trench and Dispersion Structure

As part of the stormwater management design for the Cityview Ridge Subdivision, thermal mitigation and flow dispersion are required prior to flow discharging to Clythe Creek. Following discharge from the proposed stormwater management facility, flows are directed to the proposed cooling trench and energy dispersion structure. The proposed cooling trench and energy dispersion structure (25 m long by 2.0 m wide by 1.0 m deep), consisting of 19 mm diameter clear stone and perforated storm sewer, will dissipate the energy from the runoff and disperse the flows over a large area. The perforated storm sewer located in the clear stone will disperse the flows throughout the length of the structure. Runoff will then percolate through the stone, ultimately discharging out the top of the stone. Discharge from the structure will then sheetflow along the entire length of the structure (25 m) overland towards the plantation and provincially significant wetland.

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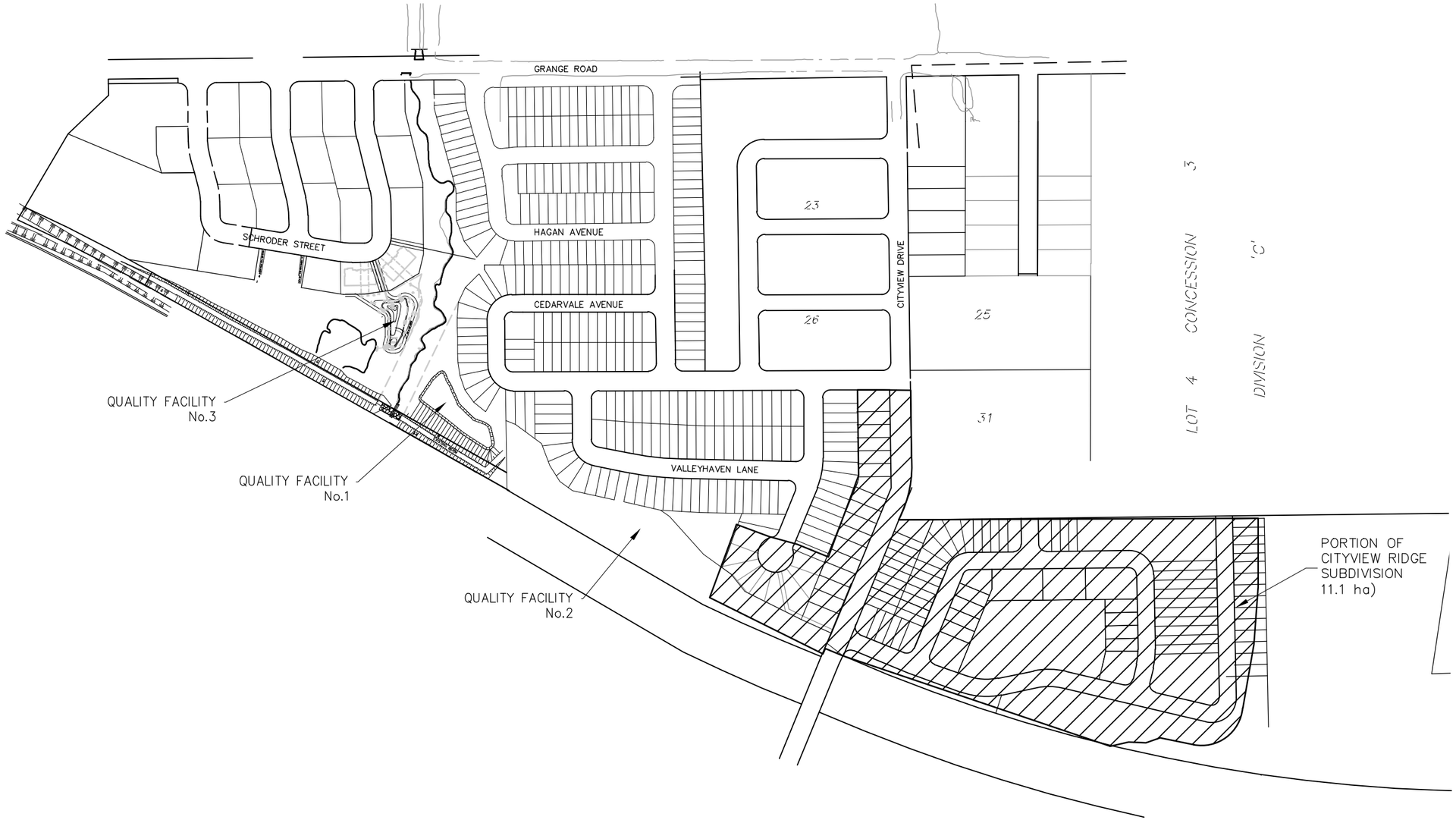

LEGEND

N.T.S.

REVISED: DECEMBER 2020

OVERALL DRAINAGE AREAS

Figure No. 3

Gamsby and Mannerow
ENGINEERS

Plotted On: December 10, 2020 105172-FIG3.dwg

The proposed cooling trench and energy dispersion structure will also act as a cooling trench to reduce the temperature of the stormwater runoff discharging towards the plantation and provincially significant wetland. Detailed calculations for the proposed cooling trench and energy dispersion structure provided in Appendix "E".

During the detailed design stage of the Subdivision, additional measures will be investigated and considered to enhance the function of the energy dissipation/dispersion structure. These measures may include the planting of shrubs and ground covering vines to reduce the direct input of solar radiation on the trench.

It is recommended that the area downstream of the energy dispersion structure be monitored following major storm events to ensure that no erosion down gradient of the structure has occurred.

5.2.5 End of Pipe Controls

a) Existing Conditions

Under existing conditions, the site consists of two (2) existing buildings and various other buildings, with the remainder of the site being open space. For hydrologic modelling purposes, the site was modelled as three (3) catchments. These catchments, which include the Cityview Drive right-of-way, are shown on the Existing Conditions Drainage Area Plan (Figure 4).

Catchment 10 (7.02 hectares, 8% impervious) represents the westerly portion of the development including the existing buildings, Cityview Drive and open space area. Runoff generated from the westerly portion Catchment 10 currently sheetflows overland in an east to west direction, ultimately discharging to the existing Stormwater Quality Facility No. 2 constructed as part of the Valleyhaven Subdivision Phase 3. Runoff generated by the eastrly portion of Catchemnt 10 is intercepted by the existing ditch on Cityview Drive, and ultimately discharges to Hadati Creek.

Catchment 20 (4.78 hectares, 0% impervious) represents the central portion of the site. Runoff generated from Catchment 20 currently discharges to the existing drainage swale ultimately discharging to Clythe Creek.

Catchment 30 (6.48 hectares, 0% impervious) represents the remainder of the site (easterly portion). Runoff generated from Catchment 30 currently sheetflows overland, ultimately discharging to the low lying area and Clythe Creek.

Table No. 4 summarizes the existing condition flow rates and runoff volumes from the site for the full range of design storm events.

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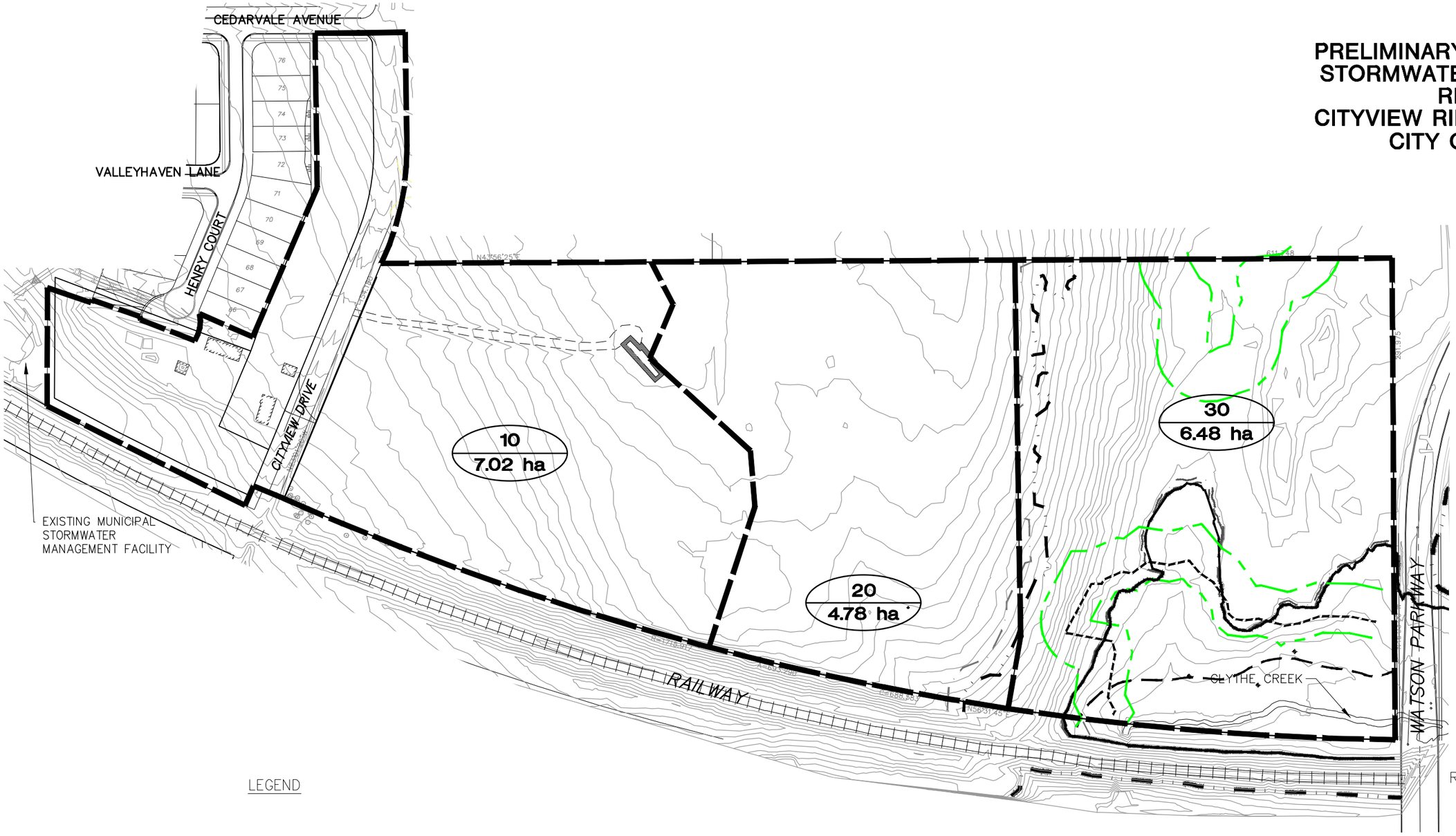

LEGEND

100 / 6.11 ha — CATCHMENT / DRAINAGE AREA

CATCHMENT BOUNDARY

EXISTING CONDITIONS DRAINAGE AREA

Figure No. 4

Gamsby and Mannerow
ENGINEERS

Plotted On: December 10, 2020 105172-FIG4.dwg

Table No. 4: Existing Condition Flow Rates and Runoff Volumes

	Catchments					
	10	**Total to Ex. SWM Pond**	20	30	**Total to Wetland**	**Total from Site**
2-Year						
Flow Rate (m^3/s)	0.130	**0.130**	0.054	0.073	**0.127**	**0.220**
Runoff Volume (m^3)	314.3	**314.3**	100.7	136.6	**237.3**	**551.6**
5-Year						
Flow Rate (m^3/s)	0.492	**0.492**	0.328	0.444	**0.772**	**1.265**
Runoff Volume (m^3)	951.8	**951.8**	519.7	704.5	**1,224.2**	**2,176.0**
25-Year						
Flow Rate (m^3/s)	1.344	**1.344**	0.931	1.261	**2.192**	**3.536**
Runoff Volume (m^3)	2,226.3	**2,226.3**	1,369.3	1,856.3	**3,595.6**	**5,451.9**
100-Year						
Flow Rate (m^3/s)	2.160	**2.160**	1.454	1.971	**3.425**	**5.585**
Runoff Volume (m^3)	3,420.5	**3,420.5**	2,173.5	2,946.5	**5,119.9**	**8,540.4**
Regional Storm						
Flow Rate (m^3/s)	0.587	**0.587**	0.397	0.538	**0.936**	**1.522**
Runoff Volume (m^3)	6,423.1	**6,423.1**	3,728.8	5,054.9	**8,783.7**	**15,206.8**

b) Allowable Release Rates

The existing stormwater management facility constructed as part of the Valleyhaven Subdivision Phase 3 (Stormwater Quality Facility No. 2) was designed, approved and constructed to accommodate stormwater runoff generated from a total contributing drainage area of 29.6-hectares (42% imperviousness), of which 11.1-hectares represents the westerly portion of the Cityview Ridge Subdivision. Therefore, the allowable release rates from the Cityview Ridge Subdivision to the existing stormwater management facility constructed as part of the Valleyhaven Subdivision Phase 3 (Stormwater Quality Facility No. 2) are outlined in Table No. 5.

Table No. 5: Allowable Release Rates from the Cityview Ridge Subdivision to the Existing Stormwater Management Facility (Stormwater Quality Facility No. 2)

	Allowable Release Rate
2-Year	0.294 m^3/s
5-Year	0.929 m^3/s
25-Year	1.689 m^3/s
100-Year	2.246 m^3/s
Regional Storm	0.587 m^3/s

The allowable release rates from the Cityview Ridge Subdivision to Clythe Creek are outlined in Table No. 6.

Table No. 6: Allowable Release Rates from the Cityview Ridge Subdivision to the existing Wetland

	Allowable Release Rate
2-Year	0.127 m^3/s
5-Year	0.772 m^3/s
25-Year	2.192 m^3/s
100-Year	3.425 m^3/s
Regional Storm	0.936 m^3/s

Therefore, post-development flows generated by the site which discharge to the existing wetland, and ultimately Clythe Creek, will be attenuated to the allowable release rates above.

c) Post-Development Conditions

Under post-development conditions, runoff generated from the westerly and central portions of the development will be directed towards either the existing stormwater management facility constructed as part of the Valleyhaven Subdivision Phase 3 (Stormwater Quality Facility No. 2) or the proposed municipal stormwater management facility in the Cityview .

For hydrologic modelling, two (2) separate hydrological models were prepared. One model was prepared for the western portion and one model was prepared for the eastern portion of the Cityview Ridge Subdivision.

The hydrologic model for the western portion of the subdivision has been adapted from the hydrological modelling created for the Valleyhaven Subdivision, Phase 3 as detailed in the Stormwater Management Design Report Draft Plan 23T-96501 and 23T-99501 for the Martini/Valeriote Subdivision (Gamsby and Mannerow Limited, March 2004). The analysis includes the watershed discharging to the southern reach of Hadati Creek, including the external areas, existing and future development areas (including the western portion of the Cityview Ridge Subdivision) and the lands downstream of the CN Railway. The stormwater management catchments for this model are shown on Figure 5 and described below. A schematic of this model has been appended.

Catchment B2a (11.38 hectares, 42% impervious) represents the future residential lands north of the Cityview Ridge Subdivision and East of Cityview Drive. Stormwater runoff generated from Catchment B2a discharges to the existing Stormwater Quality Facility No. 2 constructed as part of the Valleyhaven Subdivision Phase 3 via a conveyance channel located in the southwest corner of the Cityview Ridge Subdivision.

Catchment B2b (5.97 hectares, 42% impervious) represents the existing Valleyhaven Subdivision Phase 3. Stormwater runoff generated from Catchment B2b discharges to the existing Stormwater Quality Facility No. 2 constructed as part of the Valleyhaven Subdivision Phase 3.

Catchment B2c (7.55 hectares, 46% impervious) represents the western portion of the Cityview Ridge Subdivision. Stormwater runoff generated from Catchment B2c discharges to the existing Stormwater Quality Facility No. 2 constructed as part of the Valleyhaven Subdivision Phase 3 via a conveyance channel located in the southwest corner of the Cityview Ridge Subdivision.

The existing Stormwater Quality Facility No. 2 constructed as part of the Valleyhaven Subdivision Phase 3, was designed to provide Basic (MOE, 2003) (Formerly Level 3) quality control treatment for Catchments B2a, B2b and B2c.

In order to provide enhanced water quality treatment (80% total suspended solids removal) for stormwater runoff generated from the Cityview Ridge Subdivision and discharging to the existing Stormwater Quality Facility No. 2 constructed as part of the Valleyhaven Subdivision Phase 3, an oil/grit separator structure (Stormceptor STC 14000 or approved equivalent) along with a settling basin/forebay has been designed to provide additional quality control treatment for stormwater runoff generated from Catchments B2c and B2a, respectively.

The existing Stormwater Quantity Control Facility, consisting of a detention pond located on-line with Hadati Creek, a quantity control berm and an outlet structure connected to the existing CN culvert, will continue to provide quantity control for runoff generated from Catchments B2a, B2b and B2c.

For the eastern portion of the Cityview Ridge Subdivision, the site was modelled as three (3) catchments. These catchments are shown on Figure 6.

Catchment 201 (3.44 hectares, 65% impervious, c=0.65) represents the central portion of the proposed development.

Runoff generated from Catchment 201 will be directed towards the proposed stormwater management facility prior to discharging to the proposed energy dissipation/dispersion structure and provincially significant wetland. Quantity control for Catchment 201 will be provided by the proposed stormwater management facility. A multi-stage outlet structure consisting of a 230 mm diameter knockout, a 375 mm diameter outlet pipe and a 10.0-metre-wide overflow weir will attenuate runoff generated from Catchment 201 prior to discharge to the energy dissipation/dispersion structure.

Quality control for Catchment 201 will be provided by a sediment forebay and the permanent pool of the Stormwater Management Facility. From Table 3.2 of the Stormwater Management Planning and Design Manual (2003), a wetland type facility designed for enhanced treatment (80% total suspended solids removal) requires 115 m^3/ha of storage volume for a contributing drainage area that is approximately 65% impervious. Of the 115m^3/ha required, 40m^3/ha of the required storage volume represents the extended detention storage volume, while the remaining 75 m^3/ha represents the permanent pool storage volume. Therefore, 134m^3 and 251m^3 of storage are required in extended detention and permanent pool, respectively. The proposed facility has been designed with approximately 3,426.2m^3 of extended detention below the weir and 715.2m^3 of permanent pool storage.

Catchment 202 (0.98 hectares, 25% impervious, c=0.25) represents the rear yards of Lots 65-79 including the rooftops, rear yard areas and open space areas of the proposed development.

Runoff generated from Catchment 202, including the rooftops and rear yards, will be directed to the energy dissipation/dispersion and cooling structure prior to discharge to Clythe Creek.

Quality control treatment for runoff generated from Catchment 202 is not required as runoff generated by rooftops and grassed surfaces is considered “clean” runoff.

Catchment 300 (6.48 hectares, 0% impervious) represents the remainder of development area which consists of open space area and an area along Watson Parkway. Runoff generated from Catchment 300 will continue to sheetflow uncontrolled to Clythe Creek.

Table No. 7 lists the uncontrolled post-development flow rates and runoff volumes for each catchment area shown on Figure No. 5 and Figure No. 6, for the 2, 5, 25 and 100-year design storm events and the Regional Storm.

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LEGEND

B2a / 21.8 ha — CATCHMENT / DRAINAGE AREA

CATCHMENT BOUNDARY

N.T.S.

REVISED: DECEMBER 2020

POST-DEVELOPMENT DRAINAGE AREAS WESTERN PORTION OF SUBDIVISION

Figure No. 5

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Plotted On: December 10, 2020 105172-FIG5.dwg

PRELIMINARY SERVICING AND STORMWATER MANAGEMENT REPORT
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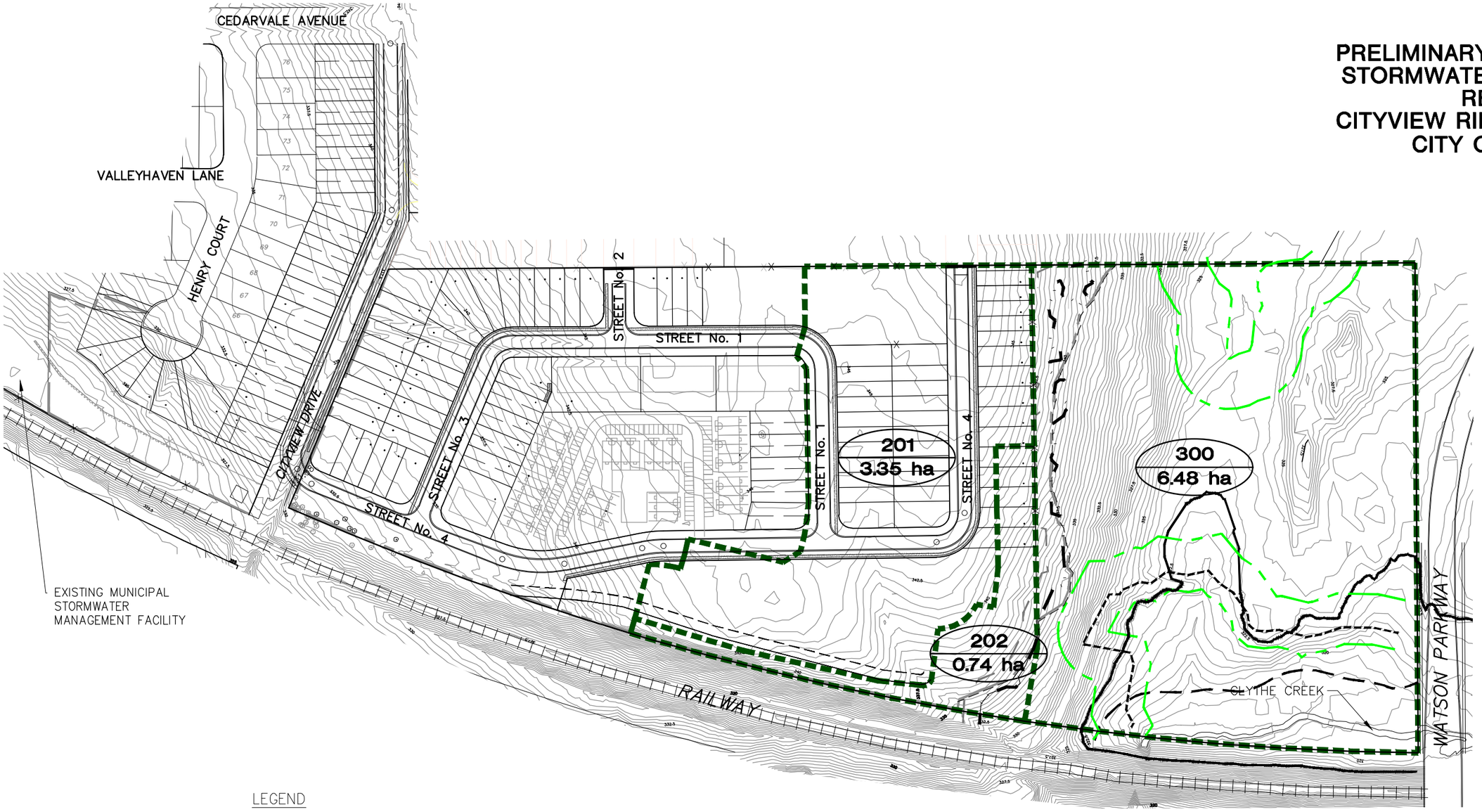

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LEGEND

100 / 6.11 ha — CATCHMENT / DRAINAGE AREA

CATCHMENT BOUNDARY

POST-DEVELOPMENT DRAINAGE AREAS EASTERN PORTION OF SUBDIVISION

Figure No. 6

Gamsby and Mannerow
ENGINEERS

Plotted On: December 10, 2020 105172-FIG6.dwg

Table No. 7: Post-Development Uncontrolled Flow Rate and Runoff Volume

	Catchments					
	B2c	**Total to Ex. SWM Pond**	201	202	300	**Total to Wetland/ Clythe Creek**
2-Year						
Flow Rate (m^3/s)	0.211	**0.211**	0.500	0.055	0.073	**0.628**
Runoff Volume (m^3)	563.2	**563.2**	737.05	93.44	136.55	**967.0**
5-Year						
Flow Rate (m^3/s)	0.674	**0.674**	0.681	0.091	0.444	**1.216**
Runoff Volume (m^3)	1,756.9	**1,756.9**	1,128.8	189.1	704.5	**2,022.4**
25-Year						
Flow Rate (m^3/s)	1.177	**1.177**	1.084	0.223	1.261	**2,568**
Runoff Volume (m^3)	2,791.2	**2,791.2**	1,846.0	375.07	1,856.3	**4,077.4**
100-Year						
Flow Rate (m^3/s)	1.563	**1.563**	1.482	0.340	1.971	**3.793**
Runoff Volume (m^3)	3,650.7	**3,650.7**	2,471.0	543.2	2,946.5	**5,960.7**
Regional Storm						
Flow Rate (m^3/s)	0.928	**0.928**	0.379	0.089	0.538	**1.006**
Runoff Volume (m^3)	10,099.4	**10,099.4**	6,419.5	1,170.3	5,054.9	**12,644.7**

Table Nos. 8, 9 and 10 compare the routing results through the stormwater conveyance channel, proposed stormwater management facility and energy dissipation/dispersion and cooling structure against the available stage/storage discharge capacities, respectively.

Table No. 8: Catchment B2a & B2c – Stormwater Conveyance Channel Stage/Velocity/Depth of Flow

	Available Capacity			Actual Capacity		
	Peak Flow (m^3/s)	Channel Velocity (m/s)	Depth of Flow (m)	Peak Flow (m^3/s)	Channel Velocity (m/s)	Depth of Flow (m)
Swale Bottom	0.000	0.000	0.000	---	---	---
2-Year	---	---	---	0.531	1.40	0.21
5-Year	---	---	---	1.605	1.88	0.35
Regional Storm	---	---	---	2.304	2.07	0.42
100-Year	---	---	---	2.856	2.18	0.46
25-Year	---	---	---	3.746	2.33	0.52
Top of Bank	16.90	3.38	1.00	---	---	---

Table No. 9: Catchment 201 – Proposed Stormwater Management Facility Available Stage/Storage/Discharge

	Available Capacity			Actual Capacity		
	Peak Flow (m^3/s)	Storage Volume (m^3)	Storage Elevation (m)	Peak Flow (m^3/s)	Storage Volume (m^3)	Storage Elevation (m)
Pond Bottom	0.000	0.0	339.35	---	---	---
Top of Permanent Pool	0.000	0.0	339.75	---	---	---
2-Year	---	---	---	0.039	535.2	339.99
5-Year	---	---	---	0.056	861.8	340.13
CB Lip	0.069	1,178.1	340.25	---	---	---
25-Year	---	---	---	0.222	1,303.9	340.30
Regional Storm	---	---	---	0.315	1,405.3	340.28
100-Year	---	---	---	0.415	1,564.6	340.39
Weir	0.470	3,426.2	340.95	---	---	---
Top of Bank	5.622	5,487.8	341.45	---	---	---

Table No. 10: Catchment 201 – Energy Dissipation/Dispersion and Cooling Structure Available Stage/Storage/Discharge

	Available Capacity			Actual Capacity		
	Peak Flow (m^3/s)	Storage Volume (m^3)	Storage Elevation (m)	Peak Flow (m^3/s)	Storage Volume (m^3)	Storage Elevation (m)
Bottom of Stone	0.000	0.0	337.05	---	---	---
Overflow Pipe	0.00005	14.8	337.70	---	---	---
2-Year	---	---	---	0.009	14.80	337.70
5-Year	---	---	---	0.011	14.82	337.70
25-Year	---	---	---	0.243	15.28	337.73
Regional Storm	---	---	---	0.319	15.43	337.74
100-Year	---	---	---	0.416	15.62	337.75
Top of Stone	0.421	20.60	338.05	---	---	---

Table No. 11 identifies the energy dissipation/dispersion and cooling structure inlet and outlet flow rates and velocities.

Table No. 11: Energy Dissipation/Dispersion Structure Flow Rate and Velocity

	Inlet		Outlet		% Reduction
	Peak Flow (m^3/s)	**Velocity (m/s)**	**Peak Flow (m^3/s)**	**Velocity (m/s)**	
2-Year	0.009	1.039	0.009	0.119	88.5%
5-Year	0.011	1.087	0.011	0.129	88.1%
25-Year	0.243	2..3	0.243	0.407	84.7%
Regional Storm	0.317	2.918	0.319	0.447	84.7%
100-Year	0.416	3.031	0.416	0.487	83.3%

Table Nos. 12 and 13 compare the allowable release rates to the post-development flow rates discharging to the existing Stormwater Quality Facility No. 2 and to Clythe Creek, respectively.

Table No. 12: Comparison of Allowable and Post-Development Conditions Flows Discharging to Existing Stormwater Quality Facility No. 2

	Allowable Release Rates to Existing SWM Pond	**Post Development Flow Rates to Existing SWM Pond (Catchment B2c)**
2-Year	0.294 m^3/s	0.212 m^3/s
5-Year	0.929 m^3/s	0.679 m^3/s
25-Year	1.689 m^3/s	1.186 m^3/s
100-Year	2.246 m^3/s	1.576 m^3/s

Therefore, the post-development flow rates discharging to the existing stormwater management facility (Stormwater Quality Facility No. 2) are less than the allowable release rates for the full range of design storm events.

Table No. 13: Comparison of Allowable and Post-Development Condition Flows Discharging to the existing Wetland

	Allowable Release Rates to the existing Wetland	Post Development Flow Rates to the existing Wetland
2-Year	0.127 m^3/s	0.126 m^3/s
5-Year	0.772 m^3/s	0.575 m^3/s
25-Year	2.192 m^3/s	1.511 m^3/s
100-Year	3.425 m^3/s	2.535 m^3/s
Regional Storm	0.936 m^3/s	0.934 m^3/s

Therefore, the post-development flow rates discharging to the existing wetland, and ultimately Clythe Creek, have been attenuated to less than the allowable release rates, for the full range of design storm events.

5.2.6 Minor/Major Drainage System

Minor system drainage will be conveyed to the existing and proposed stormwater management facilities via storm sewers with the capacity to convey the 5-year design storm event.

Major design storm flows from the westerly portion of the development will be conveyed to the existing Stormwater Quality Facility No. 2 via the municipal right-of-way and the stormwater conveyance channel. Major design storm flows from the central portion of the development will be conveyed to the proposed stormwater management facility via the municipal right-of-way. Preliminary analysis indicates that the municipal rights-of-way have the capacity to convey the runoff from a major design storm event.

The major design storm drainage patterns expected for the Cityview Ridge Subdivision are shown on Figure 7.

5.2.7 Floodplain Analysis

Cosburn Patterson Wardman Limited, as part of the Eastview Secondary Plan, analyzed the existing floodlines through Hadati Creek and Clythe Creek. As part of the Valleyhaven Subdivision Phase 3, the floodline analysis for Hadati Creek was updated. The floodline analysis for Clythe Creek was later revised by the Grand River Conservation Authority.

With the construction of the proposed stormwater management facility for the Cityview Ridge Subdivision, the flood storage volume for the major design storm event is being provided within the facility for the flows from the developable lands, the floodplain storage volume has been maintained to ensure that the hazard to the public is minimized.

The HEC-RAS modelling has been edited to show the existing condition and post-development floodlines. A comparison to the pre- and post-development floodlines (flow rate, water surface elevation and flood width) through the Clythe Creek floodplain to the CN Railway lands has been included in Appendix ‘E’. The post-development Regional Storm and 100-year Design Storm Event floodlines are shown on Drawing No. 2.

The HEC-RAS analysis is attached in Appendix ‘F’.

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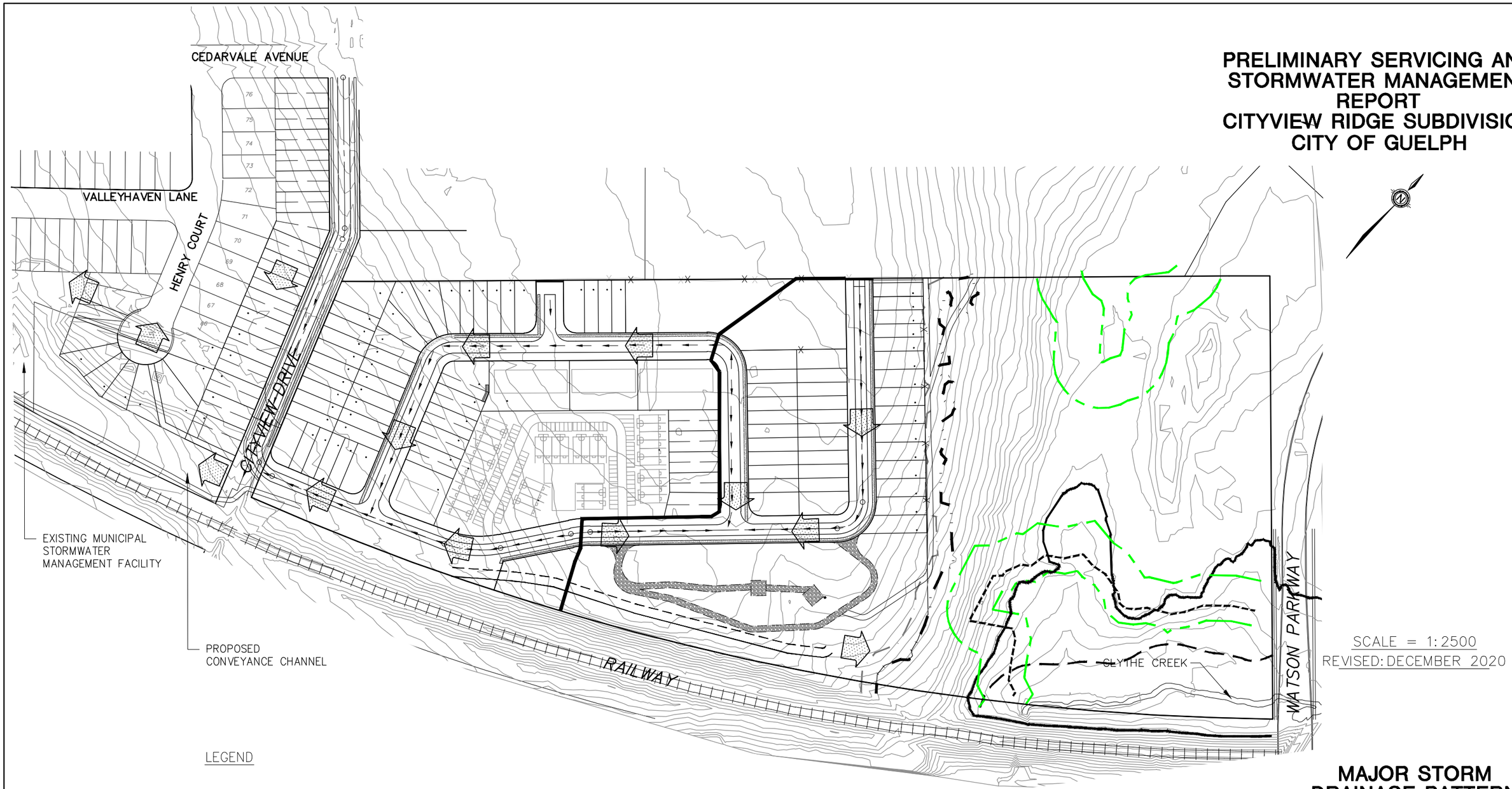
CITYVIEW RIDGE SUBDIVISION
CITY OF GUELPH



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REVISED: DECEMBER 2020

MAJOR STORM DRAINAGE PATTERN

LEGEND

- MAJOR OVERFLOW DISCHARGE ROUTE
- MAJOR INTERNAL OVERFLOW ROUTE
- DRAINAGE AREA DIVIDE
- LIMIT OF CITYVIEW RIDGE SUBDIVISION

Figure No. 7

Gamsby and Mannerow
ENGINEERS

Plotted On: December 10, 2020 105172-FIG7.dwg

6. SEDIMENT AND EROSION CONTROL PLAN

A silt fence will be installed along the property boundary and along the outer edge of buffers to the Natural Heritage System as identified in the Memorandum to the Environmental Impact Study (North-South Environmental Inc. 2021). The silt fence will minimize the opportunity for water borne sediments to be transported from the site. The ecologist and/or the Environmental Inspector will flag the location of the silt fence with the contractor. In accordance with standard City practice, an Environmental Inspector will be retained to monitor the construction activities. The silt fence location is shown on the Preliminary Grading and Drainage Plans (Drawings No. 1, 2 and 3).

Temporary rock check dams will be installed in rear yard swales after the initial grading has been completed to slow the flow rates and promote the settlement of water borne sediments before they reach the silt fences and stormwater management facilities.

Upon completion of the grading, any area not subject to active construction within 30 days will be top soiled and seeded as per OPSS 572.

The proposed stormwater management facility will be rough graded and used as a temporary sediment pond for the central portion of the site during the servicing and house building construction. The storage capacity of this pond exceeds the combined 250 m^3/hectare of active and dead storage required. A heavy-duty silt fence will be placed around the proposed stormwater management facility during construction.

As previously discussed, the southwest corner of the site currently serves as a discharge point for the site. Prior to construction, a temporary sediment pond will be constructed for sediment collection prior to flows discharging from the site to the existing roadside ditch and ultimately Clythe Creek. The design of this temporary sediment pond will be completed at the detailed design stage for the Cityview Ridge Subdivision.

A silt fence will be placed around the outlet structure of the existing stormwater management facility to restrict the movement of sediment. The discharge structure will restrict the release rate and provide extended detention for a minimum 24-hour period.

Once catch basins have been installed, the grates will be wrapped in filter cloth. This feature will be maintained until all building and landscaping has been completed.

Inspection and maintenance of all silt fencing and sediment and erosion controls will start after installation is complete. These features will be inspected on a weekly basis or after a rainfall event of 13 mm or greater. Maintenance will be carried out, within 48 hours, on any part of the controls found to need repair. A full detailed design and monitoring program will be provided in the future Environmental Impact Report.

An Environmental Inspector will submit monthly reports on the conditions of the sediment and erosion control measures to the City of Guelph.

Once construction and landscaping within the limits of the subdivision has been substantially completed (75% house building construction is complete), the silt fence will be removed, any accumulated sediment will be collected and the area will be restored. Upon final inspection by both the Environmental Inspector and City of Guelph, the monthly reporting on the condition of the sediment and erosion control measures will cease.

After construction of the complete development, erosion and sediment transport will be minimal.

7. MAINTENANCE PLAN

A two-phase maintenance plan is recommended. Phase I will address the short-term more intensive maintenance necessary during and immediately after construction. Once all landscaping has been completed, maintenance will shift to Phase II.

As outlined in the section on Sediment and Erosion Control, Phase I will include weekly inspection of all sediment control devices plus “as needed” inspection after any significant rainfall, with all immediate repair of any damaged works and collection of captured sediment. This work will be carried out by the Consultant and/or the Environmental Inspector during the construction of the works. A monthly status report will be prepared and distributed to the City of Guelph.

Phase II will be the maintenance carried out after all construction has been completed. This work will involve a yearly visual inspection of the stormwater management facilities to determine the amount of sediment accumulation. Sediment should be removed as required and the recommended vegetation replanted. This work will be carried out by the Consultant and/or the Environmental Inspector. A monthly status report will be prepared and distributed to the City of Guelph.

8. CONCLUSIONS

From the foregoing analysis, the following conclusions and recommendations are drawn:

1. Water supply for the proposed Cityview Ridge Subdivision will be provided by:
   - the extension of the existing 150 mm diameter watermain on Henry Court,
   - the extension of the existing 200 mm diameter watermain southerly on Cityview Drive,
   - the extension of the existing 150 mm diameter watermain from the existing municipal stormwater management facility to the Cityview Drive right-of-way, and
2. Sanitary service for the Cityview Ridge Subdivision will be provided by:
   - the extension of the existing 200 mm diameter sanitary sewer on Henry Court,
   - the extension of a 200 mm diameter sanitary sewer from the 200 mm diameter sanitary sewer stub in the existing municipal stormwater management facility to the Cityview Drive right-of-way.
3. All storm sewers within the Cityview Ridge Subdivision will be sized to accommodate the 5-year design storm event.
4. The topography of the site will generally allow for sufficient cover on the storm sewer to connect house foundation drains. Where a storm service connection is not possible, foundation drainage will be provided by sump pumps discharging to the grassed side and rear yard surfaces.
5. Quality and quantity control for runoff generated from the westerly portion of the development will be provided by the existing Stormwater Quality Facility No. 2 and the existing Stormwater Quantity Control Facility, constructed as part of the Valleyhaven Subdivision Phase 3.
6. Quality and quantity control for runoff generated from the central portion of the development will be provided by a sediment forebay before entering the proposed stormwater management facility, prior to discharge to the existing wetland and ultimately Clythe Creek.
7. Following the installation of rear yard infiltration galleries in many of the lots, the recharge volume under post-development conditions is 19% lower than under existing conditions. If not for saturated ground conditions near Lots 1-11, and poor infiltration rates for Lots 80-106 and Blocks 114 and 115. The post-development recharge deficit may have been brought to 4%.
8. The floodplain storage volume has been maintained under post-development conditions to ensure that the hazard to the public is minimized.
9. The stormwater management systems meet the current Provincial and Municipal guidelines.
10. During the construction phase, the proposed stormwater management facility will be used as part of the erosion and sediment control plan. This in conjunction, with the other erosion control measures, will minimize the transport of sediment off-site during the construction period.

11. Tree protection measures to be undertaken are as follows,
    - Protective fencing should be installed prior to any grading or site clearing and should remain in place until all site work has been completed. Wherever possible fencing should be installed at the drip-line plus 1 m from the canopy edge of retained trees.
    - Proper root pruning should be undertaken when and if roots of retained trees are exposed by construction activities. Exposed roots should be covered with soil or mulch to the extent possible, as soon as possible following damage to prevent further damage and desiccation.
    - Trees to be retained should be monitored and reported on as part of the regular environmental inspections undertaken throughout the construction period.
    - In the instance construction activities are taking place in close proximity to the drip-line of trees (e.g., the installation of the stormwater dissipation/dispersion structure) smaller machinery is recommended in order to minimize soil compaction and reduce the construction envelope required.
    - Within the area proposed for tree retention there should be no:
        - grade changes;
        - dumping, stockpiling or storage of any materials;
        - parking or storage of any machinery or equipment;
        - disposal of waste, garbage, brush or stumps or any burning of materials or disposal of ashes; or
        - use of any machinery without prior approval from the City.
    - Monitor trees along the northern property line for potential impact
12. It is recommended that if access for construction is required down-slope of the dissipation/dispersion structure, that only small machinery (e.g., bobcat or similar) be used to minimize the potential for encroachment in the buffer.
13. A heavy-duty (Type 2) silt fence be installed during the construction of the energy dissipation/dispersion structure.
14. It is recommended that construction of the retaining wall behind lots 65-79, and the stormwater dissipation/dispersion structure, be undertaken outside of the breeding season (mid May to mid July) to reduce the possibility of impacts to locally significant bird species. If this is not possible, a field investigation to determine if any locally significant bird species are breeding near the proposed construction should be undertaken to determine if construction should proceed.

All of which is respectfully submitted.

GM BLUEPLAN ENGINEERING LIMITED
Per:

Angela Kroetsch, P.Eng.
AK/pg
Encl.
W:\Guelph\105-2005\105172\Documents\Reports, Manuals, Contracts\105172 SWM Design Report_Revised Aug 2021 - 2021-08-30.docx

APPENDIX A:

GEOTECHNICAL INVESTIGATION
NAYLOR ENGINEERING ASSOCIATES LTD.
(FEBRUARY 2012)

105172

GEOTECHNICAL INVESTIGATION
P.T. VALERIOTE SUBDIVISION
CITYVIEW DRIVE
GUELPH, ONTARIO
for
CARSON REID HOMES LTD.

0353G4.R01_Rev.
February 2012

DISTRIBUTION:
1ec: Client
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1cc: File

0353G4.R01_Rev.

February 17, 2012

Carson Reid Homes Ltd.
183 Dufferin Street
Guelph, Ontario
N1H 4B3

Attention: Mr. Carson Reid

Dear Sir:

Re: Geotechnical Investigation
P.T. Valeriote Subdivision
Cityview Drive
Guelph, Ontario

Naylor Engineering Associates Ltd. is pleased to submit this ***revised*** report for the geotechnical investigation recently completed for the above-referenced development site.

This report outlines the investigation procedures and provides a summary of the subsurface conditions encountered. Geotechnical comments and recommendations are provided for slope stability assessment, site grading, site servicing, pavement design, house foundations, industrial/commercial building foundations, stormwater infiltration, and stormwater management ponds design.

We trust that this report is suitable for your present requirements and we thank Carson Reid Homes Ltd. and Gamsby & Mannerow Limited for this opportunity to have been of service. If you have any questions or require any further geotechnical consultation, please do not hesitate to contact our office.

Yours very truly,

Dave S. Naylor, P.Eng.
Senior Consulting Engineer

TABLE OF CONTENTS

1. Introduction

Naylor Engineering Associates Ltd. was retained by Carson Reid Homes Ltd. to carry out a geotechnical investigation for a proposed residential subdivision on Cityview Drive in Guelph, Ontario, as shown on the appended Location Plan, Drawing 1. This work was authorized by Mr. Carson Reid of Carson Reid Homes Ltd. on July 13, 2006, following submission of a detailed proposal.

The project involves the residential development of a 17.682 ha property. The proposed residential subdivision will contain about 150 lots with full municipal services. An apartment block is proposed for the northeast corner of the property. A stormwater management pond is proposed at the south central area of the property.

The purpose of this investigation was to determine the subsurface soil and groundwater conditions and, based on that information, prepare this engineering report with geotechnical recommendations pertaining to slope stability, site grading, site servicing, pavement design, house foundations, industrial/commercial foundation design, stormwater infiltration and stormwater management pond design. The report does not address site environmental or hydrogeological issues.

2. Investigation Procedure

2.1 Field Program

The fieldwork for this investigation was carried out between July 31 and August 2, 2006 and involved the drilling of ten boreholes (Boreholes 101 through 110) to depths of 5.6 to 11.1 m at the locations shown on the appended Site Plan, Drawing 2. Twenty topsoil thickness holes were dug to measure the topsoil thickness. Approximate topsoil thickness hole locations are also shown on Drawing 2.

The boreholes were advanced with a CME-75 track-mounted drillrig equipped with continuous flight solid stem augers, supplied and operated by a specialist drilling contractor. Soil samples were recovered from the boreholes at regular 0.75 and 1.50 m depth intervals using a 50 mm O.D. split spoon sampler in accordance with the Standard Penetration Test (SPT) procedure. The SPT N-values recorded are plotted on the appended borehole logs.

Monitoring wells were installed in all of the boreholes to allow measurement of the stabilized groundwater levels. These installations comprised 50 mm diameter PVC pipes with slotted filters, as well as betonite seals. At Boreholes 103, 104, 105, 106, and 107, a shallow 19 mm diameter CPVC pipe was also installed to determine the vertical hydraulic gradient. Groundwater levels were measured in the standpipes and monitoring wells on August 8, 2006 by Naylor Engineering Associates Ltd. Details of installations and groundwater measurements are provided on the appended borehole logs.

All standpipes and monitoring wells were installed by licensed well technicians in accordance with Ontario Regulation 903. A well tag was attached to the standpipe at Borehole 011. The standpipes must be properly decommissioned by a licensed well technician within six months of last use, and certainly before construction begins.

The fieldwork was supervised throughout by a member of our engineering staff who directed the drilling and sampling procedures; conducted SPT testing; documented the soil stratigraphies, and cared for the recovered soil samples.

The borehole locations and ground surface elevations were surveyed by Gamsby & Mannerow Limited and the data was supplied to us in AutoCAD format. It is understood that the elevations are related to a geodetic datum.

2.2 Laboratory Testing

All soil samples secured during this investigation were returned to our laboratory for moisture content tests; the results of which are plotted on the borehole logs. Geotechnical laboratory tests carried out on selected samples of the major subsurface soils from the investigation comprised three particle size distribution test with results presented on Figure 1, and two standard Proctor moisture-density tests with results plotted on Figures 2 and 3.

The soil samples will be stored for a period of four months (December 2006) from the date of sampling. After this time, they will be discarded unless prior arrangements have been made for longer storage.

3. Site Conditions

3.1 Site Description

The subject development is approximately 17.682 ha and is located in the northeast area of Guelph, Ontario. For the purpose of this report it was assumed Watson Parkway runs north-south adjacent to the east side of the property. The property is bordered on the north by a vacant field, on the south by a Canadian National Railway Line, on the east by Watson Parkway, and on the west by existing residential development.

The property is split in two pieces: with the proposed residential development on the west side of the property and a proposed apartment block on the east side. From the low-lying lands in the east part of the property area, the grade slopes up about 20 m to the higher lands in the west section.

The residential property is moderately sloped. A hill runs north-south and divides the residential property into east and west sloping sides. The residential property is vegetated with mostly tall grass and some medium sized deciduous trees.

The proposed apartment block is relatively level and is at the northeast corner of the property. The apartment block is densely vegetated with spruce trees. The topographic relief for this part of the property is less than 1 m.

3.2 Subsurface Soil Conditions

We refer to the appended borehole logs for detailed soil descriptions and stratigraphies, SPT N-values, moisture content profiles, details of standpipe installations, and groundwater observations and measurements.

The subsurface stratigraphy at the site generally comprises topsoil overlying silt till in the proposed residential area. At the proposed apartment block at the northeast corner of the property, the subsurface stratigraphy generally comprises topsoil overlying sand and gravel. Descriptions of the various soil deposits and the groundwater conditions encountered are provided in the following subsections.

3.2.1 Topsoil

Topsoil was contacted surficially throughout the property. The topsoil is typically 200 to 350 mm thick in the proposed residential area, and 400 mm thick in the low lying land. The topsoil generally comprises dark brown silt. The average topsoil thickness in the residential lands and commercial lands are 250 mm and 300 mm, respectively.

3.2.2 Sand and Gravel

Sand and gravel was encountered in the low lying area at the northeast corner of the site (Boreholes 109 and 110). The sand and gravel continues below the termination depths of the boreholes. This deposit consists of sand and gravel with some silt; and there were frequent cobbles and boulders in the soil matrix. A particle size distribution analysis performed on one sample of the sand and gravel indicated the sample contained 44% gravel, 41% sand, and 15% silt (see Figure 1).

Typically, the sand and gravel is very dense based on SPT N-values of greater than 50 blows per 300 mm penetration of the split-spoon sampler. The moisture content of the sand and gravel is typically about 5% above the water table, and between 8 and 12% in saturated conditions.

3.2.3 Silt Till

Silt till was encountered in all boreholes located in the proposed residential area. The silt till continues below the termination depths of the boreholes in which it was encountered. In Boreholes 102 and 105, possible weathered bedrock was encountered at borehole termination depth. This deposit ranges in composition from sandy silt with some gravel and cobbles, to silt with some clay sand and gravel. Particle size distribution analyses performed on two samples of the silt till indicated the samples contained 5% to 11% gravel, 41% sand, 36 to 44% silt, and 10 to 11% clay (see Figure 1).

Typically, within 2 m of the ground surface, the silt till is loose to compact based on SPT N-values of 5 to 25 blows per 300 mm. Below this upper portion, the silt till is dense to very dense based on SPT N-values from 30 to greater than 50 blows per 300 mm.

The moisture content of the silt till is typically between 8 and 12%. Two standard Proctor moisture-density tests performed on samples of the silt till from Boreholes 105 and 106 indicated maximum dry densities of 2.065 t/m^3 and 2.185 t/m^3 and optimum moistures of 9.0% and 8.7% (see Figures 2 and 3).

3.3 Groundwater

Groundwater was encountered in saturated seams within the silt till, and under water table (unconfined) conditions in the sand and gravel deposit. The stabilized levels were between Elevation 321.0 m (Borehole 110) to 344.5 m (Borehole 107).

Within the apartment block at the northeast corner, the horizontal gradient of the groundwater in the sand and gravel is from north to south towards Clythe Creek. Within the remainder of the residential area, the variable groundwater levels in seams within the silt till generally follow the topography.

4. Discussion and Recommendations

The project involves the residential development of an approximately 17.682 ha property. The proposed subdivision will be provided with full municipal services. It is assumed that on-site stormwater management controls will be required for the apartment block abutting Watson Parkway North. A portion of the lands on the west half of the site will drain to an existing stormwater management facility located to the west of Cityview Drive.

The subsurface stratigraphy at the site generally comprises topsoil overlying silt till in the proposed residential area, and topsoil overlying sand and gravel in the apartment block. Groundwater is contained in thin seams within the silt till at variable depths, and in the sand and gravel at about 3 to 4 m depth.

The following sections of this report provide geotechnical recommendations for the construction of the subdivision including slope stability assessment, site grading, site servicing, pavement design, house foundations, apartment building foundations, stormwater infiltration and stormwater management pond design.

4.1 Site Grading

At the time of the report preparation, grading plans were not available for review; however, we would anticipate area grading of the property to prepare the land for construction of the proposed residential subdivision. In general, material may be cut from the high areas to raise grades in lower areas of the site.

Prior to carrying out any area grading of the site, the surficial topsoil should be removed from cuts and critical fill areas. In calculating the approximate quantity of topsoil to be stripped, we note that the average thickness of topsoil contacted in the boreholes is about 300 mm for the residential lands and 300 mm for the commercial/industrial lands. We recommend that the topsoil thickness be increased by 50 mm for volume calculations to account for variations, and some stripping of the mineral soil below. The topsoil material could be used for landscaping fill to raise grades in the rear yards of the house lots or in park areas.

Following stripping of topsoil, the exposed subgrade should be inspected by Naylor Engineering Associates Ltd. Fill should be placed in maximum 300 mm thick lifts and compacted to the following minimum percentages of standard Proctor maximum dry density (SPMDD):

Fill Use	Minimum Compaction Required
Structural fill to support residential houses	98% SPMDD
Structural fill to support commercial/industrial buildings	100% SPMDD
Subgrade fill beneath streets	95% SPMDD
Bulk fill in landscaped areas	90% SPMDD

The major soil likely to be generated from the cut areas of the residential lands is silt till. The moisture content of the silt till generally ranges between 8 and 12%, and the optimum moisture for compaction is about 9% (see Figures 2 and 3). The silt till will have to be allowed to dry before it can be used as structural fill, and therefore we recommend that any structural filling be carried out in the drier summer months.

The structural fill should extend at least 1.0 m beyond the footing edge of any building and down to the subgrade level at a slope of 45° to the horizontal. A typical detail for structural fill placement beneath house foundations is shown on Drawing 5, appended.

The major soil likely to be generated from the apartment block side of the site is sand and gravel and this material will be well-suited for compaction.

Full-time inspection by experienced geotechnical personnel should be carried out during fill placement and compaction to examine and approve potential sources of fill material, and to carefully monitor the placement and verify the compaction by insitu density testing.

4.2 Site Servicing

Following the site grading operations, the property will be serviced to provide the individual lots and blocks with full municipal services. It is anticipated that the invert levels for the watermains and sewers will be at conventional depths, some 2 to 4 m below finished grade.

Temporary excavations to conventional depths for installation of underground pipes at this site should comply with Regulation 213/91 (Construction Projects) under the Ontario Occupational Health and Safety Act. The predominant soils encountered in the test holes would be classified as Type 2 soils, and temporary side slopes should be cut near vertical in the bottom 1.2 m and then trimmed back to an inclination of maximum 1 horizontal to 1 vertical.

No major groundwater problems are envisaged for excavations at this site. In general, low to moderate rates of seepage are to be expected from the silt till. It is expected that the groundwater inflow can be handled using conventional sump pumping techniques.

The subgrade soils beneath the watermain and sewer pipes will comprise native mineral soils or compacted fill placed during the site grading operations. No bearing problems are anticipated for flexible or rigid pipes founded in the native deposits or compacted on-site soils. The bedding should be placed in accordance with Ontario Provincial Standard Drawings (OPSD 802.030 and 802.033).

Pipe bedding for water and sewer services should be conventional Class 'B' pipe bedding comprising a minimum 150 mm thick layer of OPSS Granular 'A' aggregate below the pipe invert. The bedding course may be thickened if portions of the subgrade become unduly wet during excavation. Granular 'A' type aggregate should be provided around the pipe to at least 300 mm above the pipe. The bedding aggregate should be compacted to a minimum 98% SPMDD.

The trenches above the specified pipe bedding should be backfilled with inorganic on-site soils placed in 300 mm thick lifts and compacted to at least 95% SPMDD. Based on the results of insitu moisture content and standard Proctor moisture-density tests carried out on the native overburden deposits, the majority of the on-site excavated materials will be compactable to the required 95% SPMDD. The silt till soil may require some drying prior to re-use as trench backfill.

To minimize potential problems, backfilling operations should follow closely after excavation so that only a minimal length of trench is exposed. Care should be taken to protect side slopes of excavations by diverting surface run-off away from the excavations. If construction extends into the winter, then the backfilling operations should be planned so that exposure of the backfill material to frost is kept to a minimum and to ensure that frozen material is not used as backfill.

Excavations for the installation of sewers across the apartment block may extend into saturated sand and gravel deposits. The hydraulic conductivity of the granular soil is estimated to be in the order of 10^{-5} m/s based on the gradation analysis. Moderate to significant groundwater inflow through the granular soil is expected where the excavations extend below an elevation of 320.4 m. It is believed that the groundwater inflow can be controlled with high capacity pumps and perimeter interceptor ditches. In order to facilitate sewer installation more than 0.6 m below the stabilized groundwater table, a dewatering system installed by a specialist dewatering contractor may be required to lower groundwater level prior to excavation.

Frequent inspection and compaction testing by experienced geotechnical personnel should be carried out to examine and approve backfill materials, and to verify that the specified degree of compaction has been achieved.

4.3 Pavement Design

A number of local residential streets are planned for the residential subdivision. Following site grading and installation of services, the pavement subgrade will comprise predominantly recompacted excavated silt tilt soils. The following pavement component thicknesses are recommended based on the proposed pavement usage, and the frost-susceptibility and strength of the subgrade soils:

Pavement Component	Local Streets
Asphaltic Concrete	90 mm
Granular 'A' Base Course	150 mm
Granular 'B' Subbase Course	450 mm

The pavement subgrade materials should be thoroughly proof-rolled under supervision of a geotechnical engineer prior to placement of the Granular 'B' subbase course. If any unstable areas are noted, then the Granular 'B' thickness may need to be increased to support pavement construction traffic. This should be left as a field decision at the time of construction, but it is recommended that these materials be carried as a provisional item under the construction contract.

Samples of both the Granular 'A' and Granular 'B' aggregates should be checked for conformance to OPSS 1010 prior to utilization on site and during construction. The Granular 'B' subbase and Granular 'A' base courses must be compacted to 100% SPMDD, as verified by insitu density testing.

The asphaltic concrete should comprise a binder layer of HL4 and a surface layer of HL3. It is recommended that the compacted thickness be 55 mm of HL4 binder and 35 mm of HL3 surface for the local streets. The purpose of the thicker HL4 layer is to support construction traffic during the time period before the HL3 is placed.

The asphaltic concrete paving materials should conform to the requirements of OPSS 1150. The asphalt should be placed in accordance with OPSS 310 and compacted to within the range of 92.0 to 97.5% of the plant produced Maximum Relative Density (MRD) value. The Performance Graded Asphalt Cement designation for the asphaltic concrete is 58-28.

The silt till subgrade soils has poor natural drainage and therefore continuous pavement subdrains are recommended. A typical detail of a pavement subdrain is provided in Drawing 4, appended.

The concrete for sidewalks, and curb and gutter should be proportioned, mixed, placed, and cured in accordance with the requirements of OPSS 351, 353, and 1350, and shall meet the following specific requirements:

- minimum 28-day compressive strength = 32 MPa
- slump = maximum 80 mm
- air entrainment = 6.5% ± 1.5%

During cold weather, the freshly placed concrete must be covered with insulating blankets to protect against freezing. Three cylinders from each day's pour should be taken for compressive strength testing. Air entrainment, temperature, and slump tests should be made from the same batch of concrete from which test cylinders are made.

The subgrade for the sidewalks should comprise undisturbed native mineral soil or well-compacted fill. A minimum 150 mm thick layer of compacted Granular 'A' type aggregate should be placed beneath the sidewalk slabs.

4.4 House Foundations

The undisturbed native mineral soil deposits underlying this site are considered suitable to support residential house foundations. Where the footing levels will be above the existing native mineral soil grade, structural fill will be utilized. The native soil or properly compacted structural fill will be suitable to support house footings proportioned to the minimum sizes provided in Part 9 of the Ontario Building Code.

All founding surfaces for residential dwellings on structural fill or native soils should be inspected by Naylor Engineering Associates Ltd. personnel prior to placing concrete. The purpose of the inspection is to ensure that the subgrade soils are capable of supporting the house foundations, and to confirm that the house envelope does not extend beyond the limits of the structural fill pad.

The subgrade soils are considered to be frost susceptible and must be protected from freezing at all times including during construction. The exterior footings, or footings in unheated areas, should be provided with a minimum 1.20 m of earth cover upon final grading for frost protection.

House basements at this site must be provided with perimeter weeping tile systems as per the Ontario Building Code. The drain tile or pipe should be laid on undisturbed or well-compacted soil so that the top of the tile or pipe is below the bottom of the basement floor slab. The weeping tile must drain to a suitable frost-free outlet or sump as per City of Guelph requirements. We recommend that the bedding for the tiles comprise concrete sand.

4.5 Stormwater Management

At the time of the report preparation, no design details of the SWM pond were available for review. In general, the silty soils at the site will not allow stormwater infiltration; however, the SWM pond will be suitable for storage and siltation control. The sand and gravel deposit on the east side of the property would allow stormwater infiltration.

It is anticipated that berms will be required to create the SWM pond. The berms should be constructed using the on-site silt till. The berm fill should be placed in thin lifts and compacted to at least 95% SPMDD.

The SWM pond berms should be sloped at 3 horizontal to 1 vertical, or flatter, and should be re-topsoiled and vegetated as soon as possible.

It is anticipated at-source dry well infiltration may be considered for the subdivision. The soils in the proposed residential area have a high silt content and are not suitable for at-source drywell infiltration. In the proposed apartment block, the sand and gravel deposits may be used for at-source infiltration. Based on particle size distribution analyses, we estimate that the hydraulic conductivity of the native sand and gravel is in the order of 10^{-5} m/s. We recommend that an infiltration rate of 15 mm/hr be assumed for sizing the dry wells. All drywell subgrades should be inspected by Naylor Engineering Associates Ltd. to confirm the conditions are suitable for infiltration.

4.6 Apartment Buildings

At the time of the report preparation, no building locations for the apartment blocks were available. We recommend further investigation when this information is available to determine subsurface condition details for foundations and services.

All organics and other deleterious materials should be removed from beneath the footprint of the proposed building(s) and new pavement areas.

Following removal of unsuitable material, the exposed subgrade should be inspected by a geotechnical engineer. Any soft or unstable areas should be subexcavated. The native subgrade soil will comprise sand and gravel and will be contacted below the topsoil.

The undisturbed native mineral soils are considered suitable to support conventional building foundations. If the footing levels will be above the existing native mineral soils, then structural fill should be placed as noted in Section 4.1. Building foundations constructed on the native mineral soil or approved structural fill may be proportioned for a nominal net allowable bearing pressure of 200 kPa.

All founding surfaces for buildings on structural fill or native soils should be inspected by Naylor Engineering Associates Ltd. personnel prior to placing concrete. The purpose of the inspection is to ensure that the subgrade soils are capable of supporting the foundations, and to confirm that the building envelope does not extend beyond the limits of the structural fill pad.

The subgrade soils are considered to be frost susceptible and must be protected from freezing at all times including during construction. The exterior footings or footings in unheated areas should be provided with a minimum 1.20 m of earth cover upon final grading for frost protection.

4.7 Slope Stability Assessment

In order to analyze the stability of the existing slope, Boreholes 104 to 106 were advanced near the top of slope. A slope profile at the steepest location is shown on Drawing 2. The information was then used for computer analyses of the slope stability using the Slope/W Program (Mortgenstern-Price Method). The results of the analyses are shown on Drawing 3.

The soil parameters used in the analyses have been estimated based on the results of the field and laboratory testing and are as follows:

Soil Material	Unit Weight (kN/m^3)	Angle of Internal Friction	Cohesion (kPa)
Silt Till	22	32°	20

The slope stability analyses were carried out for a number of potential failure types. The various failures analyzed included shallow slumping type failure of the slope surface, medium depth rotational failures in the silt till, and deep rotational failures through the entire height of the slope.

In order to determine an appropriate development setback from the top of slope, a minimum factor of safety of 1.50 was used as per Grand River Conservation Authority policy. The steepest slope profile was used for the analyses to determine the setback required to achieve this factor of safety. The setback is typically determined based on the point at which the failure slipcircle (for factor of safety of 1.50) intersects the tableland of the crest of the slope; however, the analyses revealed that the slope has a factor of safety of greater than 1.50. The analysis reveals that the slope has a factor of safety of 2.75 which is well above the Grand River Conservation Authority minimum slope factor of safety.

Toe erosion at the wetland at the bottom of the slope is expected to be minor. A nominal 100 year erosion setback of 1 m is recommended.

A 6 m erosion access allowance is recommended for slopes by the Ministry of Natural Resources. The erosion access allowance is the setback needed to ensure enough space is available for workers and vehicles to access the area.

In conclusion, the primary causes of potential instability for the slope embankment would be development and loading directly at the crest, and general surface erosion caused by run-off from the site. To ensure no loading at the crest (from buildings, pools, fill, etc.) and to compensate for possible long-term erosion, the following setbacks from the top of slope are recommended:

Cross-Section	Stability Setback for Factor of Safety of 1.50 (m)	100 year Erosion Setback (m)	Erosion Access Allowance Setback (m)	Total Development Setback from Top of Slope (m)
A-A'	0	1	6	7

The estimated top of slope and 'total development setback' lines are shown on Drawing 2, appended.

Surface run-off must be directed away from the slope crest if possible. No fill should be placed at the crest of the slope or over the face of the existing slope unless the fill placement is engineered. No excavation work should be carried out on the slope or at the bottom of the slope.

This investigation was conducted to determine geotechnical parameters for the construction of the proposed residential subdivision and apartment block on Cityview Drive in Guelph, Ontario. The recommendations in this report are based on subsurface conditions encountered at specific borehole locations, and conditions between the boreholes will vary. Should conditions be encountered which differ materially from those at the borehole locations, we ask that we be notified immediately in order to assess the additional information and its effects on our conclusions.

Respectfully submitted,

LICENSED PROFESSIONAL ENGINEER
D. S. NAYLOR
33646761
2012-02-17
PROVINCE OF ONTARIO

Neal Morris, B.Sc. (Eng)

Dave S. Naylor, P.Eng.
Senior Consulting Engineer

jb/jmp

LIST OF ABBREVIATIONS

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

Sample Types		Soil Tests and Properties	
AS	auger sample	SPT	Standard Penetration Test
CS	chunk sample	UC	unconfined compression
RC	rock core	FV	field vane test
SS	split spoon	ø	angle of internal friction
TW	thin-walled, open	γ	unit weight
WS	wash sample	w_p	plastic limit
		w	water content
		w_l	liquid limit
		I_L	liquidity index
		I_p	plasticity index
		PP	pocket penetrometer

Penetration Resistances

Dynamic Penetration Resistance	The number of blows by a 63.5 kg (140 lb.) hammer dropped 0.76 m (30 in.) required to drive a 50 mm (2 in.) diameter 60 ° cone a distance 0.30 m (12 in.). The cone is attached to 'A' size drill rods and casing is not used.
Standard Penetration Resistance, N (ASTM D1586)	The number of blows by a 63.5 kg (140 lb.) hammer dropped 0.76 m (30 in.) required to drive a standard split spoon sampler 0.30 m (12 in.)
WH	sampler advanced by static weight of hammer
PH	sampler advanced by hydraulic pressure
PM	sampler advanced by manual pressure

Soil Description

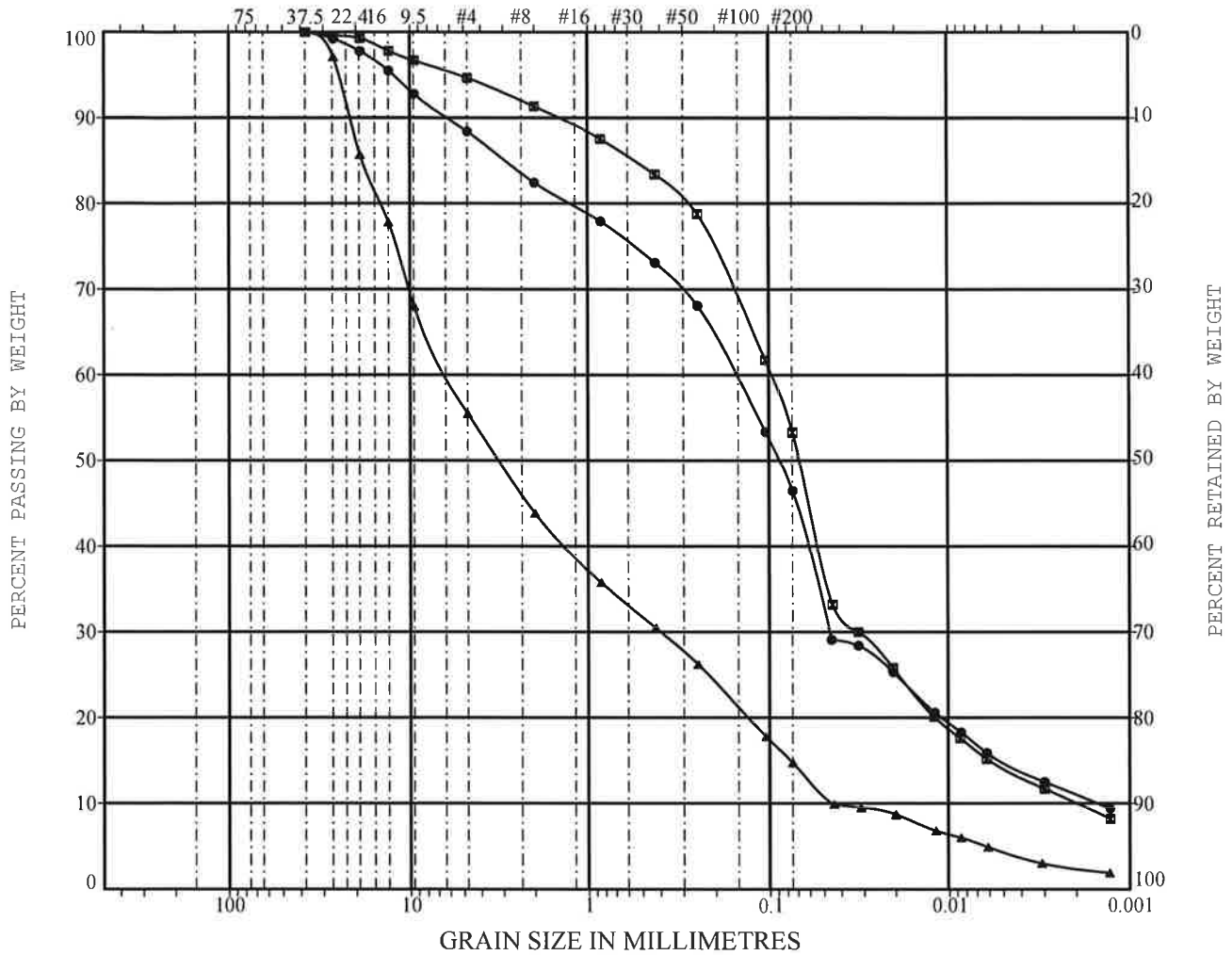
Cohesionless Soils	**SPT 'N' Value**	**D_r (%)**
Relative Density (D_r)	(blows per 0.30 m)	
Very Loose	0 to 4	0 to 20
Loose	4 to 10	20 to 40
Compact	10 to 30	40 to 60
Dense	30 to 50	60 to 80
Very Dense	over 50	80 to 100

Cohesive Soils	Undrained Shear Strength (C_u)	
Consistency	**kPa**	**psf**
Very Soft	less than 12	less than 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1000
Stiff	50 to 100	1000 to 2000
Very Stiff	100 to 200	2000 to 4000
Hard	over 200	over 4000

DTPL	Drier than plastic limit
APL	About plastic limit
WTPL	Wetter than plastic limit

UNIFIED SOIL CLASSIFICATION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN MILLIMETRES			U.S. STANDARD SIEVE No.			HYDROMETER



PROJECT P.T. Valeriote Subdivision

LOCATION Cityview Drive, Guelph, Ontario JOB NO. 0353G4

CURVE ID	BOREHOLE/ TEST PIT	SAMPLE NO.	DEPTH (m)	SOIL DESCRIPTION
●	BH101	BS	1.85-3.05	SILT TILL: SILT and SAND, some Gravel, trace Clay
⊠	BH105	BS	1.22-2.13	SILT TILL: SAND and SILT, trace Gravel and Clay
▲	BH110	Sa2	5.00-6.50	SAND AND GRAVEL, some Silt

REMARKS

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Figure No. 1

FIGURE NO. 2

Naylor Engineering Associates
CONSULTING ENGINEERS

LABORATORY PROCTOR MOISTURE-DENSITY TEST

PROJECT P.T. Valeriote Subdivision

LOCATION Cityview Drive, Guelph, Ontario JOB NO. 0353G4

BOREHOLE NO. BH105 DATE TESTED August 21, 2006

SAMPLE DEPTH 1.22 – 2.13 TESTED BY WF

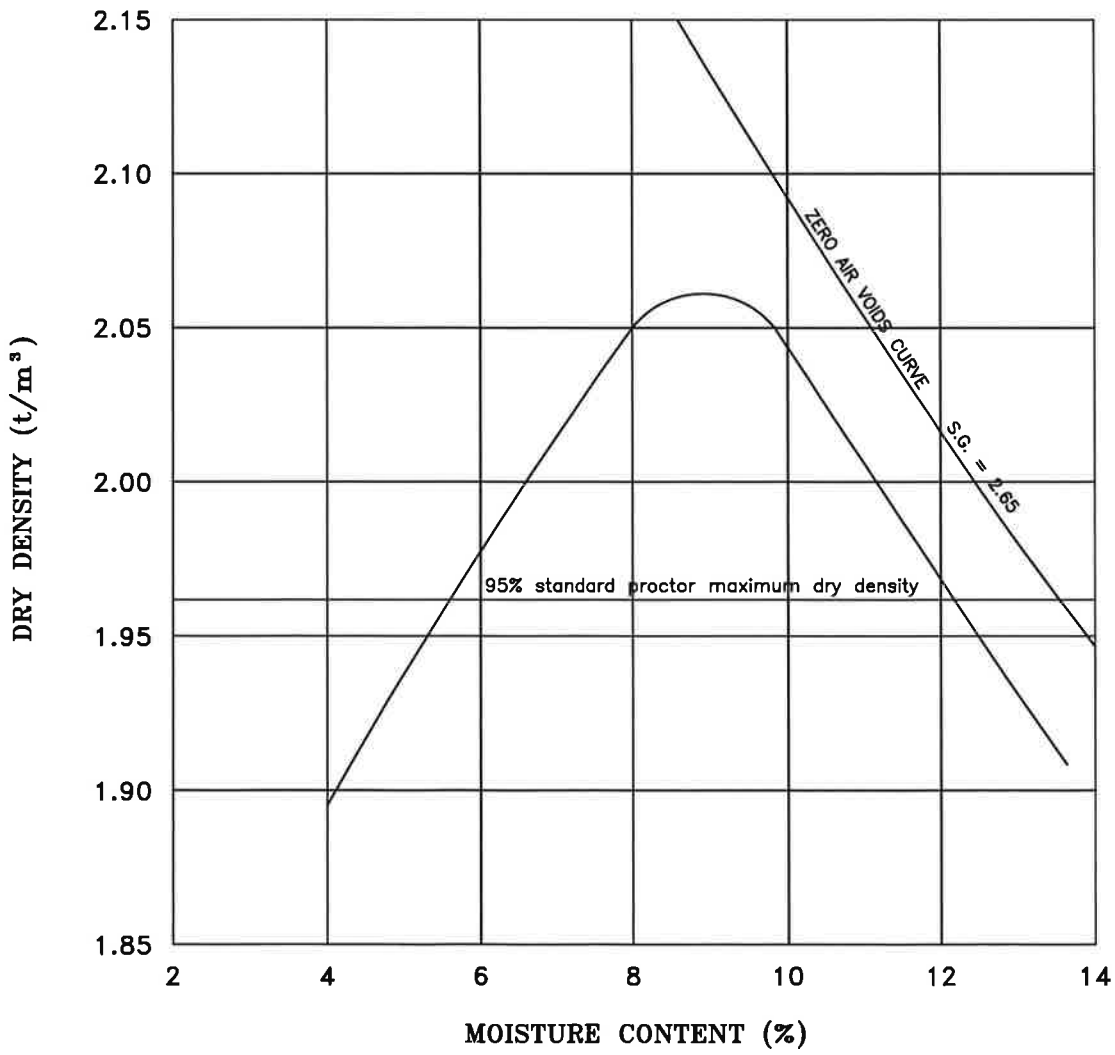
SOIL TYPE SILT TILL MOISTURE CONTENT 14.9%

REMARKS

STANDARD PROCTOR – ASTM D698-91
METHOD – A ☑ B ☐ C ☐ D ☐
MODIFIED PROCTOR – ASTM D1557-91
METHOD – A ☐ B ☐ C ☐ D ☐

MAXIMUM DRY DENSITY 2.065 t/m³

OPTIMUM MOISTURE 9.0%



F:\0353\0353G4\0353G4_Figure 1.dwg
August 25, 2006 (GRL)

FIGURE NO. 3

Naylor Engineering Associates
CONSULTING ENGINEERS

LABORATORY PROCTOR MOISTURE-DENSITY TEST

PROJECT P.T. Valeriote Subdivision

LOCATION Cityview Drive, Guelph, Ontario JOB NO. 0353G4

BOREHOLE NO. BH106 DATE TESTED August 21, 2006

SAMPLE DEPTH 1.52 - 3.05m TESTED BY KJ

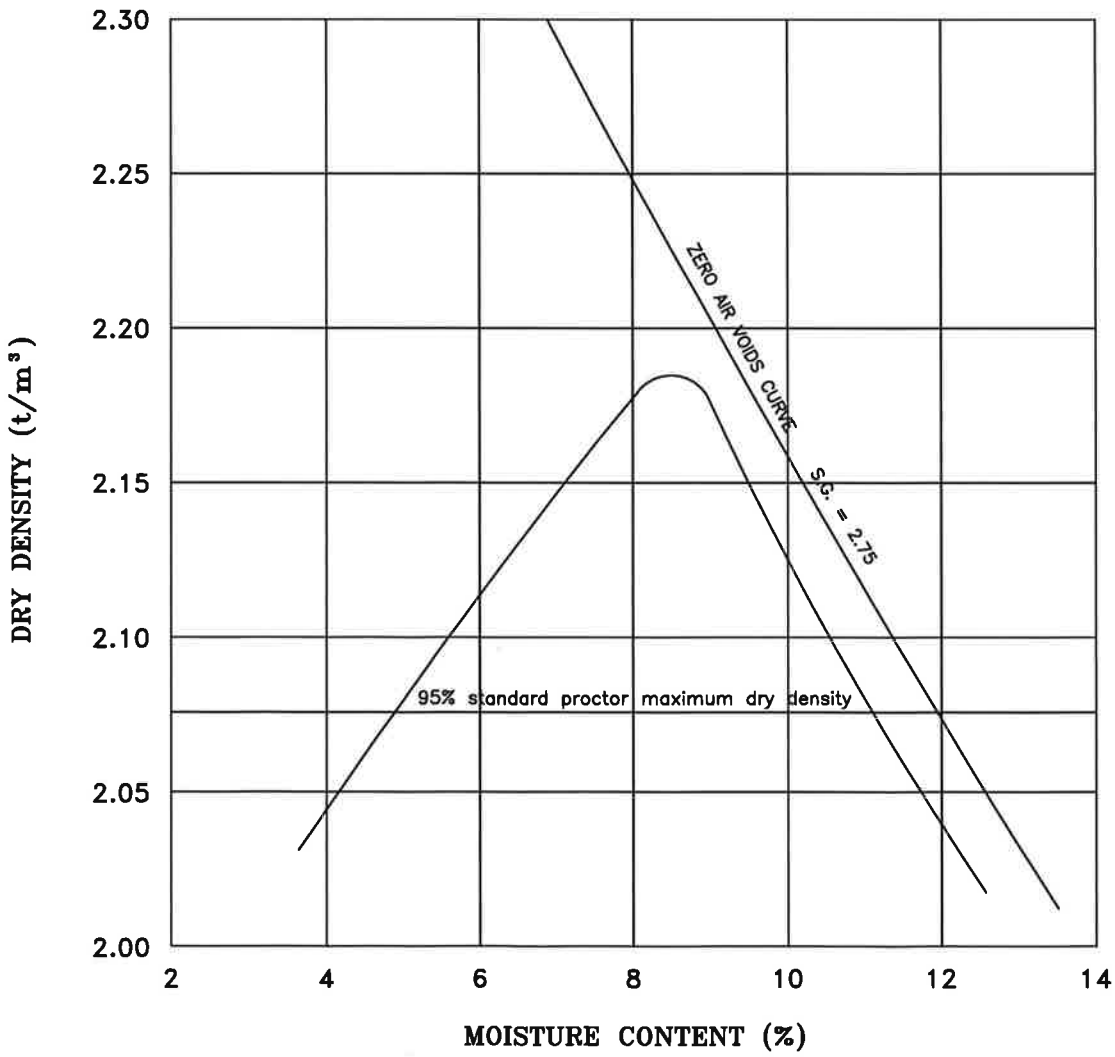
SOIL TYPE SILT TILL MOISTURE CONTENT 8.7%

REMARKS

STANDARD PROCTOR - ASTM D698-91
METHOD - A ☐ B ☐ C ☑ D ☐
MODIFIED PROCTOR - ASTM D1557-91
METHOD - A ☐ B ☐ C ☐ D ☐

MAXIMUM DRY DENSITY 2.185 t/m³

OPTIMUM MOISTURE 8.7%



F:\0353\0353G4\0353G4_Figure 2.dwg
August 28, 2006 (GRL)

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 101

Ground Elevation: *338.61 m*

Project: *P.T. Valeriote Subdivision*

Job No.: *0353G4*

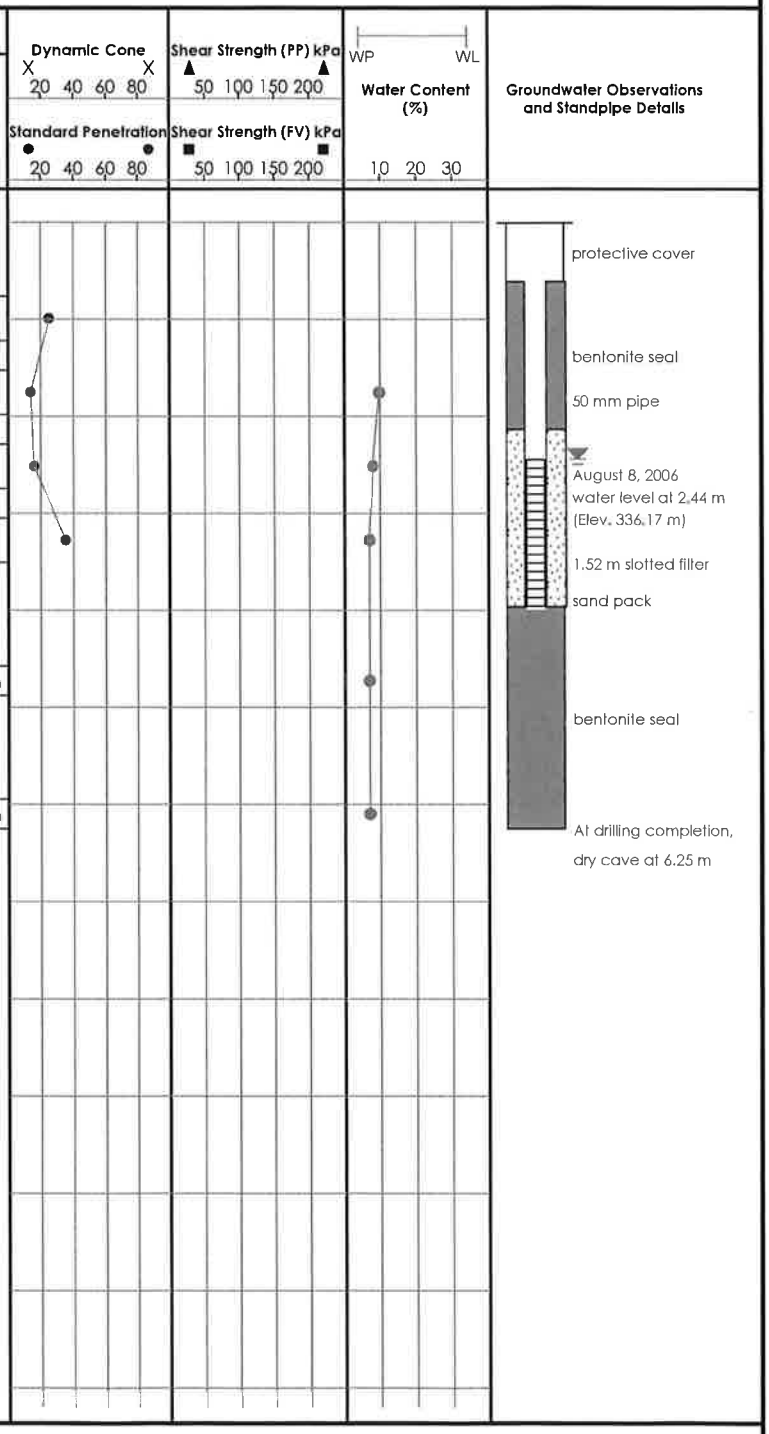
Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *August 2, 2006*

Depth (m)	Description	Symbol	Elevation (m)
0.00	Ground Elevation		338.61
	TOPSOIL: dark brown silt, moist		
1.00	***SILT TILL:*** compact brown sandy silt, some gravel, moist		338.00
2.00	very moist		337.00
3.00	dense to very dense, moist		336.00
4.00			335.00
5.00			334.00
6.00			333.00
	Borehole terminated at 6.25 m		332.00
7.00			331.00
8.00			330.00
9.00			329.00
10.00			328.00
11.00			327.00
12.00			

SAMPLE

Number	Type	N-Value
1	SS	25
2	SS	14
3	SS	16
4	SS	35
5	SS	45\150mm
6	SS	50\150mm



Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes: *Bulk sample taken from 1.83 to 3.05 m.*

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates Ltd.

Borehole Number: 102

Ground Elevation: *334.42 m*

Project: *P.T. Valeriote Subdivision*

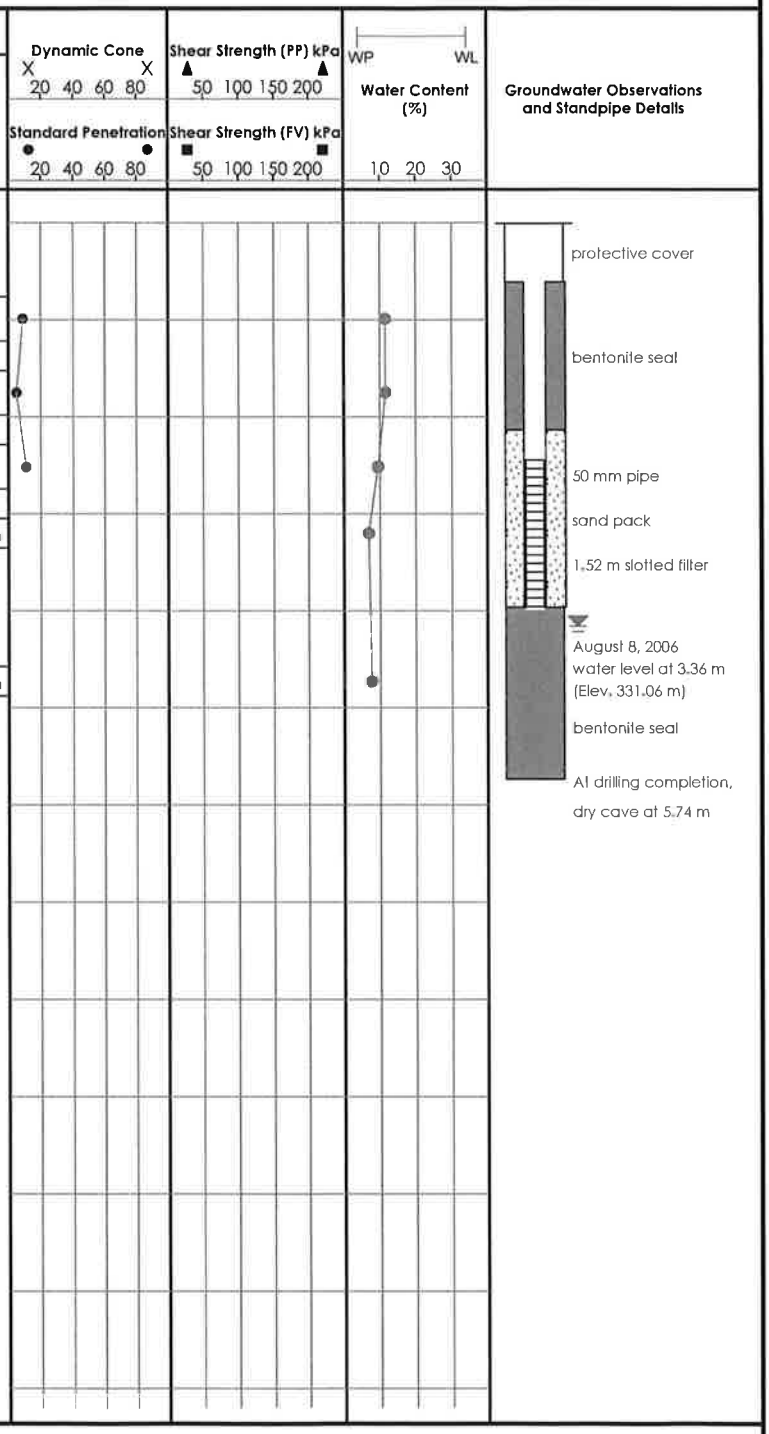
Job No.: *0353G4*

Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *August 2, 2006*

Depth (m)	Description	Elevation (m)
	Ground Elevation	334.42
0.00	***TOPSOIL:*** dark brown silt, moist	
	SILT TILL: loose brown sandy silt, some gravel, trace clay, very moist	
1.00		333.00
2.00		332.00
	compact, very moist	
3.00	very dense, moist	
4.00		331.00
		330.00
5.00		329.00
	augering on weathered bedrock or boulder	
6.00	Borehole terminated at 5.74 m upon auger refusal on bedrock or boulder	328.00
7.00		327.00
8.00		326.00
9.00		325.00
10.00		324.00
11.00		323.00
12.00		

Number	Type	N-Value
1	SS	9
2	SS	5
3	SS	11
4	SS	50\150mm
5	SS	45\150mm



Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes:

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates Ltd.

Borehole Number: 103

Ground Elevation: *344.44 m*

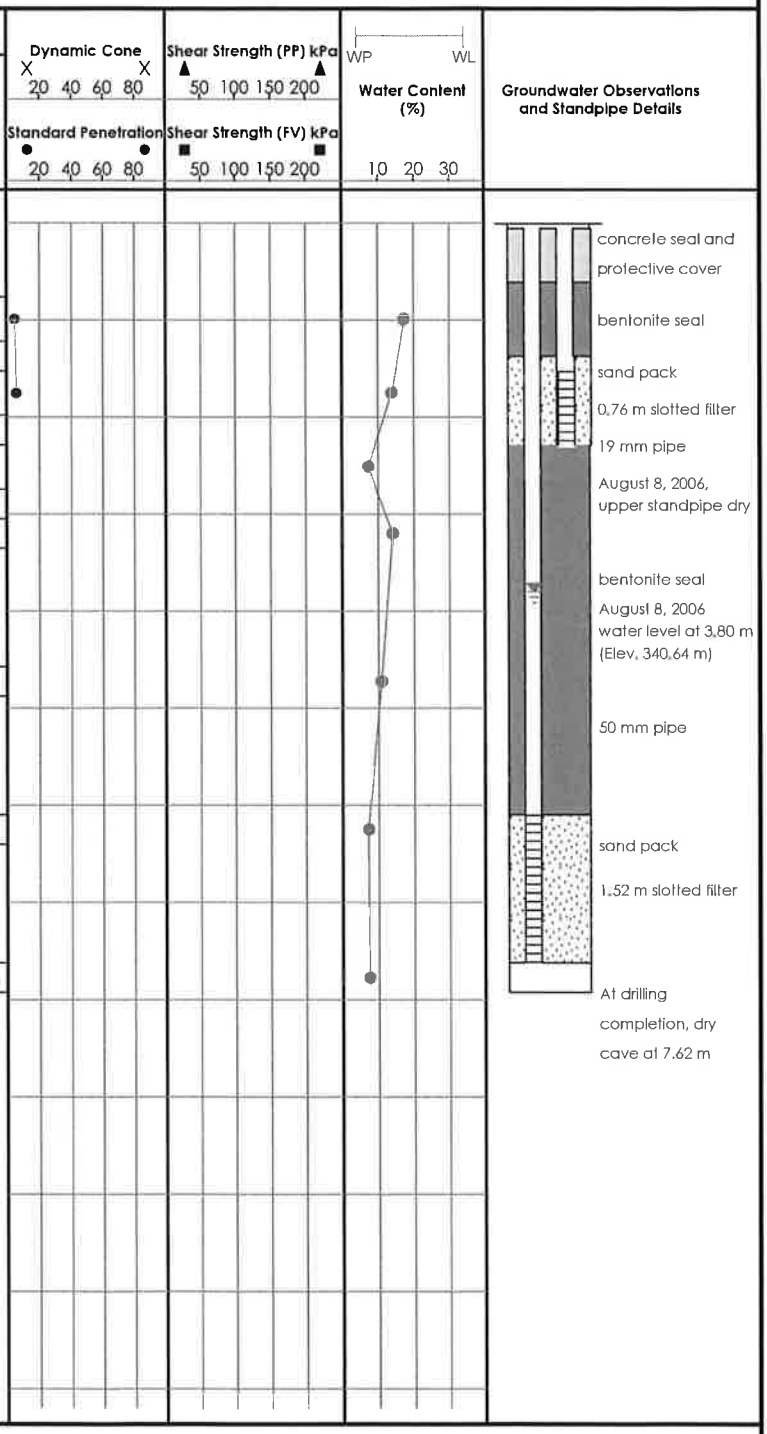
Project: *P.T. Valeriote Subdivision*

Job No.: *0353G4*

Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *July 31, 2006*

Depth (m)	Description	Elevation (m)	Number	Type	N-Value
0.00	Ground Elevation	344.44			
	TOPSOIL: dark brown silt, moist				
1.00	***SILT TILL:*** loose rusty brown silt, some sand, trace clay and gravel, trace tree roots, moist to very moist	343.00	1	SS	5
			2	SS	6
2.00	dense to very dense brown sandy silt, some gravel, trace clay, moist	342.00	3	SS	*
3.00			4	SS	55\150mm
4.00		341.00			
		340.00	5	SS	45\150mm
5.00		339.00			
6.00	grey, moist		6	SS	60\150mm
7.00		338.00			
		337.00	7	SS	75\150mm
8.00	Borehole terminated at 7.92 m				
9.00		336.00			
10.00		335.00			
11.00		334.00			
12.00		333.00			



Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes: ** Sampler driving on gravel.*

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates Ltd

Borehole Number: 104

Ground Elevation: *339.95 m*

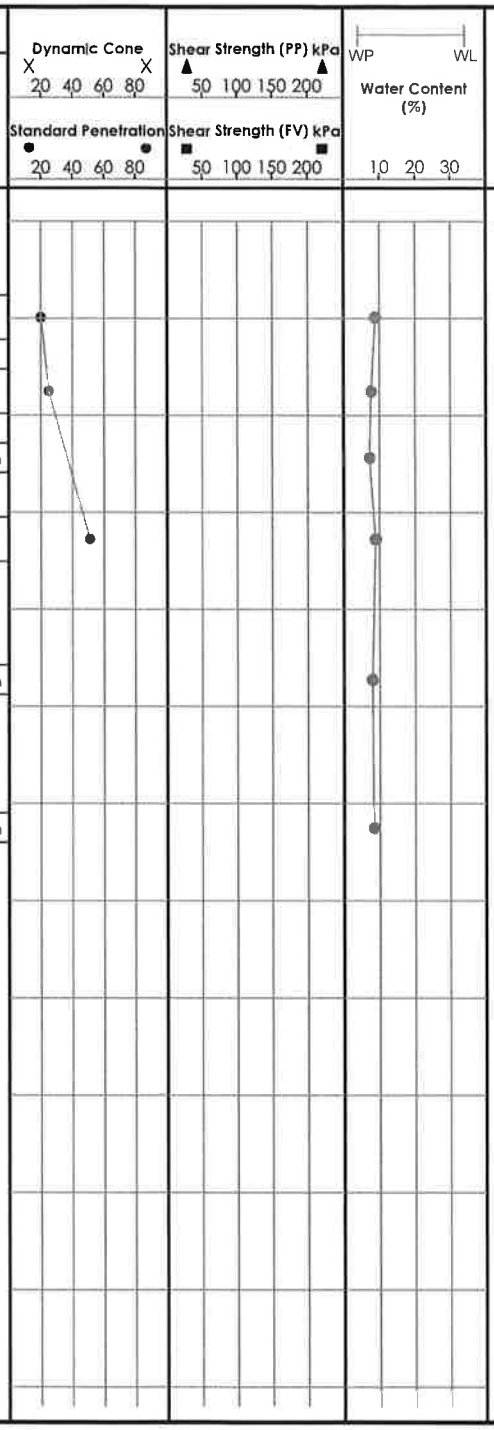
Project: *P.T. Valeriote Subdivision*

Job No.: *0353G4*

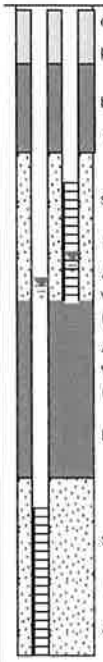
Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *July 31, 2006*

Depth (m)	Description	Elevation (m)	Number	Type	N-Value
	Ground Elevation	339.95			
0.00	***TOPSOIL:*** dark brown silt, moist				
	SILT TILL: compact brown sandy silt, some gravel, trace clay, moist	339.00	1	SS	20
1.00					
		338.00	2	SS	25
2.00					
	very dense, moist		3	SS	30\150mm
3.00		337.00	4	SS	51
4.00		336.00			
			5	SS	45\150mm
5.00		335.00			
	cobbles, some dolostone				
6.00		334.00	6	SS	65\150mm
	Borehole terminated at 6.71 m				
7.00		333.00			
8.00		332.00			
9.00		331.00			
10.00		330.00			
11.00		329.00			
12.00		328.00			



Groundwater Observations and Standpipe Details



At drilling completion, water level at 6.40 m

Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes:

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates Ltd.

Borehole Number: 105

Ground Elevation: *343.82 m*

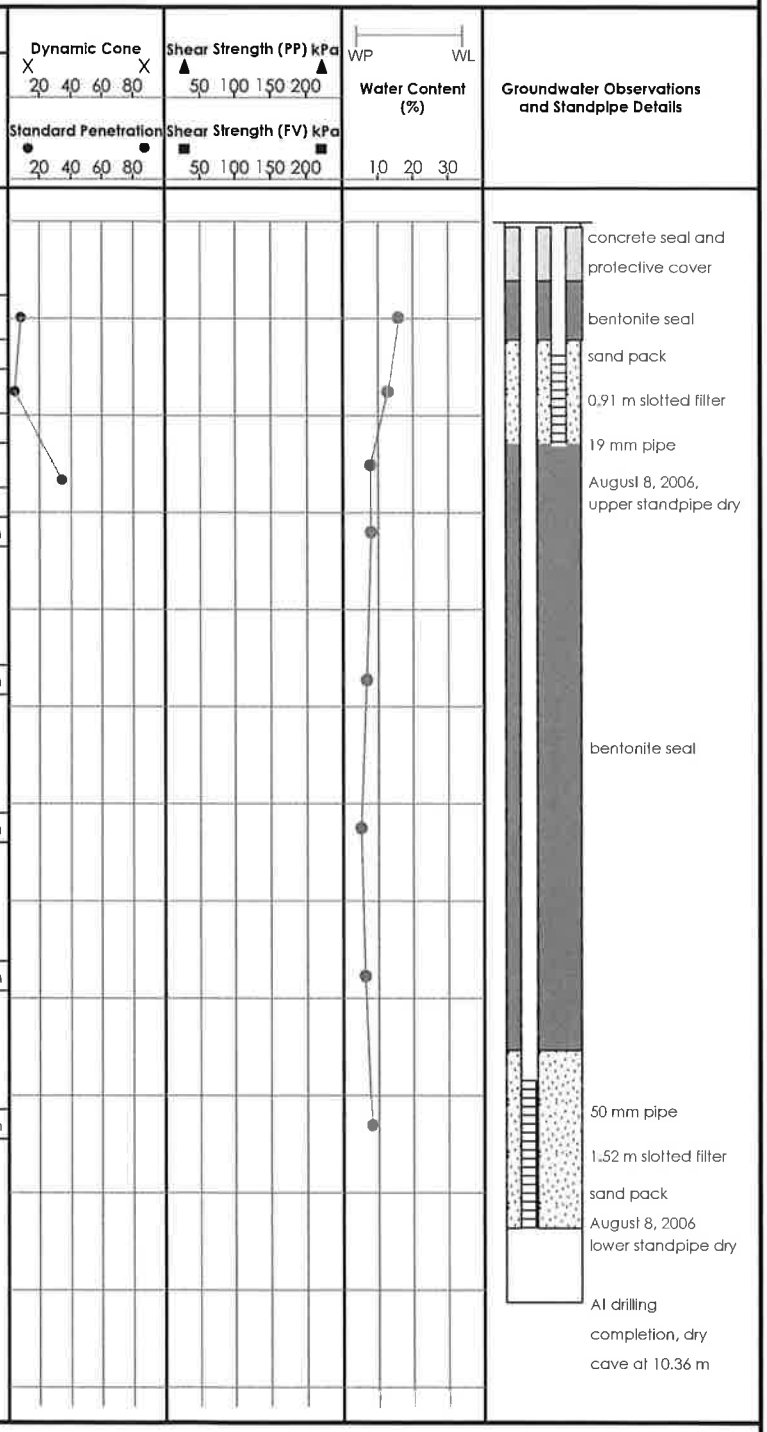
Project: *P.T. Valeriote Subdivision*

Job No.: *0353G4*

Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *July 31, 2006*

Depth (m)	Description	Elevation (m)	Number	Type	N-Value
0.00	Ground Elevation	343.82			
	TOPSOIL: dark brown silt, moist				
1.00	***SILT TILL:*** loose brown silt, some sand, trace clay and gravel, very moist	343.00	1	SS	8
		342.00	2	SS	4
2.00	dense to very dense brown sandy silt		3	SS	34
		341.00	4	SS	50\150mm
3.00					
4.00		340.00			
	some cobbles				
	grey, moist	339.00	5	SS	55\150mm
5.00					
		338.00			
6.00			6	SS	70\150mm
		337.00			
7.00					
		336.00	7	SS	70\150mm
8.00					
		335.00			
9.00			8	SS	60\150mm
		334.00			
10.00					
		333.00			
11.00	augering on bedrock or boulder				
	Borehole terminated at 11.13 m upon auger refusal on bedrock or boulder	332.00			
12.00					



Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes: *Bulk sample taken from 1.22 to 2.13 m.*

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates

Borehole Number: 106

Ground Elevation: *347.25 m*

Project: *P.T. Valeriote Subdivision*

Job No.: *0353G4*

Location: *Cityview Drive, Guelph, Ontario*

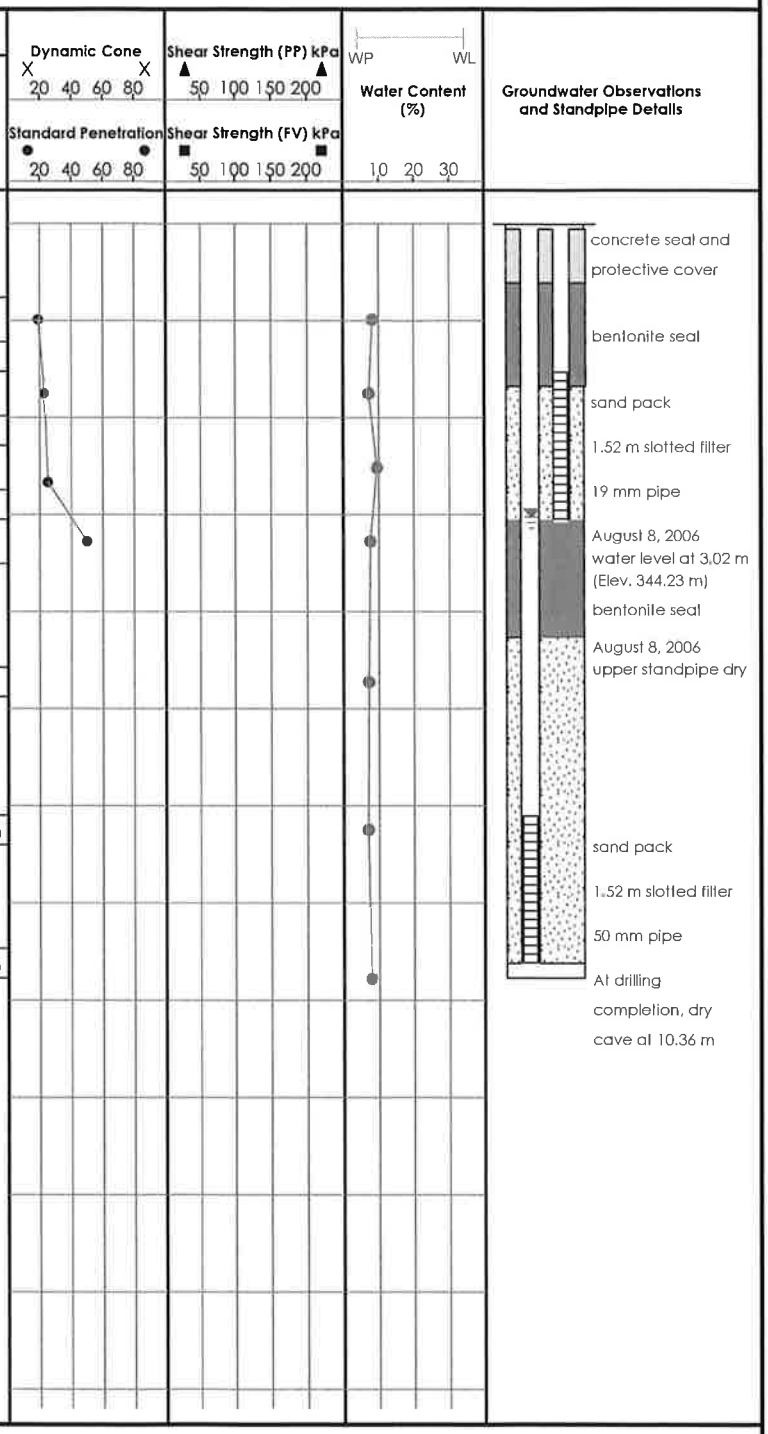
Drill Date: *August 2, 2006*

SOIL PROFILE

Depth (m)	Description	Symbol	Elevation (m)
	Ground Elevation		347.25
0.00	***TOPSOIL:*** dark brown silt, moist		
	SILT TILL: compact brown sandy silt, some gravel, trace clay, moist		
1.00	some cobbles		346.00
2.00	very moist		345.00
3.00	dense to very dense, moist		344.00
4.00			343.00
5.00			342.00
6.00			341.00
7.00			340.00
8.00	Borehole terminated at 7.77 m		339.00
9.00			338.00
10.00			337.00
11.00			336.00
12.00			335.00

SAMPLE

Number	Type	N-Value
1	SS	19
2	SS	23
3	SS	25
4	SS	50
5	SS	*
6	SS	40\150mm
7	SS	40\150mm



Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes: *Bulk sample taken from 1.52 to 3.05 m. *Sampler bouncing on gravel.*

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates Ltd.

Borehole Number: 107

Ground Elevation: *345.47 m*

Project: *P.T. Valeriote Subdivision*

Job No.: *0353G4*

Location: *Cityview Drive, Guelph, Ontario*

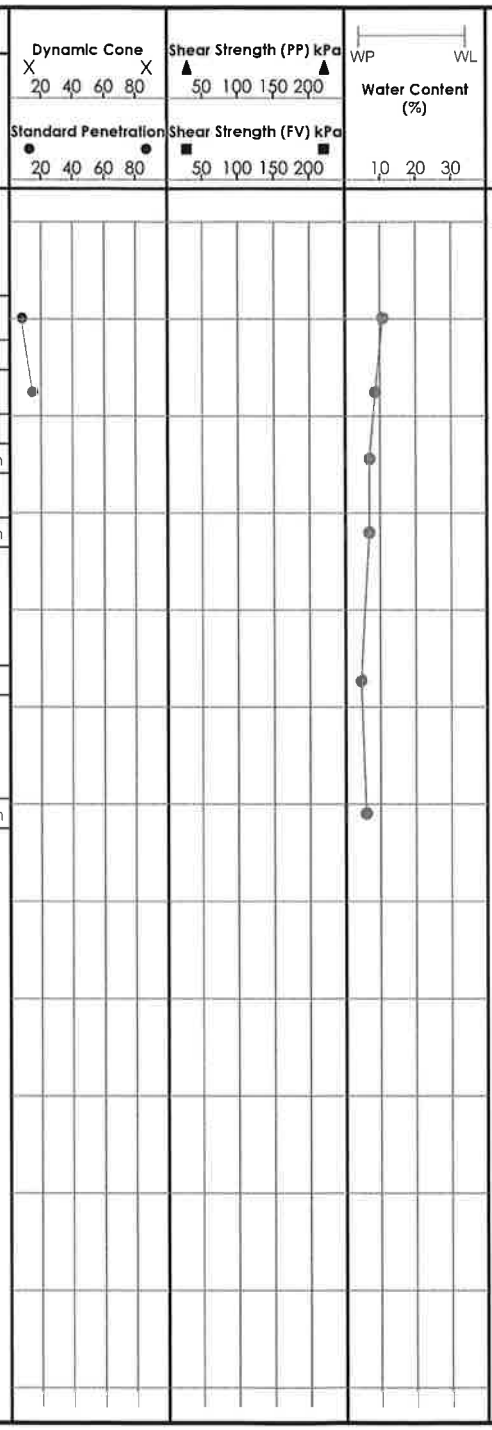
Drill Date: *July 31, 2006*

SOIL PROFILE

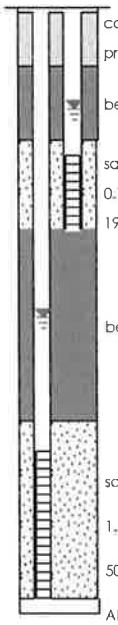
Depth (m)	Description	Symbol	Elevation (m)
	Ground Elevation		345.47
0.00	***TOPSOIL:*** dark brown silt, moist		
	SILT TILL: loose brown silt, some sand, trace clay, very moist		
1.00	compact		344.00
2.00	compact to very dense brown sandy silt, some gravel		
3.00			343.00
	grey, moist		342.00
4.00			341.00
5.00			340.00
6.00	Borehole terminated at 6.25 m		339.00
7.00			338.00
8.00			337.00
9.00			336.00
10.00			335.00
11.00			334.00
12.00			

SAMPLE

Number	Type	N-Value
1	SS	8
2	SS	15
3	SS	35\150mm
4	SS	50\150mm
5	SS	*
6	SS	60\150mm



Groundwater Observations and Standpipe Details



AI drilling completion, dry cave at 6.10 m

August 8, 2006
water level in upper standpipe at 1.05 m (Elev. 344.42 m)
water level in lower standpipe at 3.20 m (Elev. 342.27 m)

Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes: * *Sampler bouncing on gravel.*

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates Ltd.

Borehole Number: 108

Ground Elevation: *342.70 m*

Project: *P.T. Valeriote Subdivision*

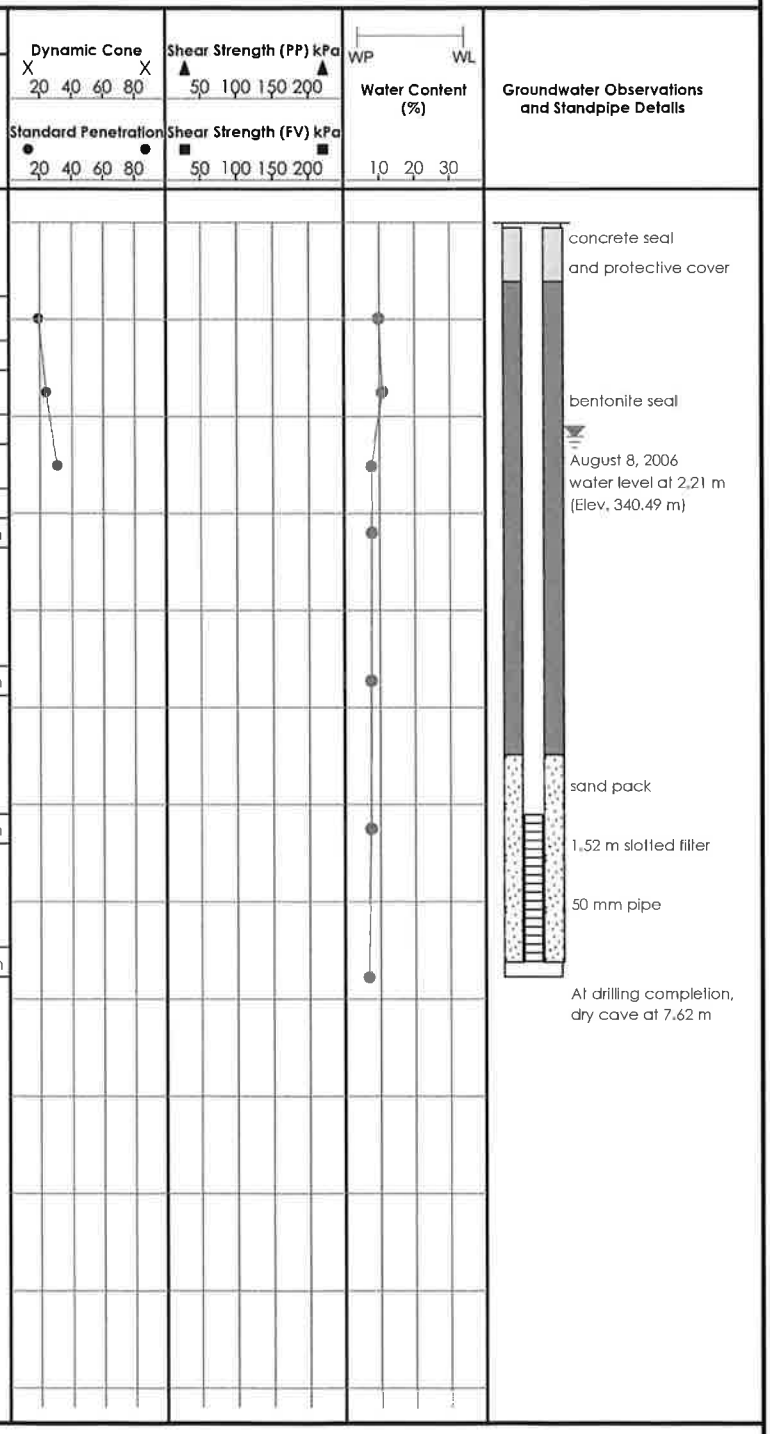
Job No.: *0353G4*

Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *July 31, 2006*

Depth (m)	Description	Elevation (m)
0.00	Ground Elevation	342.70
	TOPSOIL: dark brown silt, moist	
1.00	***SILT TILL:*** compact brown silt, some sand, gravel and clay, moist	342.00
2.00	dense to very dense, trace clay, moist	341.00
3.00	some cobbles	340.00
4.00	grey, moist	339.00
5.00		338.00
6.00		337.00
7.00		336.00
8.00	Borehole terminated at 7.77 m	335.00
9.00		334.00
10.00		333.00
11.00		332.00
12.00		331.00

Number	Type	N-Value
1	SS	19
2	SS	24
3	SS	31
4	SS	45\150mm
5	SS	45\125mm
6	SS	58\150mm
7	SS	65\150mm



Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes: *Bulk sample taken from 1.52 to 3.05 m.*

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 109

Ground Elevation: *326.19 m*

Project: *P.T. Valeriote Subdivision*

Job No.: *0353G4*

Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *August 1, 2006*

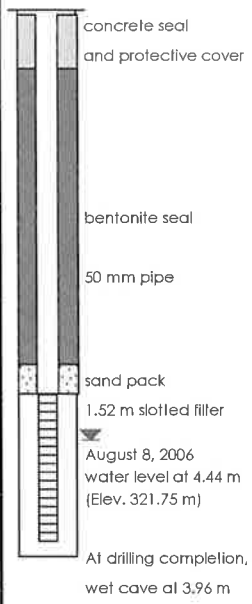
Depth (m)	Description	Symbol	Elevation (m)
	Ground Elevation		326.19
0.00	***TOPSOIL:*** dark brown silt, moist		
1.00	***SAND AND GRAVEL:*** very dense brown sand and gravel, frequent cobbles and boulders, some silt, damp		325.00
2.00			324.00
3.00			323.00
4.00	saturated		322.00
5.00	augering on possible bedrock		321.00
6.00	Borehole terminated at 5.64 m		320.00
7.00			319.00
8.00			318.00
9.00			317.00
10.00			316.00
11.00			315.00
12.00			314.00

SAMPLE

Number	Type	N-Value
1	SS	55
2	SS	30\150mm
3	SS	*
4	SS	*
5	SS	*

Dynamic Cone (X) 20 40 60 80
Standard Penetration (●) 20 40 60 80
Shear Strength (PP) kPa (▲) 50 100 150 200
Shear Strength (FV) kPa (■) 50 100 150 200
Water Content (%) WP WL 10 20 30

Groundwater Observations and Standpipe Details



Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes: * *Sampler bouncing on gravel.*

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 110

Ground Elevation: *323.60 m*

Project: *P.T. Valeriote Subdivision*

Job No.: *0353G4*

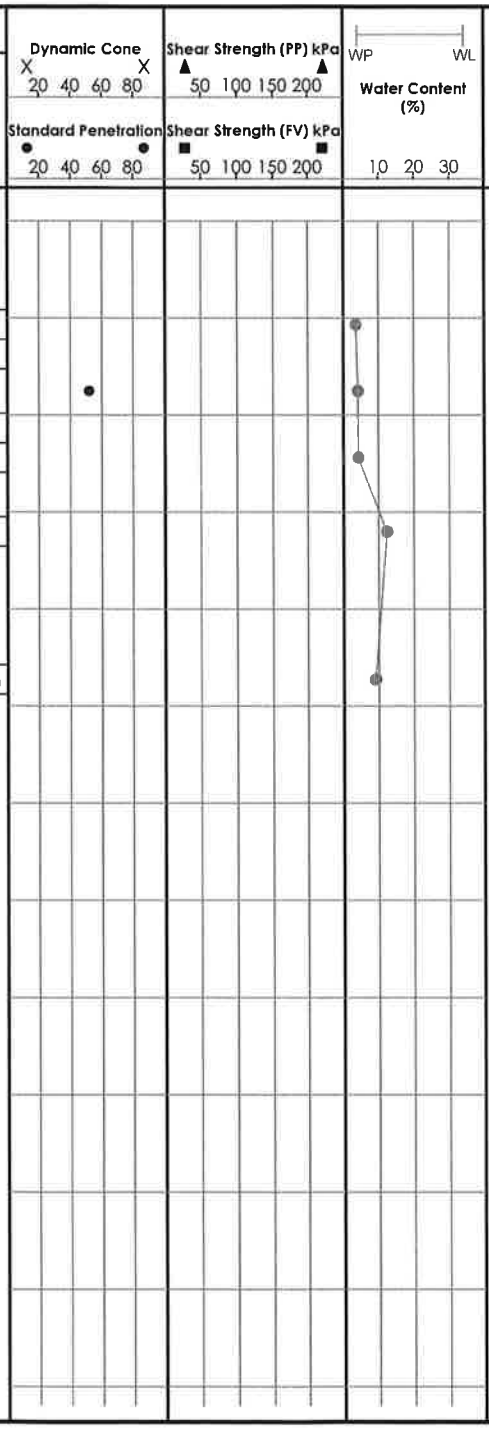
Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *August 1, 2006*

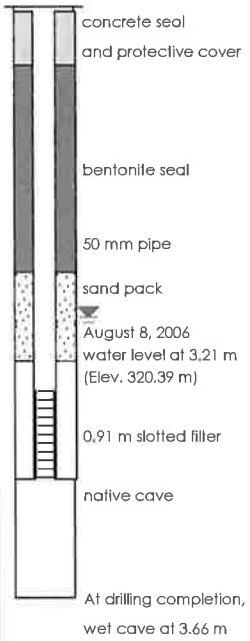
Depth (m)	Description	Symbol	Elevation (m)
	Ground Elevation		323.60
0.00	***TOPSOIL:*** dark brown silt, moist		
	SAND AND GRAVEL: very dense brown sand and gravel, frequent cobbles and boulders, some silt, damp		323.00
1.00			
			322.00
2.00			
			321.00
3.00	saturated		
	some silt		
			320.00
4.00			
			319.00
5.00			
			318.00
6.00	Borehole terminated at 6.10 m		
			317.00
7.00			
			316.00
8.00			
			315.00
9.00			
			314.00
10.00			
			313.00
11.00			
			312.00
12.00			

SAMPLE

Number	Type	N-Value
1	SS	40\150mm
2	SS	52
3	SS	35\150mm
4	SS	*
5	SS	55\150mm



Groundwater Observations and Standpipe Details



Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes: * *Sampler bouncing on gravel.*

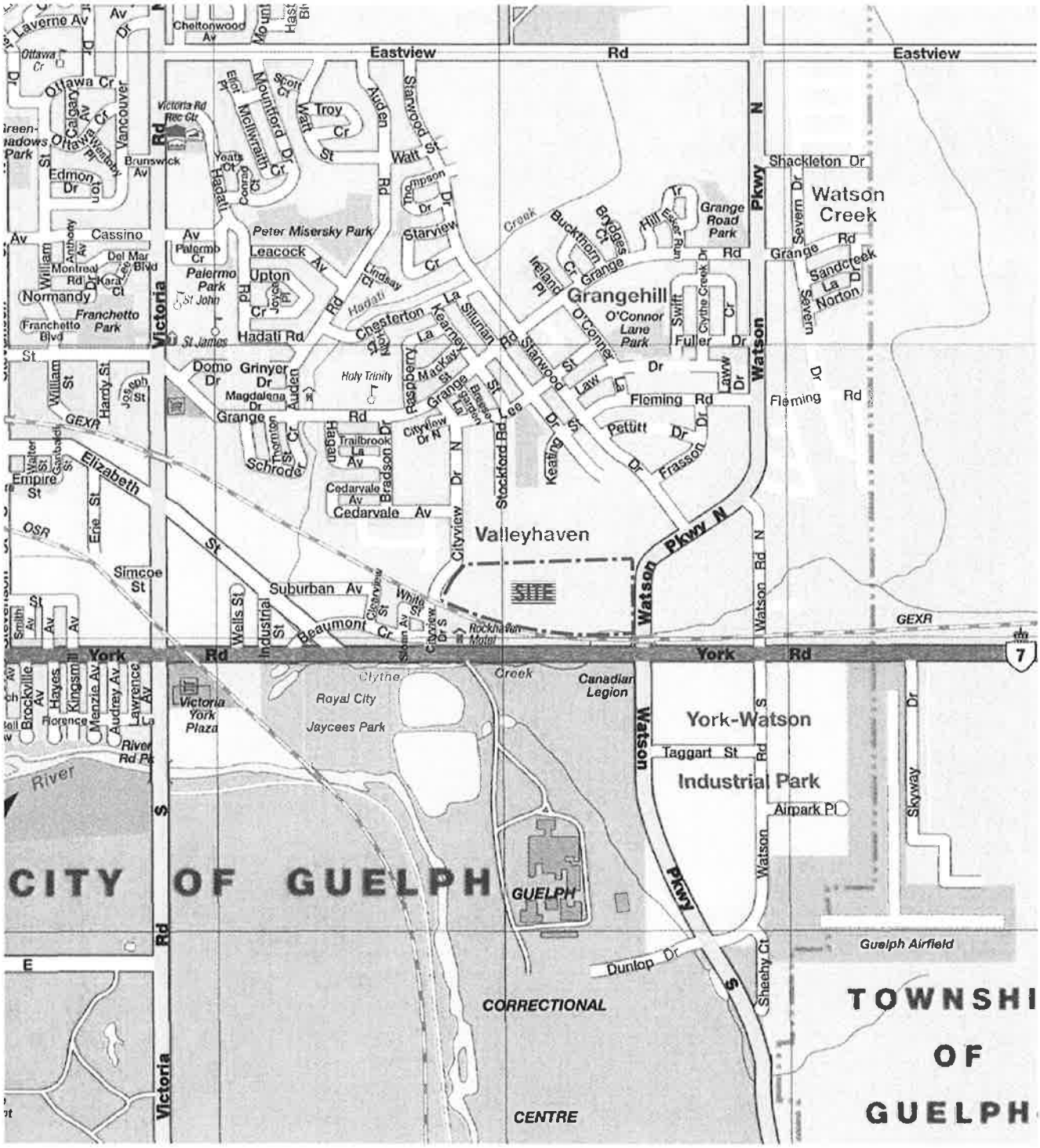
Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

No.	Revisions	Date
0	**Report Issued**	**Sept. 2006**
1		
2		
3		

NORTH



Drawing Reference: Base drawing from page 61 of MapArt's Kitchener-Waterloo Map Book (2006).

P.T. Valeriote Subdivision

Cityview Drive

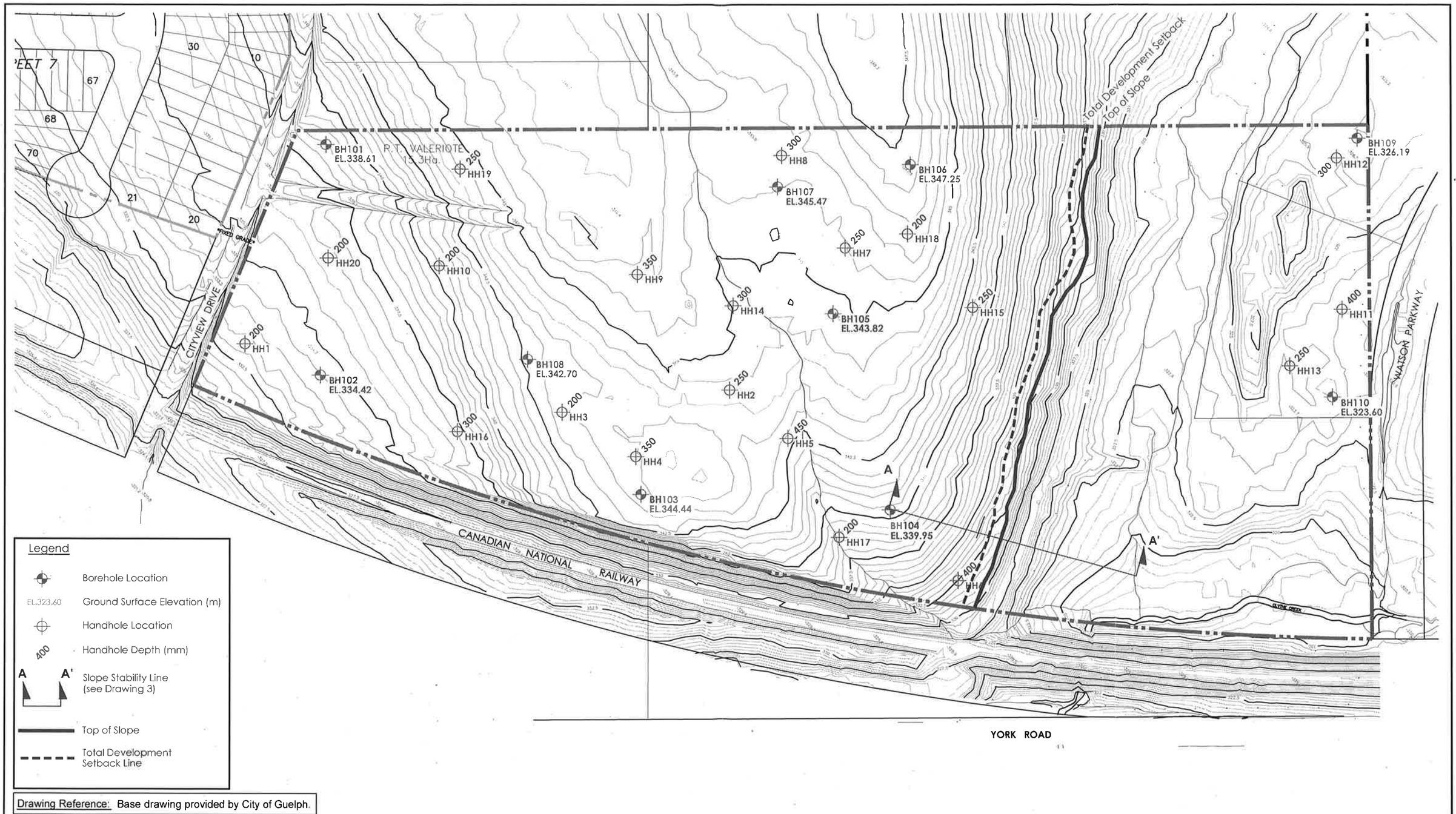
Guelph, Ontario

Naylor Engineering Associates Ltd
CONSULTING ENGINEERS

LOCATION PLAN

Date	Scale	Job No.	Drawing No.
Sept. 2006	**1:20000**	**0353G4**	**1**

F:\0353\0353G4\0353G4_01.dwg
August 14, 2006
(dc)



Drawing Reference: Base drawing provided by City of Guelph.

Note:
Locations of site features in this drawing are approximate based on available information. Exact locations must be verified in the field.

No.	Revisions	Date
0	Report Issued	Sept. 2006
1	Report Revised	Jan. 2012
2		
3		

NORTH

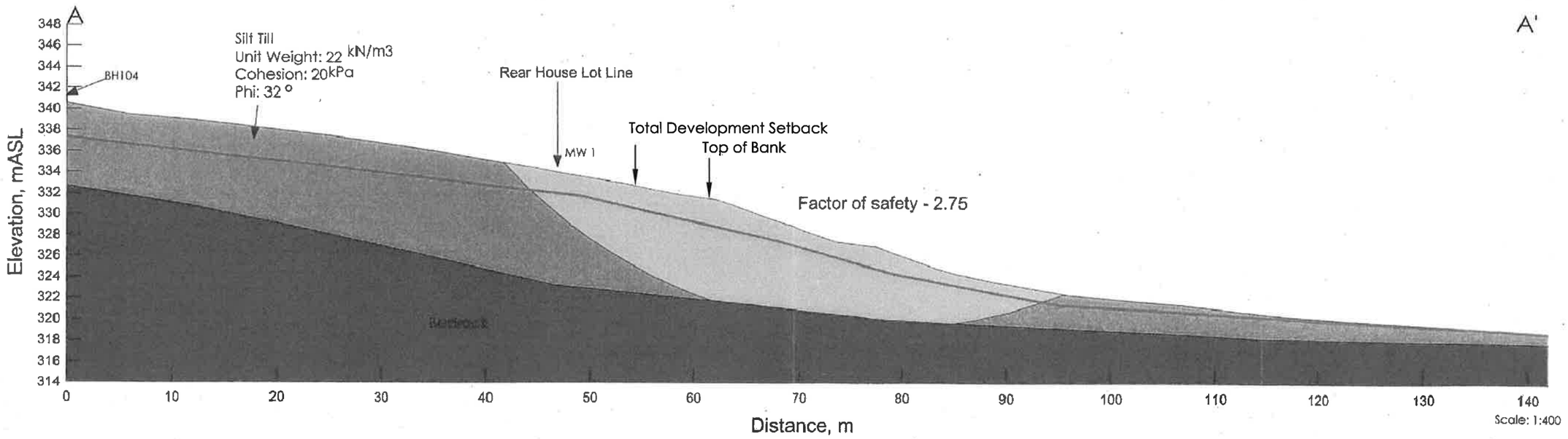
Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

P.T. Valeriote Subdivision
Cityview Drive
Guelph, Ontario

SITE PLAN

Date	Scale	Job No.	Drawing No.
Sept. 2006	1:2000	0353G4	2

F:\0353\0353G4\0353G4_02.dwg
August 31, 2006 (SR)



No.	Revisions	Date
0	**Report Issued**	**Sept. 2006**
1		
2		
3		

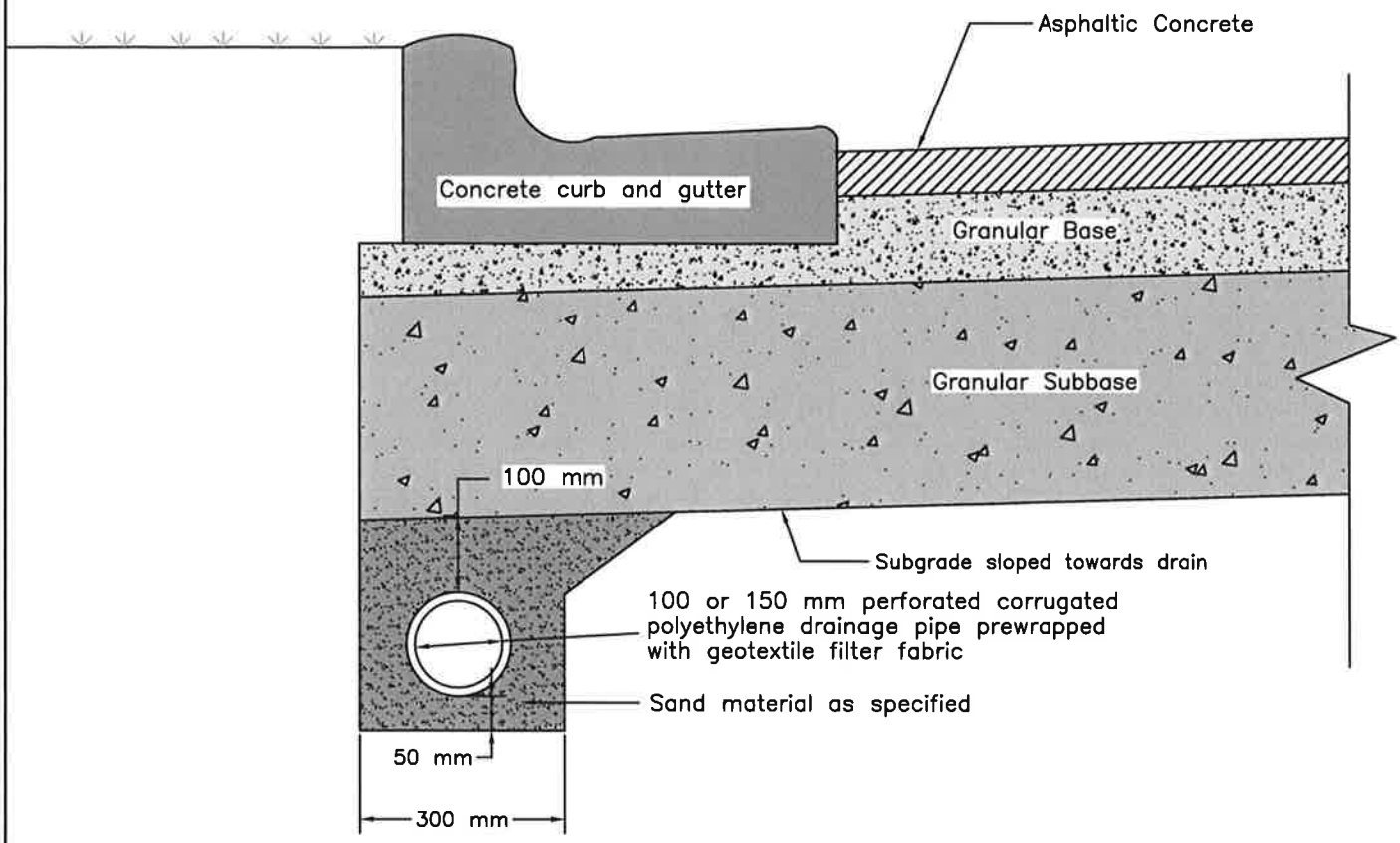
Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

P.T. Valeriote Subdivision
Cityview Drive
Guelph, Ontario

SLOPE STABILITY A - A'

Date	Scale	Job No.	Drawing No.
Sept. 2006	**1:400**	**0353G4**	**3**

F:\0353\0353G4\0353G4_03.dwg
September 8, 2006 (SR)



GENERAL REQUIREMENTS FOR PAVEMENT SUBDRAINS

1. Perforated corrugated polyethylene drainage pipe shall meet the requirements of OPSS 1840.

2. Pipe filter fabric conforming to OPSS 1860 for geotextile Class 1 with a filtration opening size of 150 to 450 microns shall be supplied on all sections of perforated pipe.

3. The open upstream ends of pipes should be capped.

4. Subdrain pipes to be set on at least 1% grade draining to a positive frost-free outlet. If the subdrains are outletted to a ditch then the last 1.5 m of the outlet pipe should consist of a corrugated galvanized steel pipe equipped with a rodent gate.

5. Bedding and backfill material shall be concrete sand meeting the gradation requirements of OPSS 1002 (Fine Aggregate for Concrete).

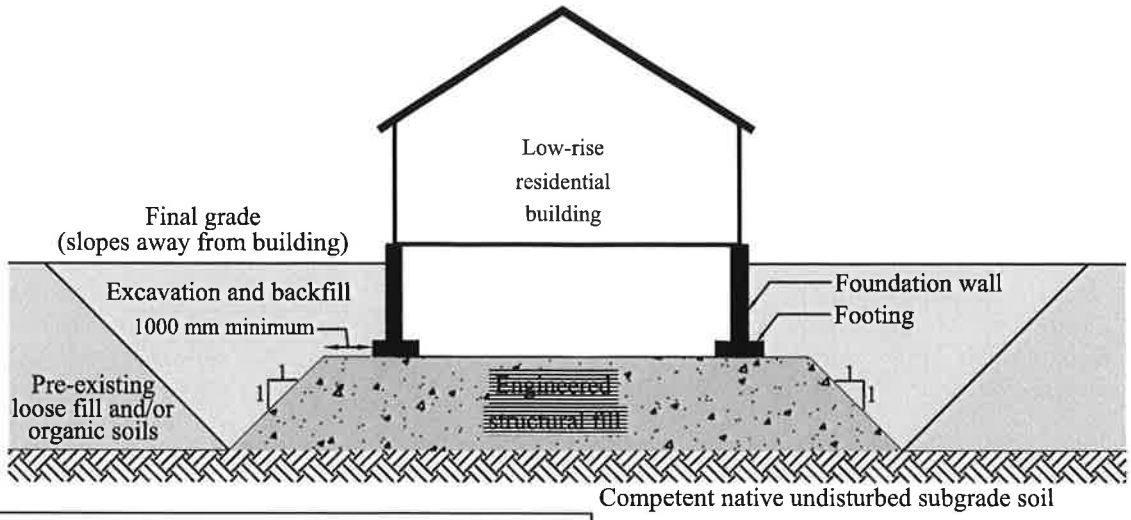
Naylor Engineering Associates
CONSULTING ENGINEERS

TYPICAL PAVEMENT SUBDRAIN DETAIL

Date	Scale	Job No.	Drawing No.
Sept. 2006	NTS	0353G4	4

F:\0353\0353G4\0353G4_04.dwg
September 12, 2006 (SR)

ENGINEERED STRUCTURAL FILL PAD



GENERAL REQUIREMENTS FOR ENGINEERED STRUCTURAL FILL

1. The area must be excavated of all pre-existing loose fill, topsoil, and/or organic soil until competent native undisturbed soil is reached.

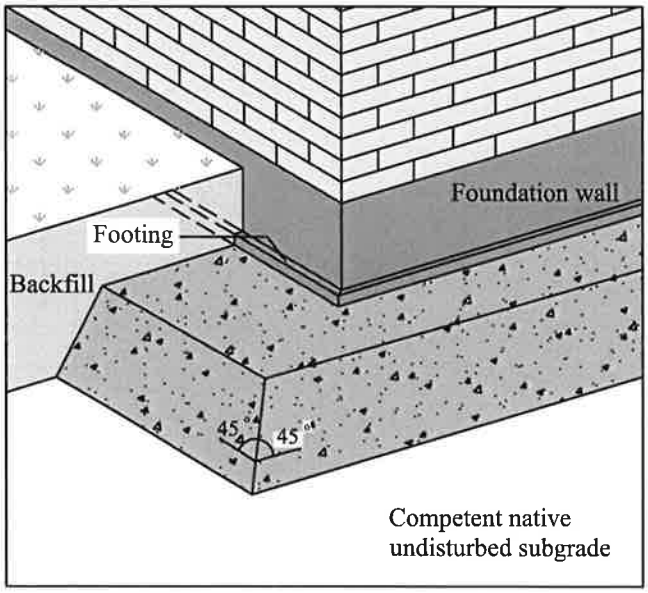
2. The excavation should allow for the structural fill to extend 1000 mm beyond the outside edge of the building footings and down to the approved subgrade soil at a slope of 1 horizontal to 1 vertical (45°).

3. The subgrade below the engineered fill should be inspected and approved by a geotechnical engineer prior to fill construction. Fill placement and compaction operations to be carried out under full-time geotechnical supervision.

4. The structural fill should comprise sand and gravel aggregate placed in 300 mm thick lifts and compacted to at least 98% Standard Proctor Maximum Dry Density (SPMDD). The exterior backfill should consist of approved inorganic soil also placed in 300 mm thick lifts and compacted to minimum 95% SPMDD.

5. All excavations must be carried out in conformance with the current Ontario Occupational Health and Safety Act and Regulations 213/91 for construction projects.

6. Exterior footings must be provided with minimum 1.2 m of soil cover for frost protection.



Naylor Engineering Associates
CONSULTING ENGINEERS

TYPICAL STRUCTURAL FILL PAD DETAIL

Date	Scale	Job No.	Drawing No.
Sept. 2006	NTS	0353G4	5

F:\0353\0353G4\0353G4_05.dwg
September 12, 2006 (SR)

APPENDIX B:

SLOPE STABILITY ASSESSMENT
ENGLOBE CORP.
(FEBRUARY 2016)
UPDATED SLOPE STABILITY ASSESSMENT OF EAST FACING SLOPE
(DECEMBER 2020)
AND
SLOPE STABILITY ASSESSMENT OF SOUTH-FACING SLOPE
ENGLOBE CORP. (MARCH 2019)

February 11, 2016

Cityview Ridge Developments Inc.
c/o Ms. Angela Kroetsch, P.Eng.
GM BluePlan Engineering
330 Trillium Drive, Unit D
Kitchener, Ontario N2E 3J2

Subject: Cityview Ridge Subdivision
Slope Stability Assessment – Lots 62 to 78
Guelph, Ontario
Our ref.: 160-P-0009857-0-01-100-GE-L-0001-00

Dear Ms. Kroetsch:

Englobe Corp. (Englobe) is pleased to provide this letter report for the slope stability analysis recently completed for the proposed Cityview Ridge Subdivision at the location shown on the appended Location Plan, Drawing 1. The work for this investigation was authorized by Mr. Carson Reid of Cityview Ridge Developments Inc. on February 2, 2016.

The area being investigated comprises Lots 62 to 78 along the east side of the proposed development. It is understood that the proposed development will include the placement of fill and construction of retaining walls and a walking trail along the rear of the above mentioned lots.

The purpose of this slope stability analysis is to assess the impact of the proposed structures on the stability of the existing slope at the site.

General Information

The subject site is located on Cityview Drive, Guelph Ontario and the area being investigated is located at the east side of the site, near the top of a slope. A Grand River Conservation Authority (GRCA) regulated wetland is located at the base of the subject slope.

Naylor Engineering Associates Ltd. (NEA) previously completed a geotechnical investigation and slope stability assessment at the subject site including the drilling of three boreholes near the top of the slope (Boreholes BH104 to BH106) to depths of 6.7 to 11.1 m. The findings of this investigation illustrated that the existing slope is comprised of native non-cohesive silt till. Groundwater was found to occur in saturated seams at variable depths within the silt till deposit. A slope stability analysis was carried out along the steepest portion of the slope located in the southeast portion of the site. The results of the slope stability analysis found that the slope had a factor of safety of greater than 1.5. We refer the reader to the geotechnical investigation for further information (NEA, Geotechnical Investigation, P.T. Valeriote Subdivision, Cityview Drive, Guelph, Ontario. 0353G4.R01_Rev, February 2012). The relevant borehole logs of the previous investigation and site plan (NEA – Drawing 2 – Site Plan) illustrating the borehole locations have been appended to this letter.

It is understood that proposed structures include three retaining walls, swales, houses, a walking trail, and fill placement will occur with the proposed site development, near the top of the slope. The three proposed retaining walls will traverse along the east side of Lots 72 to 78, Lot 67, and along the east side of the walking trail behind Lots 77 and 78 (Gamsby and Mannerow Engineers, Carson Reid Homes Cityview Ridge, Project Number 105-172, Preliminary Site Grading and Drainage Plan [Drawing 2] and Trail Plan and Sections [Drawing 8], Revised March 30, 2015). It is further understood that grades at the rear of Lots 75 to 78 are to be raised by up to 3.5 m with final grades near Elevation 340.5 to 341.0 m. The fill will be partially retained by the retaining walls, beyond which it is to be sloped to the east at an inclination of 3 horizontal to 1 vertical, then blends into the existing grades. The thickness of the fill decreases toward the north, and along Lots 68 to 72, the proposed elevation at the rear of the lots is close to or below the existing grades.

Slope Stability Assessment

Cross-Section B-B' was created based on topographic data provided by Gamsby and Mannerow Engineers and the location of the section is shown on our Drawing 2 – Site Plan, and is illustrated in Drawing 3 – Cross Section B-B'. The cross section was created to represent a worst case scenario, where the slope was the steepest and the proposed additional loading was greatest. Cross-Sections X-X and O-O from the provided topographic plan were also used to assess the slope stability.

The information from the boreholes and cross-sections were used for computer analyses of the slope stability using the Slope/W Program (Morgenstern-Price Method). The soil parameters used in this analysis have been estimated based on the information from the existing boreholes, laboratory testing, as well as local experience and available literature values and are provided in Table 1.

Table 1 Soil Parameters

SOIL MATERIAL	UNIT WEIGHT (kN/m^3)	ANGLE OF INTERNAL FRICTION (º)	COHESION (kPa)
Silt Till	22	32	0

The following assumptions have been made in order to assess the possible impact of the proposed structures on the slope stability at the subject site:

- Soil conditions at the site comprise native silt till deposits. Suspected bedrock was encountered but was not proven by coring during the NEA investigation. As such the soil was assumed to be continuous to Elevation 300 m.
- Foundations will be designed as per the previous geotechnical report (NEA, 0353G4.R01_Rev).
- The proposed retaining wall will be adequately designed for sliding and overturning.
- Grades of the site will be raised (where applicable) with well compacted subgrade or structural fill. The fill is placed in 300 mm thick lifts and compacted to 95% SPMDD (subgrade fill) or 98% SPMDD (structural fill for residential buildings and below retaining walls) at a minimum.
- The proposed fill and retaining wall were assumed to have a unit weight of 24 kN/m3.
- The assumed groundwater depth is 2.6 m at the top of the slope and at ground surface at the GRCA 100-year floodplain.

A slope stability analysis was carried out on the three cross sections for a number of potential failure types. The various failures analyzed included shallow slumping type failure of the slope surface, medium depth rotational failures, and deep rotational failures.

Following the GRCA policy, the design range for the factor of safety must be 1.30 to 1.50 or greater.

The results of the slope stability assessment completed for the slope sections and considering the proposed retaining walls, houses and fill indicate factors of safety in excess of 1.5 for all three of the analyzed cross sections, at which medium depth to deep rotational failures would cause the loss of the structure.

In conclusion, the findings of our slope stability assessment do not show an aggravation of existing slope instabilities or future slope instabilities due to the proposed structures. As well, there is an adequate factor of safety against rotational slope failures that could adversely affect the stability of the proposed structures.

Some maintenance and minor slope repairs should be expected over the life span of the structures, especially along the upper portion of the slope. The placed fill should be vegetated as soon as possible after placement.

Englobe should be contacted if the design of the proposed structures changes (i.e. size, location, or proposed footing depths) in order to provide updated recommendations on slope stability.

We trust that this information is complete and suitable for your present requirements. If you have any questions or require further information, please do not hesitate to contact our office.

Yours very truly,

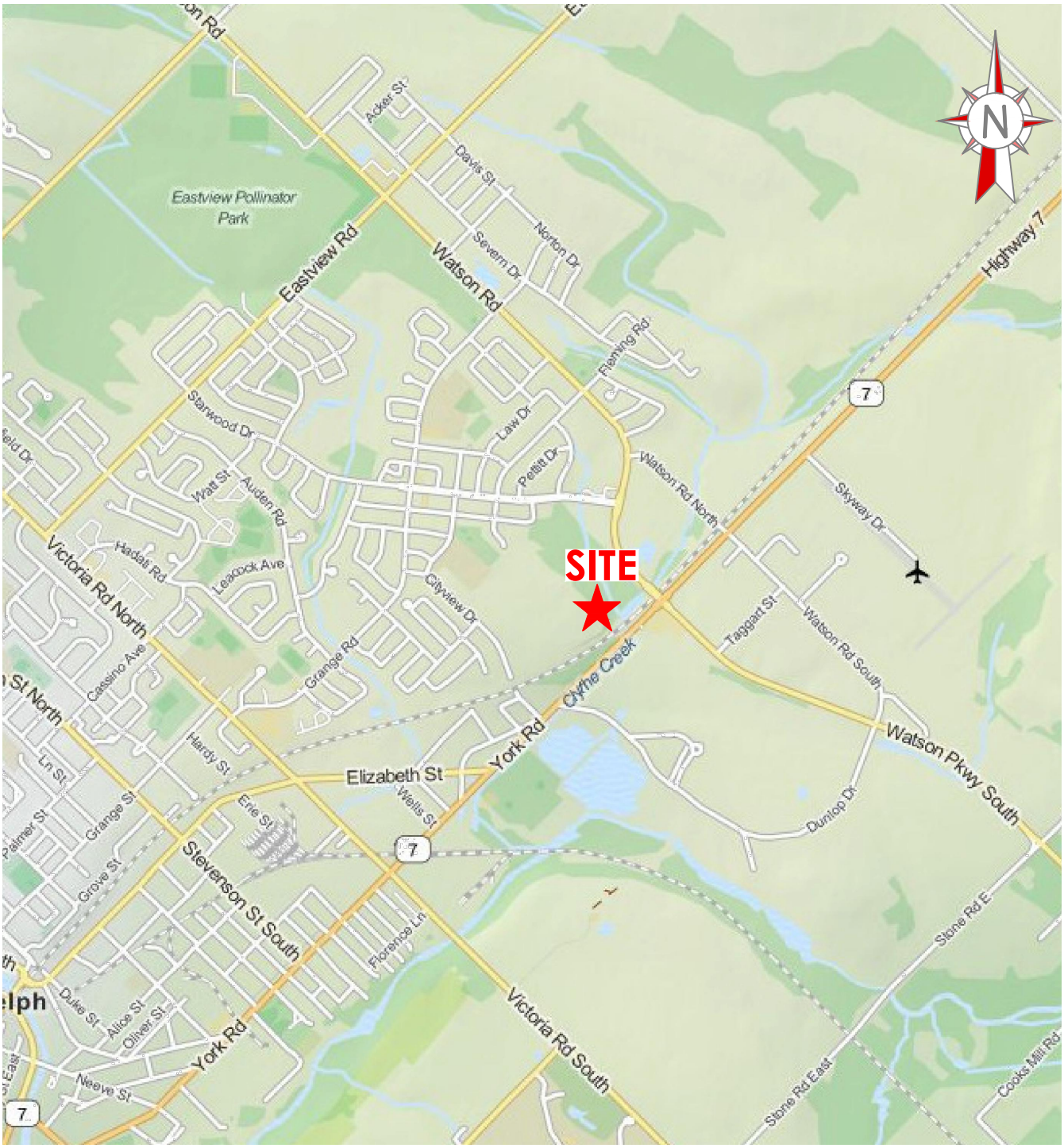
Dan Gonser EIT
Geotechnical Department

J.B. England, P.Eng.
Senior Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
J. B. ENGLAND
2016-2-11
PROVINCE OF ONTARIO

jw

Encl. Drawing 1 – Site Plan
Encl. Drawing 2 – Site Plan
Encl. Drawing 3 – Cross-Section A-A'
Encl. NEA – Drawing 2 – Site Plan
Encl. NEA – Boreholes BH104 to BH106



NOTES :
1-REFERENCES : © OpenStreetMap contributors (2016).

0 250 500 750 1000 m
SCALE 1:25000

Project

Cityview Ridge Subdivision
Slope Stability Assessment

Guelph, Ontario

Title

LOCATION PLAN

Englobe Corp.
353, Bridge Street East
Kitchener (Ontario) N2K 2Y5
Telephone : 519.741.1313
Fax : 519.741.5422

Prepared	K. Ashe	Discipline	GEOTECHNICAL	Project manager	D. Gonser
Drawn	K. Ashe	Scale	1 : 25000	Sequence no.	01 of 03
Checked	D. Gonser	Date	2015-02-04		

M. dept.	Project	Disc.	Dwg no.	Rev.
160	P-0009857-0-01-100	GE	001	00

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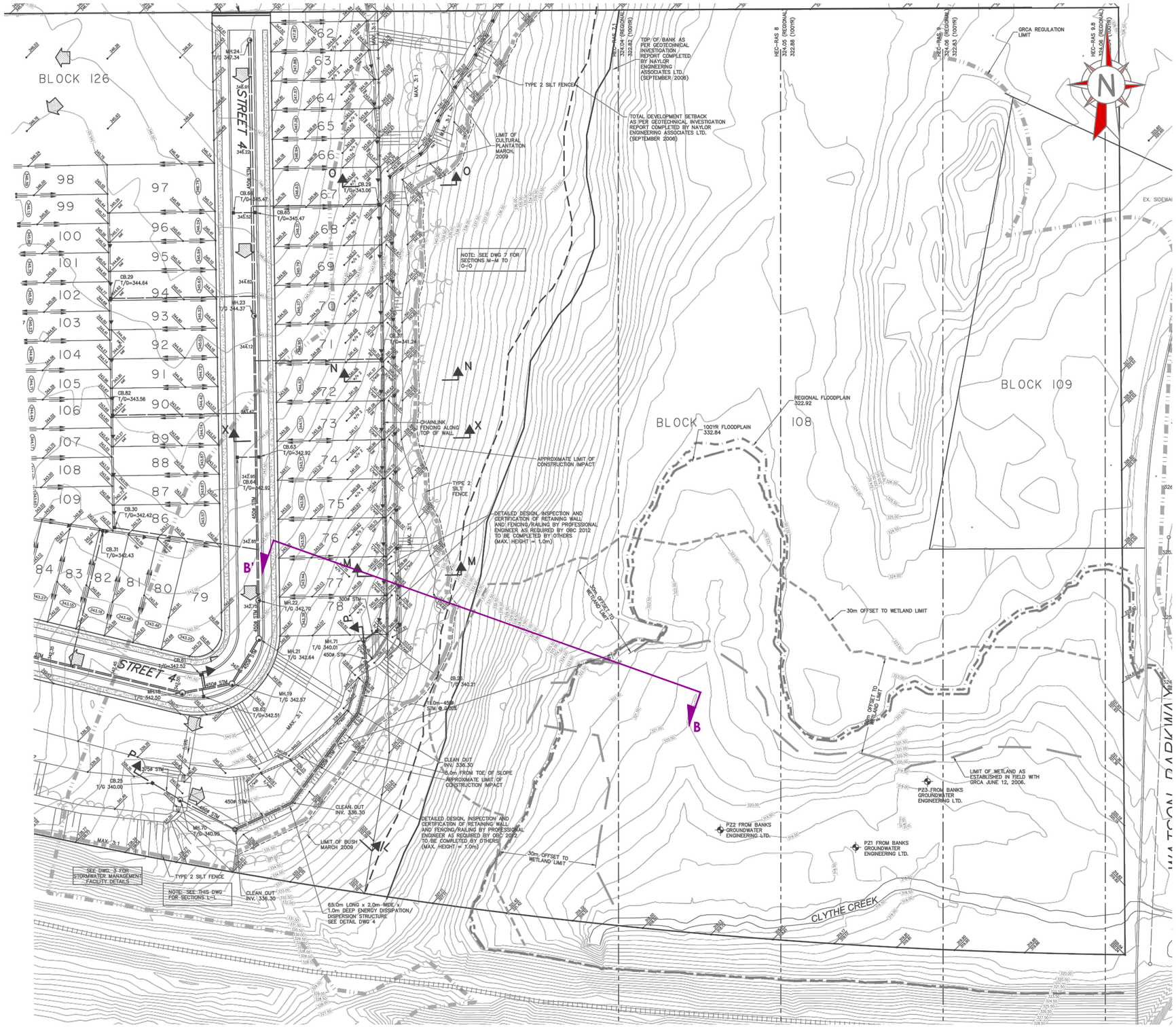

LEGEND :

B B' CROSS SECTION

0 10 20 30 40 50 m

SCALE 1:1250

NOTES :

1-REFERENCES : GAMSBY AND MANNEROW ENGINEERS, Carson Reid Homes Cityview Ridge, Preliminary Grading and Drainage Plan, Project Number 105-172, Drawing Number 2, Revised March 30, 2015.

2-Drawing scale may be distorted due to file conversion and/or copying. Measurements taken from the drawing must be verified in the field.

Project

Cityview Ridge Subdivision Slope Stability Assessment

Guelph, Ontario

Title

SITE PLAN

Englobe Corp.
353, Bridge Street East
Kitchener (Ontario) N2K 2Y5
Telephone : 519.741.1313
Fax : 519.741.5422

Prepared **K. Ashe**	Discipline **GEOTECHNICAL**
Drawn **K. Ashe**	Scale **1:1250**
Checked **D. Gonser**	Date **2016-02-04**
Project manager **D. Gonser**	Sequence no. **02** of **03**

M. dept.	Project	Disc.	Dwg no.	Rev.
160	P-0009857-0-01-100	GE	002	00

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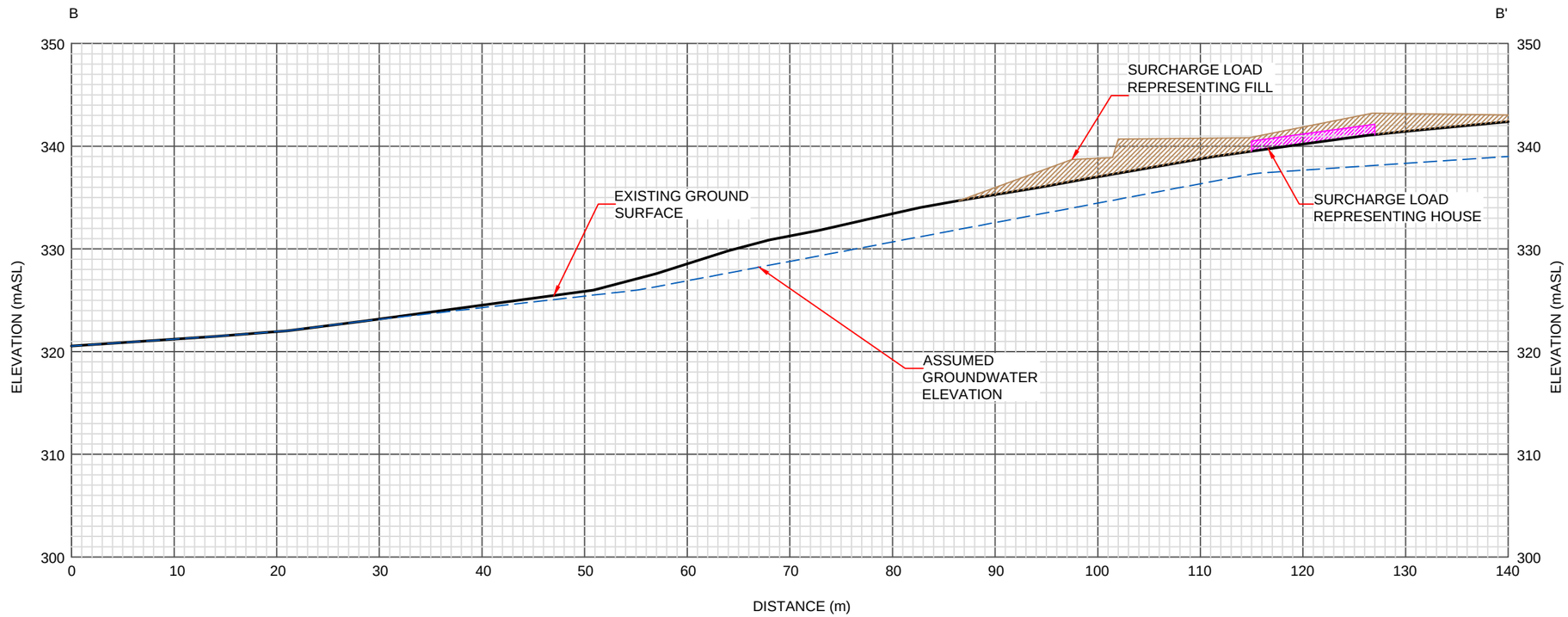

NOTES :

1-Drawing scale may be distorted due to file conversion and/or copying.
Measurements taken from the drawing must be verified in the field.

0 5 10 15 m
SCALE 1:500

Project

Cityview Ridge Subdivision
Slope Stability Assessment

Guelph, Ontario

Title

CROSS SECTION B - B'

Englobe Corp.
353, Bridge Street East
Kitchener (Ontario) N2K 2Y5
Telephone : 519.741.1313
Fax : 519.741.5422

Prepared K. Ashe	Discipline GEOTECHNICAL	Project manager D. Gonser	
Drawn K. Ashe	Scale 1 : 500	Sequence no. 03 of 03	
Checked D. Gonser	Date 2016-02-04		

M. dept.	Project	Disc.	Dwg no.	Rev.
160	P-0009857-0-01-100	GE	003	00

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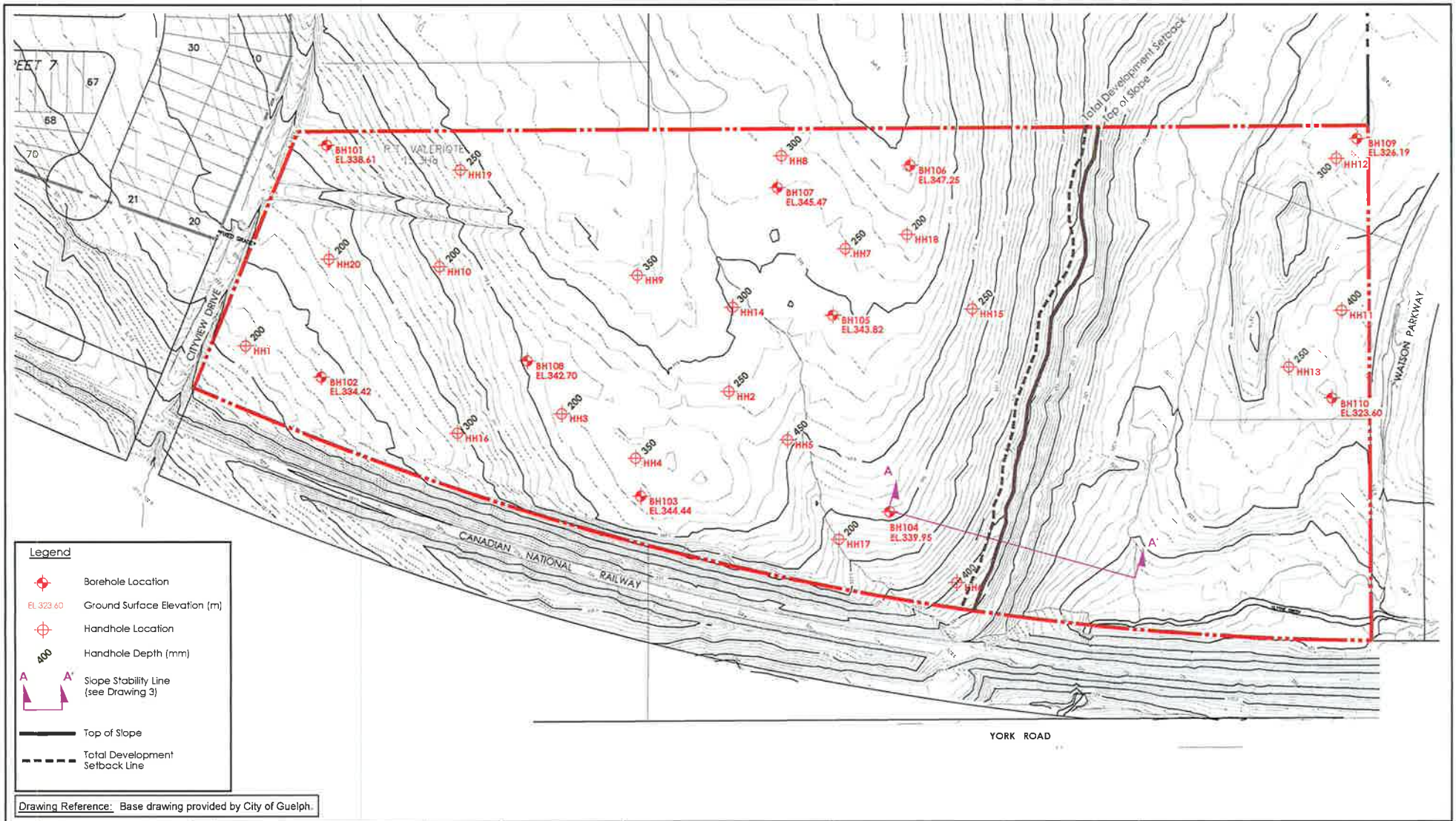


Legend

- Borehole Location
- EL.323.60 Ground Surface Elevation (m)
- Handhole Location
- 400 Handhole Depth (mm)
- A A' Slope Stability Line (see Drawing 3)
- Top of Slope
- Total Development Setback Line

Drawing Reference: Base drawing provided by City of Guelph.

Note:
Locations of site features in this drawing are approximate based on available information. Exact locations must be verified in the field.

No.	Revisions	Date
0	Report Issued	Sept. 2006
1	Report Revised	Jan. 2012
2		
3		

NORTH

Naylor Engineering Associates Ltd
CONSULTING ENGINEERS

P.T. Valeriote Subdivision
Cityview Drive
Guelph, Ontario

SITE PLAN

Date	Scale	Job No.	Drawing No.
Sept. 2006	1:2000	0353G4	2

F:\0353\0353G4\0353G4_02.dwg
August 31, 2006 (SR)

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 104

Ground Elevation: *339.95 m*

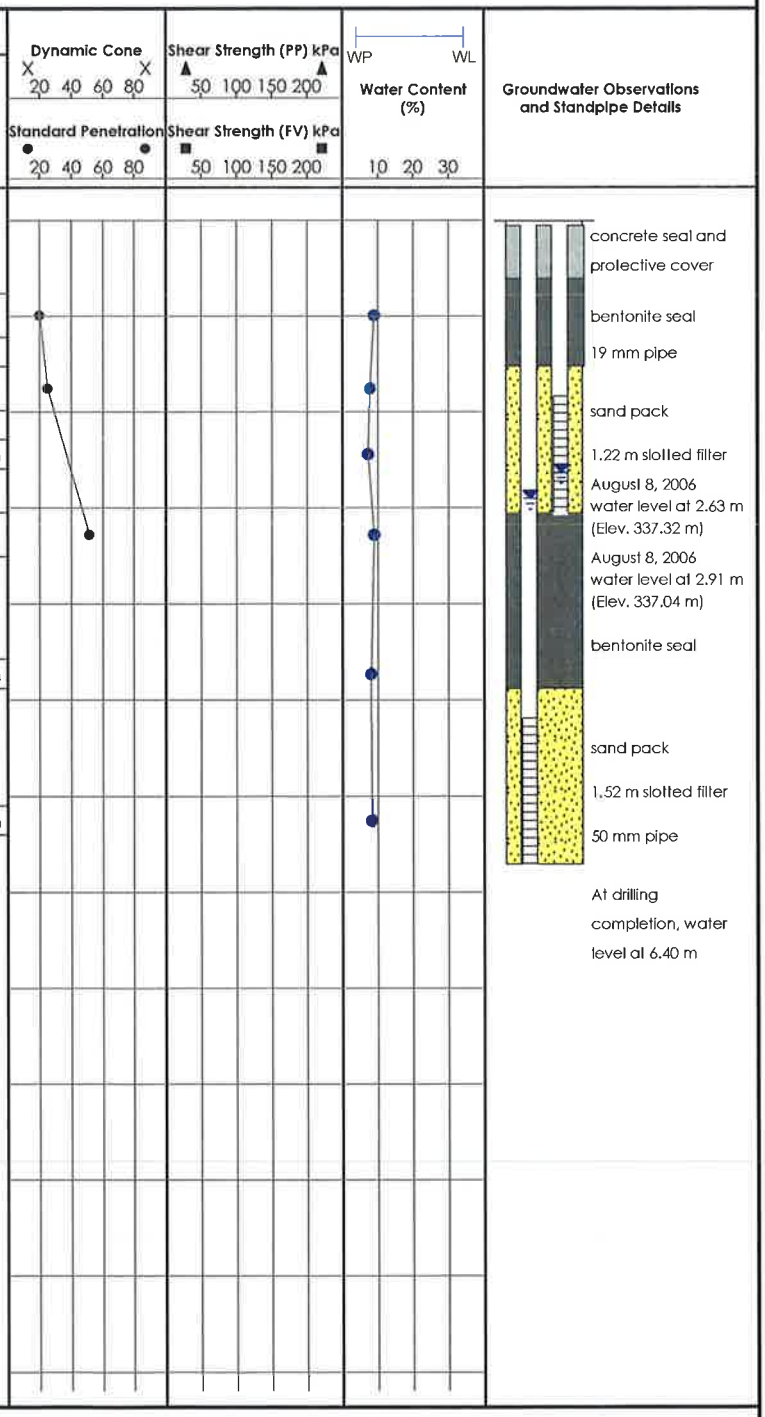
Project: *P.T. Valeriote Subdivision*

Job No.: *0353G4*

Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *July 31, 2006*

Depth (m)	Description	Elevation (m)	Number	Type	N-Value
	Ground Elevation	339.95			
0.00	***TOPSOIL:*** dark brown silt, moist				
	SILT TILL: compact brown sandy silt, some gravel, trace clay, moist	339.00	1	SS	20
1.00					
		338.00	2	SS	25
2.00					
	very dense, moist		3	SS	30\150mm
3.00		337.00	4	SS	51
4.00		336.00			
			5	SS	45\150mm
5.00		335.00			
	cobbles, some dolostone				
6.00		334.00	6	SS	65\150mm
	Borehole terminated at 6.71 m				
7.00		333.00			
8.00		332.00			
9.00		331.00			
10.00		330.00			
11.00		329.00			
12.00		328.00			



Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes:

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates Ltd
CONSULTING ENGINEERS

Borehole Number: 105

Ground Elevation: *343.82 m*

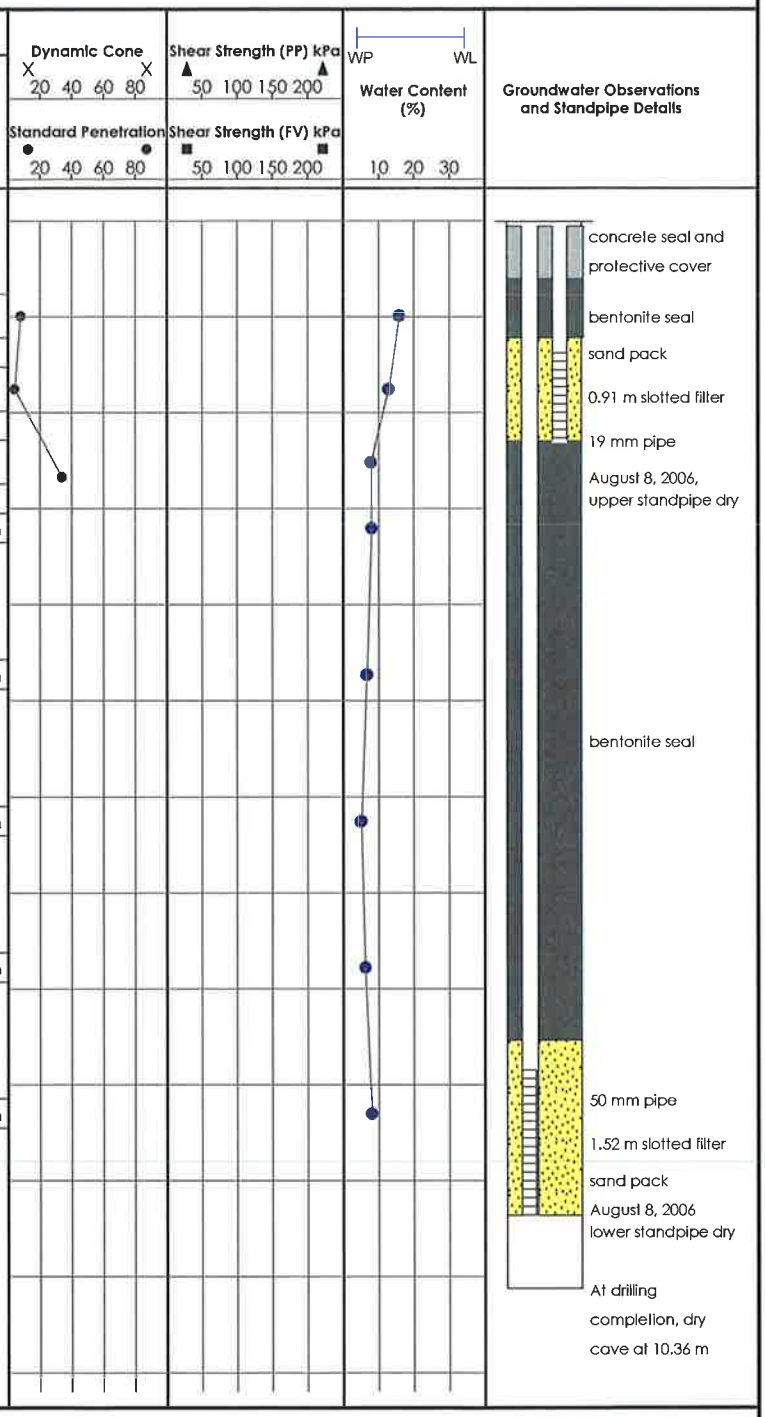
Project: *P.T. Valeriote Subdivision*

Job No.: *0353G4*

Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *July 31, 2006*

Depth (m)	Description	Elevation (m)	Number	Type	N-Value
0.00	Ground Elevation	343.82			
	TOPSOIL: dark brown silt, moist				
1.00	***SILT TILL:*** loose brown silt, some sand, trace clay and gravel, very moist	343.00	1	SS	8
		342.00	2	SS	4
2.00	dense to very dense brown sandy silt		3	SS	34
		341.00			
3.00			4	SS	50\150mm
		340.00			
4.00	some cobbles				
	grey, moist	339.00	5	SS	55\150mm
5.00					
		338.00			
6.00			6	SS	70\150mm
		337.00			
7.00					
		336.00	7	SS	70\150mm
8.00					
		335.00			
9.00			8	SS	60\150mm
		334.00			
10.00					
		333.00			
11.00	augering on bedrock or boulder				
	Borehole terminated at 11.13 m upon auger refusal on bedrock or boulder	332.00			
12.00					



Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes: *Bulk sample taken from 1.22 to 2.13 m.*

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 106

Ground Elevation: *347.25 m*

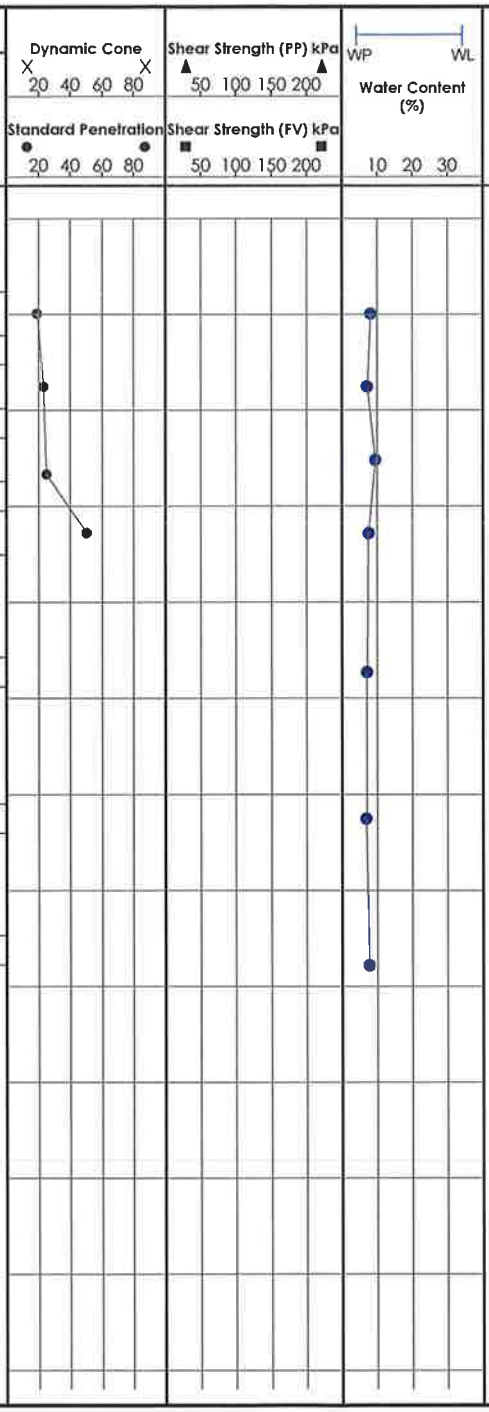
Project: *P.T. Valeriote Subdivision*

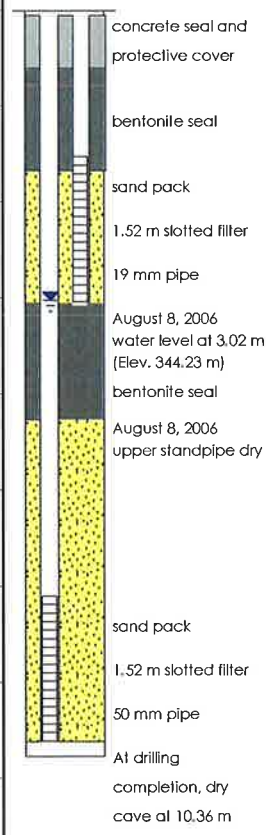
Job No.: *0353G4*

Location: *Cityview Drive, Guelph, Ontario*

Drill Date: *August 2, 2006*

Depth (m)	Description	Elevation (m)	Number	Type	N-Value
0.00	Ground Elevation	347.25			
	TOPSOIL: dark brown silt, moist				
1.00	***SILT TILL:*** compact brown sandy silt, some gravel, trace clay, moist; some cobbles	346.00	1	SS	19
			2	SS	23
2.00	very moist	345.00	3	SS	25
3.00	dense to very dense, moist	344.00	4	SS	50
4.00		343.00			
			5	SS	*
5.00		342.00			
6.00		341.00	6	SS	40\150mm
7.00		340.00			
			7	SS	40\150mm
8.00	Borehole terminated at 7.77 m	339.00			
9.00		338.00			
10.00		337.00			
11.00		336.00			
12.00		335.00			





Reviewed by: *DN*

Drill Method: *Solid Stem Auger*

Notes: *Bulk sample taken from 1.52 to 3.05 m. *Sampler bouncing on gravel.*

Field Tech.: *RM*

Sheet: *1 of 1*

Drafted by: *DC(01a)*

Englobe
englobecorp.com

December 14, 2020

Cityview Ridge Developments Inc.
c/o GM BluePlan Engineering Limited
330 Trillium Drive, Unit D
Kitchener, Ontario N2E 3J2
Attention: Ms. Angela Kroetsch, P.Eng.

Subject: Slope Stability Assessment of East-Facing Slope
Cityview Ridge Subdivision
Cityview Drive
Guelph, Ontario
Our ref.: 160-P-0009857-0-01-100-GE-L-0001-00

Ms. Angela Kroetsch:

Englobe Corp. (Englobe) is pleased to provide this letter report for the slope stability assessment completed for the proposed Cityview Ridge Subdivision on Cityview Drive, Guelph (Location Plan, Drawing 1). The work for this investigation was authorized by Mr. Carson Reid of Cityview Ridge Developments Inc. on January 15, 2018 with additional analyses authorized on February 6, 2019.

The areas being investigated comprise Lots 62 to 78 along the east side of the proposed development. It is understood that a proposed stormwater management (SWM) facility, and adjacent rail corridor are located to the south of the site. Based on preliminary site grading plan, it is understood that the proposed development will involve the placement of fill and construction of retaining walls and a walking trail along the rear of the above-mentioned lots. In addition, the SWM facility construction will include the placement of fill near the top of the slope towards the east side of the site and cutting of the native soils towards the west side of the site.

The purpose of this slope stability assessment is to analyze the impact of the proposed development on the stability of the existing slope at the east side of the site near Lots 62 to 78 (i.e. Cross Sections OO', BB' and XX' as shown in Drawing 2 of attached appendices).

Reference is made to Englobe letter 160-P-0009857-0-01-100-GE-L-0002-00 dated March 01, 2019 for slope stability findings related to the south slope on this site.

General Information

The subject site is located on Cityview Drive, in Guelph Ontario and the area being investigated is located at the east site of the site, near the top of a slope. It is understood that protected natural heritage features (Clythe Creek and a Grand River Conservation Authority (GRCA) regulated wetland) are located at the base of the east slope and a rail line is located at the base of the south slope.

Naylor Engineering Associates Ltd. (NEA) previously completed a geotechnical investigation and slope stability assessment at the subject site including drilling of ten boreholes (Boreholes BH101 to BH110) to depths of 5.6 to 11.1 m for the general area of the proposed development. Based on the findings of this investigation, it is assumed that the existing slopes are comprised of native non-cohesive glacial silt till. It is recommended that a supplementary borehole investigation be conducted specifically for the purpose of slope stability assessment. Groundwater was found to occur in saturated seams at variable depths within the silt till deposit. A slope stability analysis was carried out in the southeast portion of the site and the results of the slope stability analysis found that the slope had a factor of safety of greater than 1.5. We refer the reader to the geotechnical investigation for further information (NEA, Geotechnical Investigation, P.T. Valeriote Subdivision, Cityview Drive, Guelph, Ontario. 0353G4.R01_Rev. February 2012). The relevant borehole logs of the previous investigation and site plan (NEA – Drawing 2 – Site Plan) illustrating the borehole locations have been appended to this letter.

In 2016, Englobe completed further slope stability analyses on the east side slope near Lots 62 to 78 to assess the proposed placement of fill, construction of retaining walls, and construction of a walking trail. The results of the analyses conducted on the east side slope found that the slopes remained stable under the proposed development loading conditions (Englobe Corp., Cityview Ridge Subdivision, Slope Stability Assessment – Lots 62 – 78, Guelph, Ontario, 160-P-0009857-0-01-100-GE-L-0001-01, February 2016).

It is understood that proposed development includes retaining walls, swales, houses, a walking trail, SWM facility, and fill placement near the top of the slope. The proposed retaining walls will traverse along the east side of Lots 72 to 78 and Lot 67, along the east side of the walking trail behind Lots 77 and 78 and along the east side of the walking trail between lot 78 and the SWM facility.

It is further understood that grades at the rear of Lots 75 to 78 are to be raised by up to 3.5 m with final grades near Elevation 340.5 to 341.0 m. The fill will be partially retained by the retaining walls, beyond which it is to be sloped to the east at an inclination of 3 horizontal to 1 vertical, then blend into the existing grades. The thickness of the fill decreases toward the north, and along Lots 68 to 72, the proposed elevation at the rear of the lots is close to or below the existing grades.

The proposed SWM facility will have a pond bottom at Elevation 339.35 m with a permanent pool water level at Elevation 339.75 m and a design regional storm event water level at Elevation 340.32 m. It is understood that the pond will be constructed with a clay liner to Elevation 340.64 m. It is assumed that the clay liner will be designed and constructed in a manner that the storm water management pond will not increase the moisture content of the underlying soil, causing excessive forces and reducing strength of the soil. Toward the west and central portions of the SWM facility, the existing grades are above the proposed finished grades and material will be cut for construction of the facility. Toward the east portion of the SWM facility, the existing grade is near the proposed pond base and material will placed to construct the berms along the outside of the pond. Based on conversation with GM BluePlan Engineering (GMBP), it is understood that surplus onsite material (silt till) will be reused for construction of the SWM facility.

(Gamsby and Mannerow Engineers, Carson Reid Homes, Cityview Ridge, Project Number 105-172, Preliminary Site Grading and Drainage Plan [Drawings 1 and 2], Stormwater Pond Plan and Sections [Drawing 4), Stormwater Pond Cross-Sections [Drawing 5], and Trail Plan and Sections [Drawing 8], Revised June 6, 2017).

Slope Inspection

Englobe completed a site visit on January 20, 2018 to inspect the existing slope conditions. The slope inspections were carried out based on the guidance provided in the Ontario Ministry of Natural Resources (MNR) document: *Technical Guide, River & Stream Systems: Erosion Hazard Limit* and slope ratings for the east slope was produced in accordance with Table 4.2 of the MNR document. The slope inspection rating chart is attached to this letter and show that the east slope had a rating of 25 points, indicating Slight Potential.

Slope Stability Assessment

For the slope stability analyses, Cross-Sections X-X and O-O were used from the provided topographic plan whereas, the Cross-Section B-B' was created based on topographic data provided by Gamsby and Mannerow Engineers. The locations of the sections are shown on our Drawing 2, Site Plan. These cross sections were created to represent worst case scenarios, where the slopes were the steepest and the proposed additional loading was greatest.

Following the GRCA policy, the design range for the factor of safety (FOS) must be 1.3 to 1.5 or greater. Considering the potential for loss of life or significant injury in the event of slope failure, Englobe recommends that a factor of safety of 1.5 should be targeted as the design factor of safety.

The information from the boreholes and cross-sections were used for computer analyses of the slope stability using the Slope/W Program (Morgenstern-Price Method). The soil parameters used in this analysis have been estimated based on the information from the existing boreholes, site laboratory testing, local experience, and available literature correlations and are provided in Table 1.

Table 1: Soil Parameters

SOIL MATERIAL	UNIT WEIGHT (kN/m^3)	ANGLE OF INTERNAL FRICTION (°)	COHESION (kPa)
Silt Till, loose	22	32	0
Silt Till, compact	22-23	32-33	0
Silt Till, dense to very dense	23.3	35	0

Standard Proctor moisture-density testing carried out during the previously referenced NEA indicated that if the soil was compacted to 100% standard Proctor maximum dry density (SPMDD) at the approximate optimum moisture content, the bulk unit weight of the material would be in the range of 22 to 23.3 kN/m3 and such, this range of unit weights were selected in the analysis.

Based on the gradation analyses carried out on samples of the glacial till during the NEA investigation, the material was found to comprise sand and silt with trace to some gravel, and traces of clay. Typically soils containing trace amounts of clay do not exhibit reliable and consistent cohesive strength, therefore, no cohesion was applied in the analyses.

The angle of internal frictions that were used in the analyses are based on the measured standard penetration testing (SPT) N-values obtained during the NEA investigation. The relative density of the glacial till soils, based on the SPT N-values was found to range from loose to very dense, and increased with depth. The soil layers modelled in the analysis were based on the relative densities as determined by the N-values. The angle of internal frictions that were utilized for each soil layer are based on local experience and laboratory testing performed on projects with similar soil conditions as well as published correlations summarized in the publication *Performance and use of the Standard Penetration Test in Geotechnical Engineering Practice* (McGregor, and Duncan, Centre for Geotechnical Practice and Research, Virginia Polytechnic Institute and State University, October 1998).

Suspected bedrock was encountered but was not proven by coring during the NEA investigation. Based on local area knowledge, bedrock outcrops are present to the south of the site in the area between the railroad tracks, York Road, and Cityview Drive South. Based on available bedrock mapping and water well records, it is anticipated that the bedrock surface is located at depths exceeding 20 m below ground surface to the north of the site. Based on the available data, bedrock is suspected to slope downwards towards the north but reliable data to determine the bedrock elevation on the site is not available and as such the soil was conservatively assumed to be continuous to Elevation 300 m.

The following additional assumptions have been made in order to assess the possible impact of the proposed structures on the slope stability at the subject site:

- Residential foundations will be designed as per the previous NEA geotechnical report and the Ontario Building Code and were modelled to exhibit a surcharge load equivalent to 75 kPa.
- The proposed retaining wall will be adequately designed for sliding and overturning.
- Grades of the site will be raised (where applicable) with well compacted subgrade or structural fill utilizing the onsite glacial till. The fill is placed in 300 mm thick lifts and compacted to 95% SPMDD (general subgrade fill) or 98% SPMDD (structural fill for residential buildings and below retaining walls) at a minimum.
- The proposed fill materials were conservatively assumed to exhibit a surcharge load of 23.3 kN/m^3 based on a compaction of 100% SPMDD.
- The assumed groundwater depth was modelled at the top of the slope to be approximately 0.5 m higher than the groundwater level encountered in the closest relevant NEA monitoring well for each cross section. It is recommended supplementary borehole investigation with monitoring wells, provide current information for the slope stability assessment. For the east side slope, the groundwater was modelled to be at ground surface where the slope met the GRCA 100-year floodplain.

A slope stability analysis was carried out on three cross sections (O-O', X-X' and B-B')for a number of potential failure types using computer software (GeoStudio SLOPE/W – Morgenstern-Price Method). The various failures analyzed included shallow slumping type failure of the slope surface, medium depth rotational failures, and deep rotational failures. At each cross-section location, the existing and proposed conditions were modelled to determine the impact of the proposed development on the slope stability. The GeoStudio SLOPE/W print outs for each analyzed scenario are attached as Slope Figures 1 to 6 and the results are summarized below, and in Table 2.

Table 2: Cross Section Summary

CROSS SECTION	EXISTING MINIMUM FACTOR OF SAFETY	MINIMUM FACTOR OF SAFETY UNDER PROPOSED CONDITIONS	STABLE SLOPE SETBACK FOR FACTOR OF SAFETY OF 1.5	EROSION SETBACK	ACCESS ALLOWANCE SETBACK	TOTAL DEVELOPMENT SETBACK FROM TOP OF SLOPE
Cross Section B-B'	>1.5	>1.5	N/A	1.0 m	6.0 m	7.0 m
Cross Section O-O'	>1.5	>1.5	N/A	1.0 m	6.0 m	7.0 m
Cross Section X-X'	>1.5	>1.5	N/A	1.0 m	6.0 m	7.0 m

The results of the slope stability assessment completed for the slope sections on the east side of the site and considering the proposed retaining walls, houses and fill indicate FOS in excess of 1.5 for all three of the analyzed cross sections on the east side of the site. The slope setbacks applied during the aforementioned NEA investigation, as shown on the attached Drawing 2, are appropriate for the given conditions.

The top of slope and development setback lines are shown on the attached Drawings 2. As portions of the proposed development are located beyond the stable slope and development setback limits, the development will need to be modified and the slope should be analyzed under the actual proposed conditions when they are finalized.

The protected natural heritage features (Clythe Creek and the associated wetlands) are located beyond the toe of the east side slope. As the calculated factor of safety of the slope on the east side is greater than 1.5 under the proposed development conditions, there is a low potential for these areas to be impacted by slope failure.

Retaining Wall Design and Construction Considerations

The construction of the proposed retaining walls and trail along the east side of the site should be feasible with the following considerations. The design of the retaining walls should be performed by a licensed structural engineer. The retaining wall must be designed to resist the lateral earth pressures. For calculating the lateral earth pressure for walls, an active earth pressure coefficient (Ka) of 0.36, an at-rest earth pressure coefficient (Ko) of 0.53 and a soil unit weight of 19 to 21 kN/m3 may be used. An

appropriate safety factor should be employed and recommendations of Section 24 of Canadian Foundation Engineering Manual should be followed.

We recommend that the backfill for the wall comprise clean free-draining granular material such as OPSS.MUNI 1010 Granular B Type 1. The soils encountered on-site are not considered suitable for reuse as retaining wall backfill. The backfill should be placed in thin lifts and compacted to 95% standard Proctor maximum dry density (SPMDD). Over-compaction should be avoided since this may cause excessive lateral earth pressures against the retaining walls. It is recommended that backfilling operations be inspected in order to approve the backfill materials and ensure the proper degree of compaction is being achieved.

Subdrains should be installed behind the retaining wall foundations. The subdrains should comprise minimum 150 mm diameter perforated pipes with filter sock and sand bedding (OPSS Concrete Sand). The subdrains must drain by gravity to a frost free outlet.

The slope behind the retaining wall should be graded with an inclination of 3.0 horizontal to 1.0 vertical or flatter and the soil considered as surcharge in the retaining wall design. The finished slopes should be topsoiled and vegetated as soon as possible after construction to minimize surface erosion. The minimum topsoil thickness should be 100 mm. Some routine maintenance of the slope surfaces may be required to address minor long-term weathering and erosion.

To reduce surface runoff over the retaining wall and down the slope it is recommended that surface runoff be diverted behind the retaining wall and lead to a positive outlet.

We trust that this information is complete and suitable for your present requirements. If you have any questions or require further information, please do not hesitate to contact our office.

Yours very truly,

Puneet Verma, P.Eng.
Geotechnical Engineer

Ala Abu Obeid, M.Sc., P.Eng., PMP
Senior Geotechnical Engineer

Encl.	Drawing 1 – Location Plan
Encl.	Drawing 2 – Site Plan – East Side
Encl.	Slope Figures 1 to 6 – GeoStudio printouts
Encl.	Slope Stability Rating Chart – East Side Slope
Encl.	NEA – Drawing 2 – Site Plan
Encl.	NEA – Figures 1 to 3 – Lab Testing Results
Encl.	NEA – Boreholes BH101 to BH108

LICENSED PROFESSIONAL ENGINEER
P. VERMA
100500892
14/12/20
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LICENSED PROFESSIONAL ENGINEER
A. N. ABU OBEID
100113422
14/12/20
PROVINCE OF ONTARIO

Statement of Limitations

The geotechnical recommendations provided in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known at the time of report preparation, we recommend that we be retained during the final design stage to verify that the geotechnical recommendations have been correctly interpreted in the design. Also, if any further clarification and/or elaboration are needed concerning the geotechnical aspects of the project, Englobe should be contacted. We recommend that we be retained during construction to confirm that the subsurface conditions do not deviate materially from those encountered in the test holes and to ensure that our recommendations are properly understood.

The geotechnical recommendations provided in this report are intended for the use of the owner and its retained designer. They are not intended as specifications or instructions to contractors. Any use which a contractor makes of this report, or decisions made based on it, are the responsibility of the contractor. The contractor must also accept the responsibility for means and methods of construction, seek additional information if required, and draw their own conclusions as to how the subsurface conditions may affect their work. Englobe accepts no responsibility and denies any liability whatsoever for any damages arising from improper or unauthorized use of the report or parts thereof.

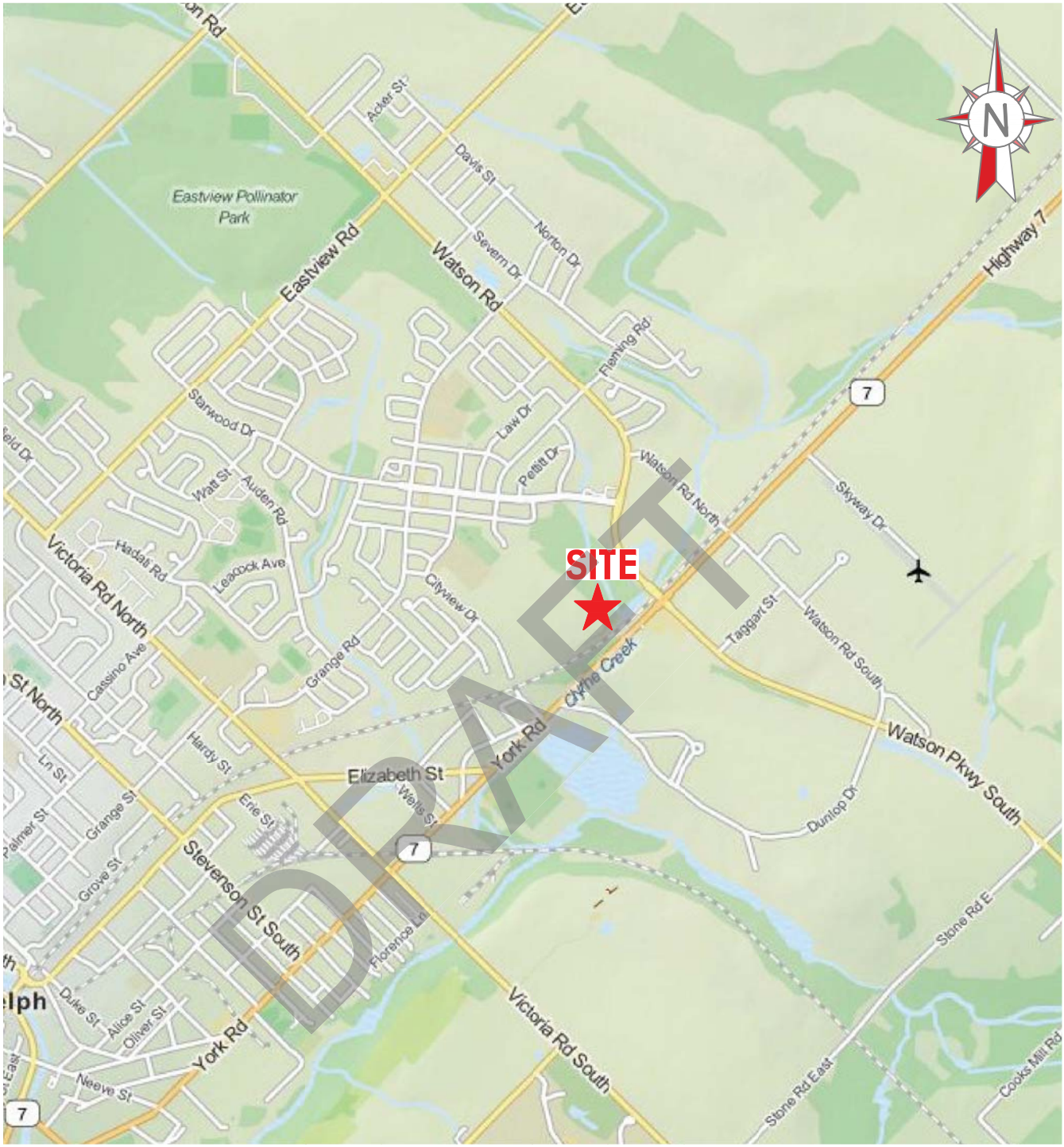
It should be noted that the soil boundaries indicated on the borehole log are inferred from noncontinuous sampling and observations during drilling and should not be interpreted as exact planes of geological change. These boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design. Also, the subsoil and groundwater conditions have been determined at the borehole locations only.

It is further noted that, depending on the time of year the field work was completed, water levels should be expected to vary, perhaps significantly from those observed at the time of this investigation.

It is important to note that the geotechnical investigation involves a limited sampling of the site gathered at specific test hole locations and the conclusions in this report are based on this information gathered. The subsurface geotechnical, hydrogeological, environmental and geologic conditions between and beyond the test holes will differ from those encountered at the test holes. Also, such conditions are not uniform and can vary over time. Should subsurface conditions be encountered which differ materially from those indicated at the test holes, we request that we be notified in order to assess the additional information and determine whether or not changes should be made as a result of the conditions.

The Englobe recommendations are contingent upon provision of a consistently competent, stable subgrade, which is properly drained and free of soft spots and objectionable materials such as organics.

All construction works should only be completed during periods of favourable weather. The need for continuous construction supervision by a qualified, experienced technician, and quality control testing during construction projects cannot be over-emphasized. All materials and construction services required should be in accordance with Ontario Provincial Standard Specifications.



NOTES :
1-REFERENCES : © OpenStreetMap contributors (2018).

0 250 500 750 1000 m
SCALE 1:25000

Project

Cityview Ridge Subdivision
Slope Stability Assessment

Guelph, Ontario

Title

LOCATION PLAN

Englobe

Englobe Corp.
353, Bridge Street East
Kitchener (Ontario) N2K 2Y5
Telephone : 519.741.1313
Fax : 519.741.5422

Prepared	E.Ciochon	Discipline	GEOTECHNICAL	Project manager	D. Gonser
Drawn	E.Ciochon	Scale	1 : 25000	Sequence no.	01 of 03
Checked	D. Gonser	Date	2018-01-23		

M. dept.	Project	Disc.	Dwg no.	Rev.
160	P-0009857-0-02-101	GE	001	00

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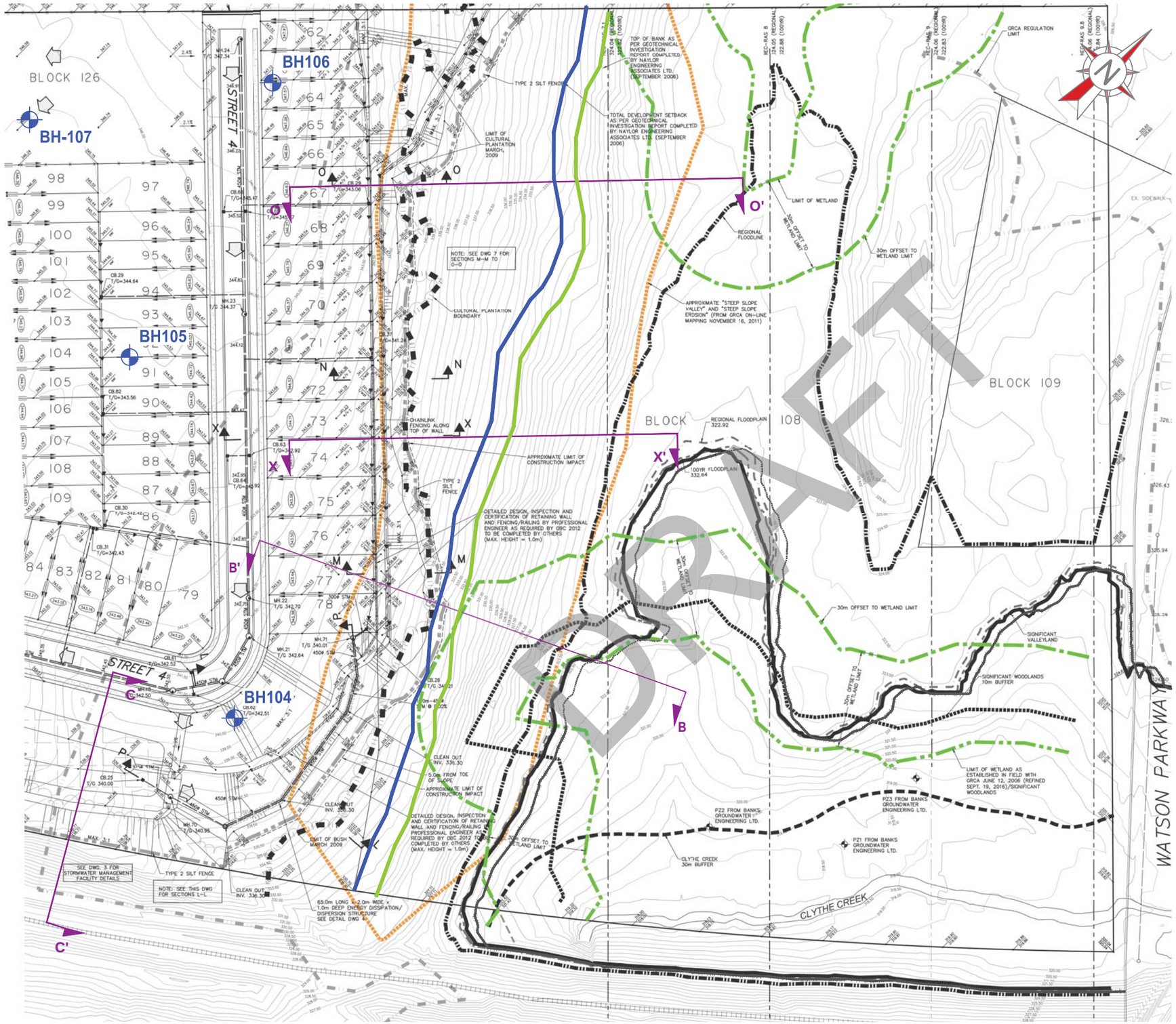

LEGEND :

- MONITORING WELL LOCATION (Previous NEA Investigation, Project No.0353G4, 2006)
- B B' CROSS SECTION
- TOTAL DEVELOPMENT SETBACK
- TOP OF SLOPE

0 10 20 30 40 50 m

SCALE 1:1250

NOTES :

1-REFERENCES : GAMSBY AND MANNEROW ENGINEERS, Carson Reid Homes Cityview Ridge, Preliminary Grading and Drainage Plan, Project Number 105-172, Drawing Number 2, Revised June 22, 2017.

2-Drawing scale may be distorted due to file conversion and/or copying. Measurements taken from the drawing must be verified in the field.

Project

Cityview Ridge Subdivision
Slope Stability Assessment

Guelph, Ontario

Title

SITE PLAN

Englobe Corp.
353, Bridge Street East
Kitchener (Ontario) N2K 2Y5
Telephone : 519.741.1313
Fax : 519.741.5422

Prepared E.Ciochon	Discipline GEOTECHNICAL
Drawn E.Ciochon	Scale 1:1250
Checked D. Gonser	Date 2018-01-22
Project manager D. Gonser	Sequence no. 02 of 03

M. dept.	Project	Disc.	Dwg no.	Rev.
160	P-0009857-0-02-101	GE	002	00

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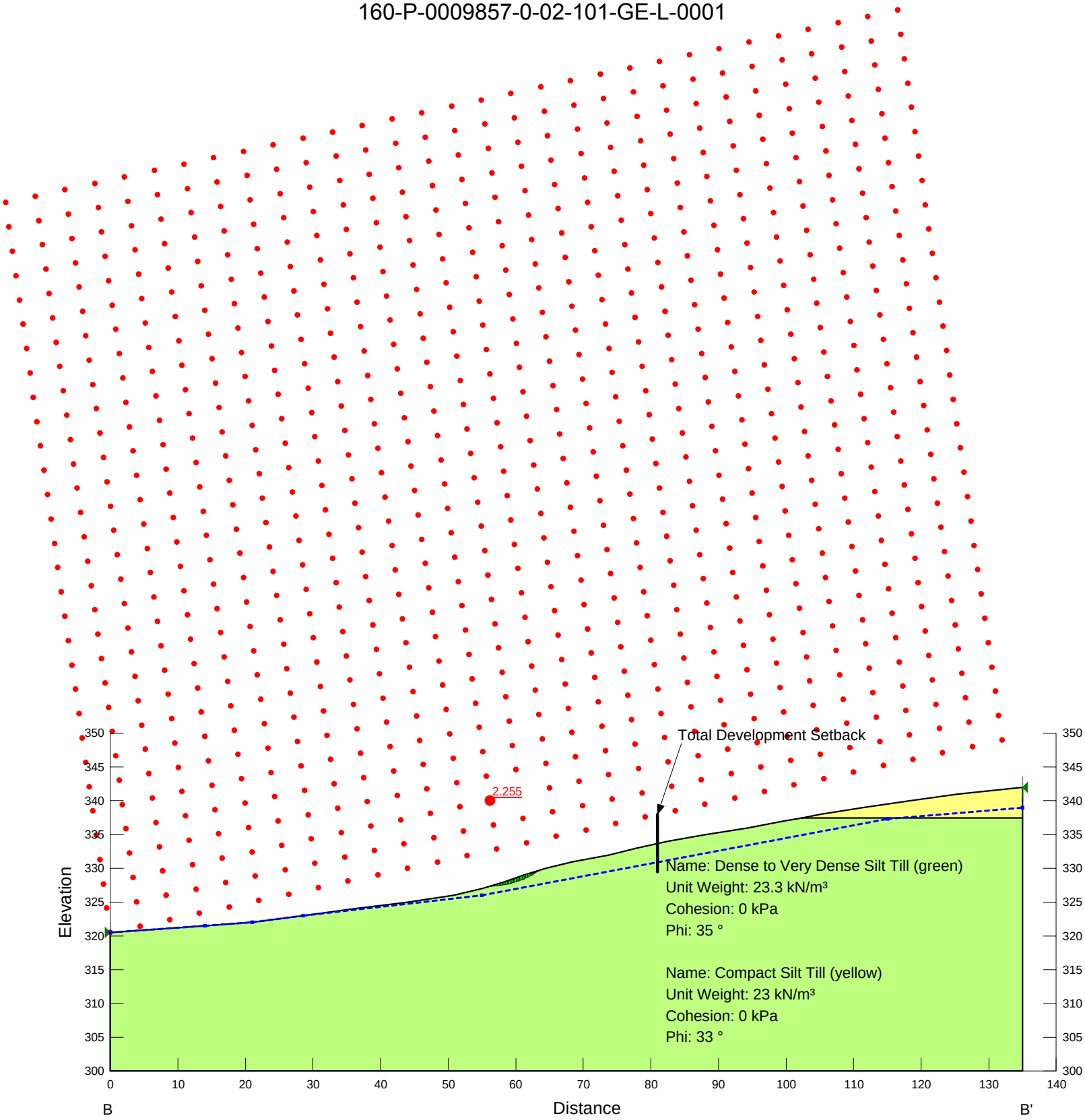
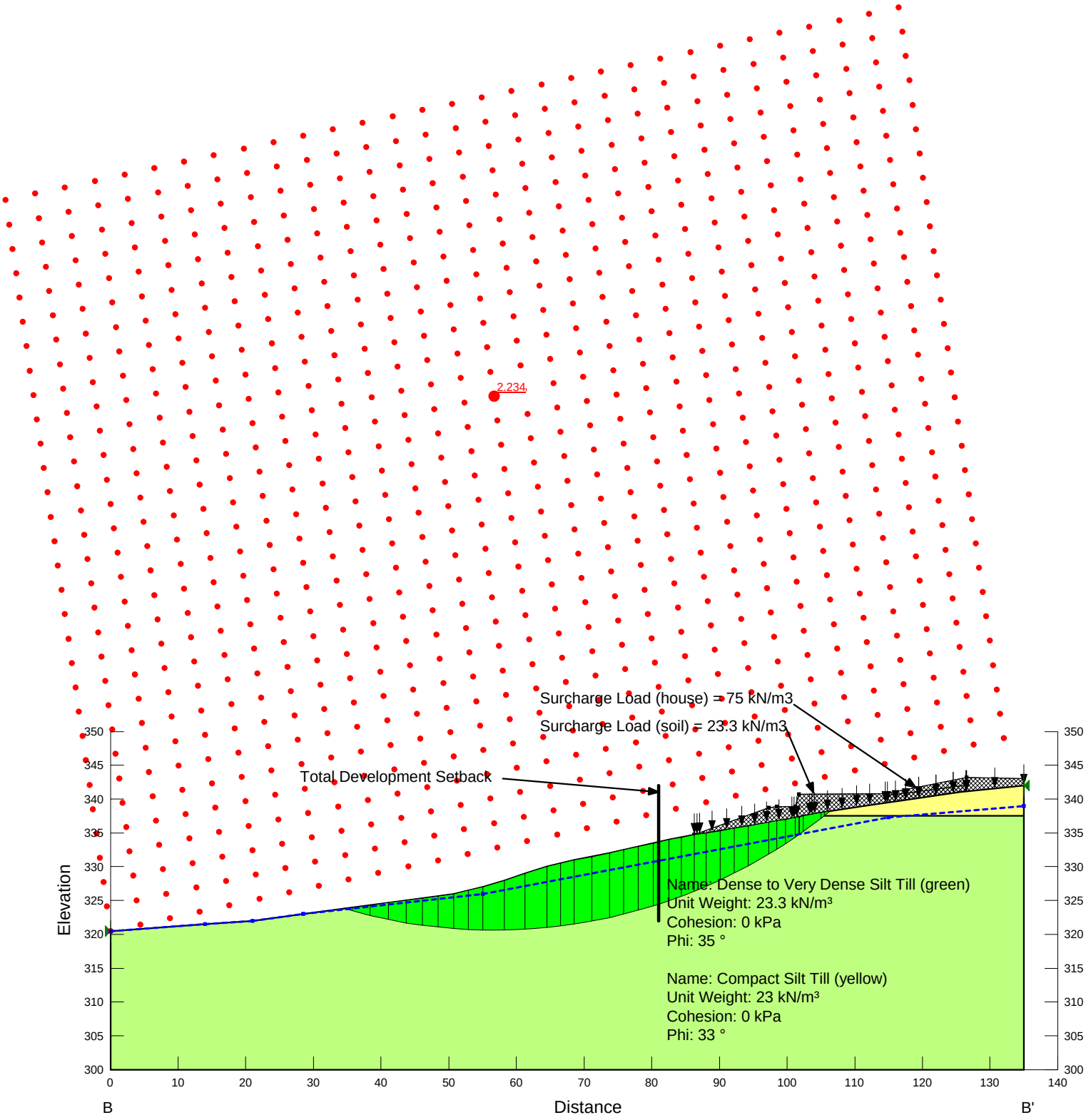
Slope Figure 1: Cross Section BB – Existing Conditions
Cityview Ridge Subdivision
Guelph, Ontario
160-P-0009857-0-02-101-GE-L-0001



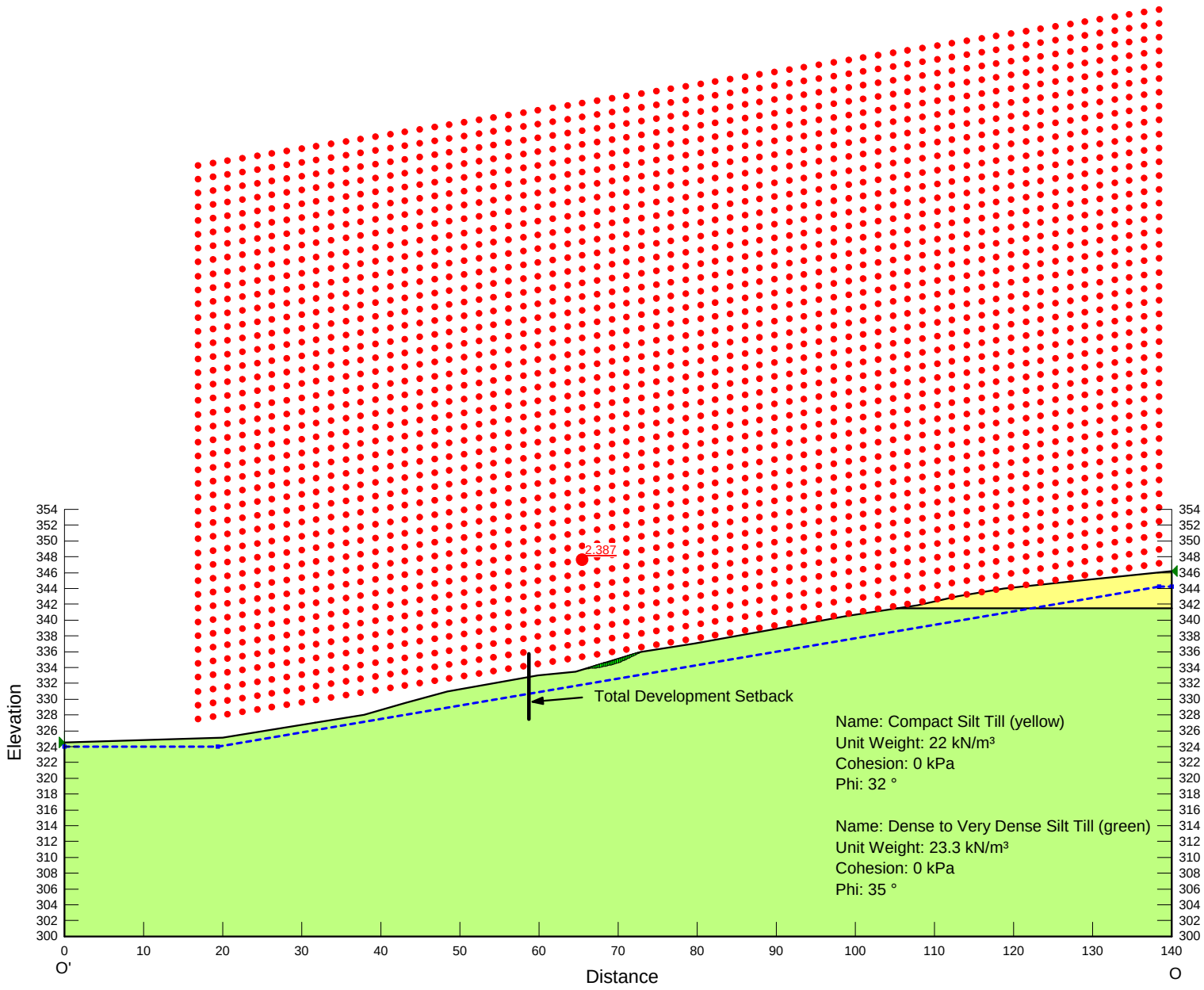
Englobe

Slope Figure 2: Cross Section BB – Proposed Conditions
Cityview Ridge Subdivision
Guelph, Ontario
160-P-0009857-0-02-101-GE-L-0001



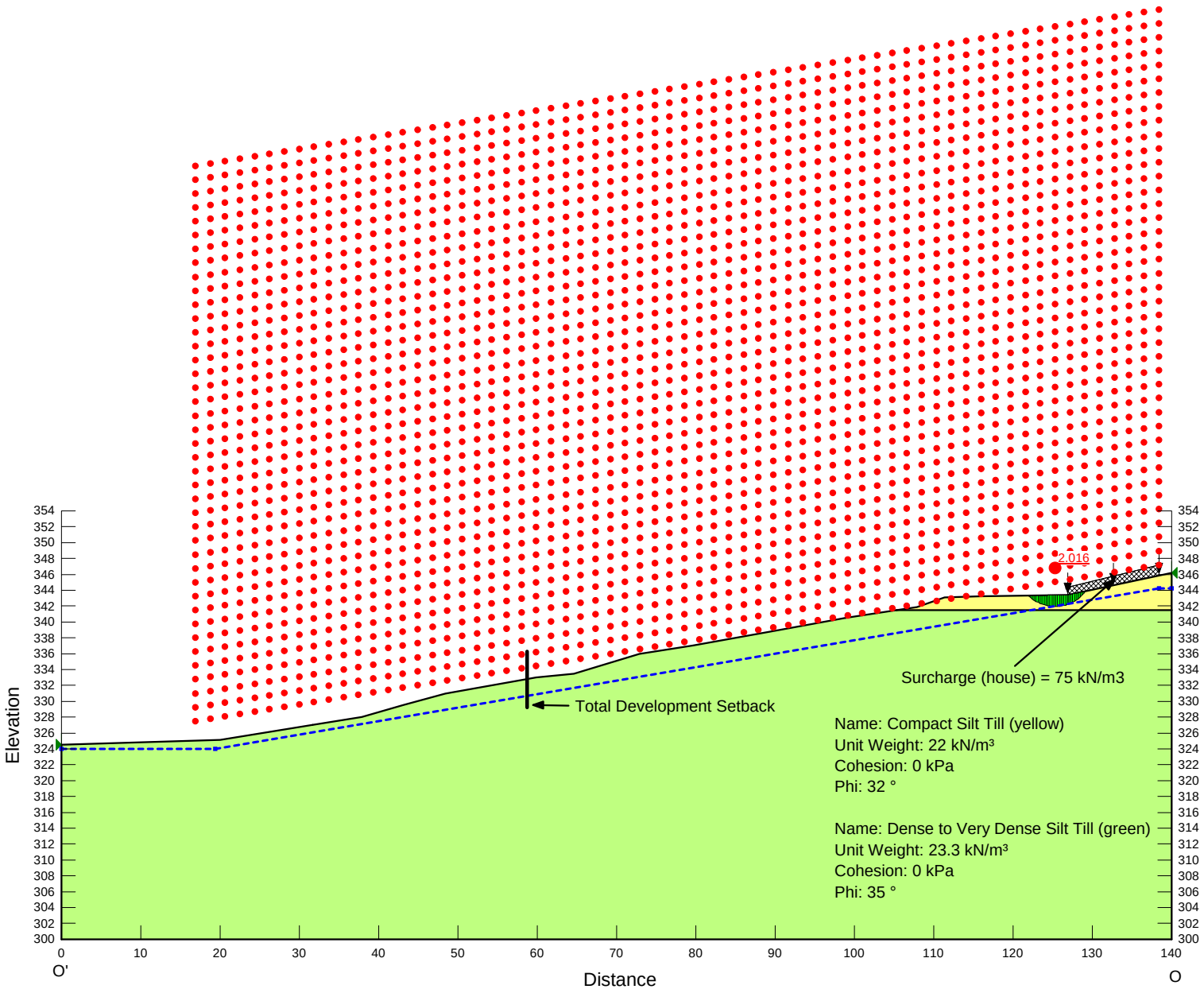
Englobe

Slope Figure 11: Cross Section OO – Existing Conditions
Cityview Ridge Subdivision
Guelph, Ontario
160-P-0009857-0-02-101-GE-L-0001

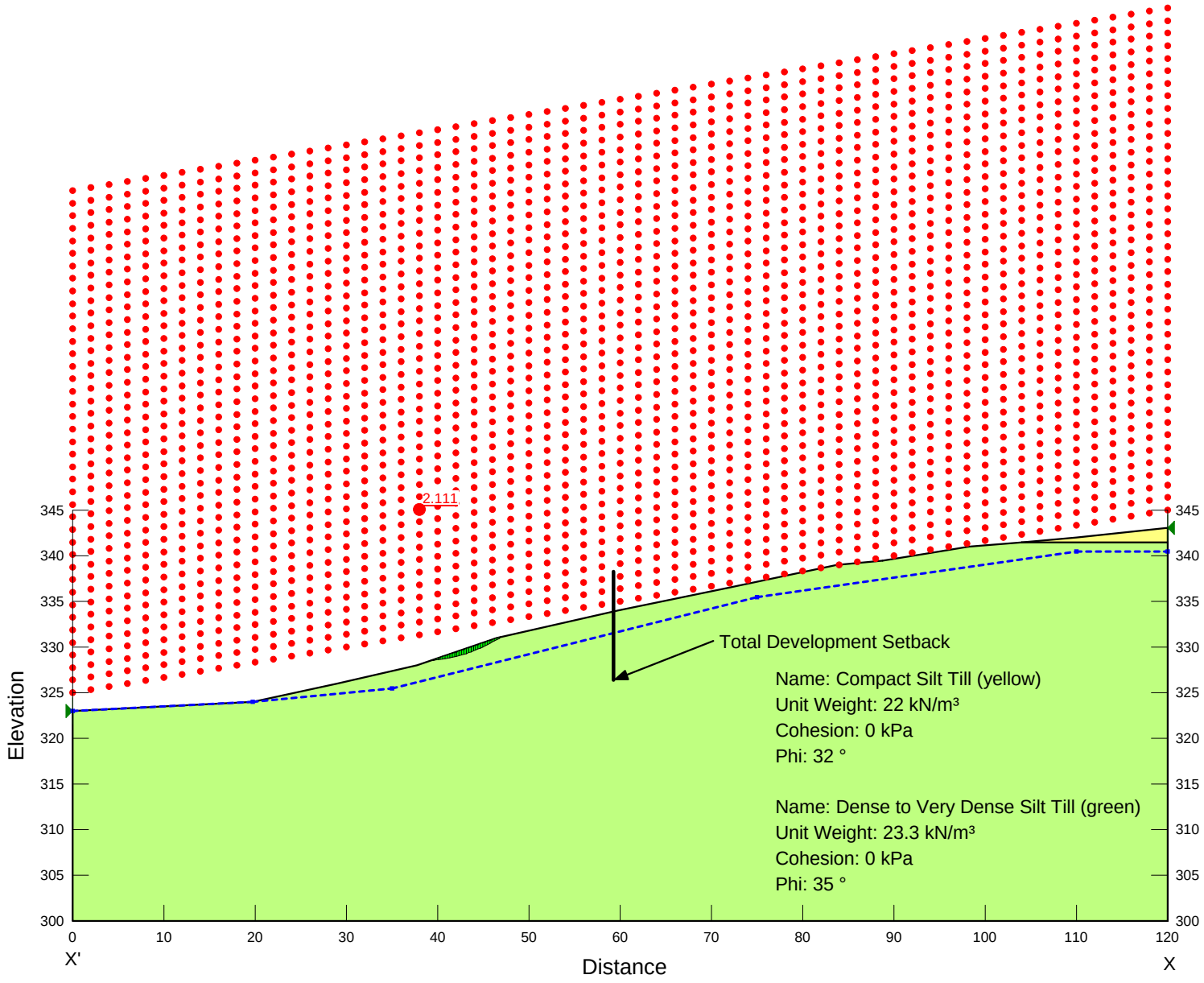


Englobe

Slope Figure 12: Cross Section OO – Proposed Conditions
Cityview Ridge Subdivision
Guelph, Ontario
160-P-0009857-0-02-101-GE-L-0001

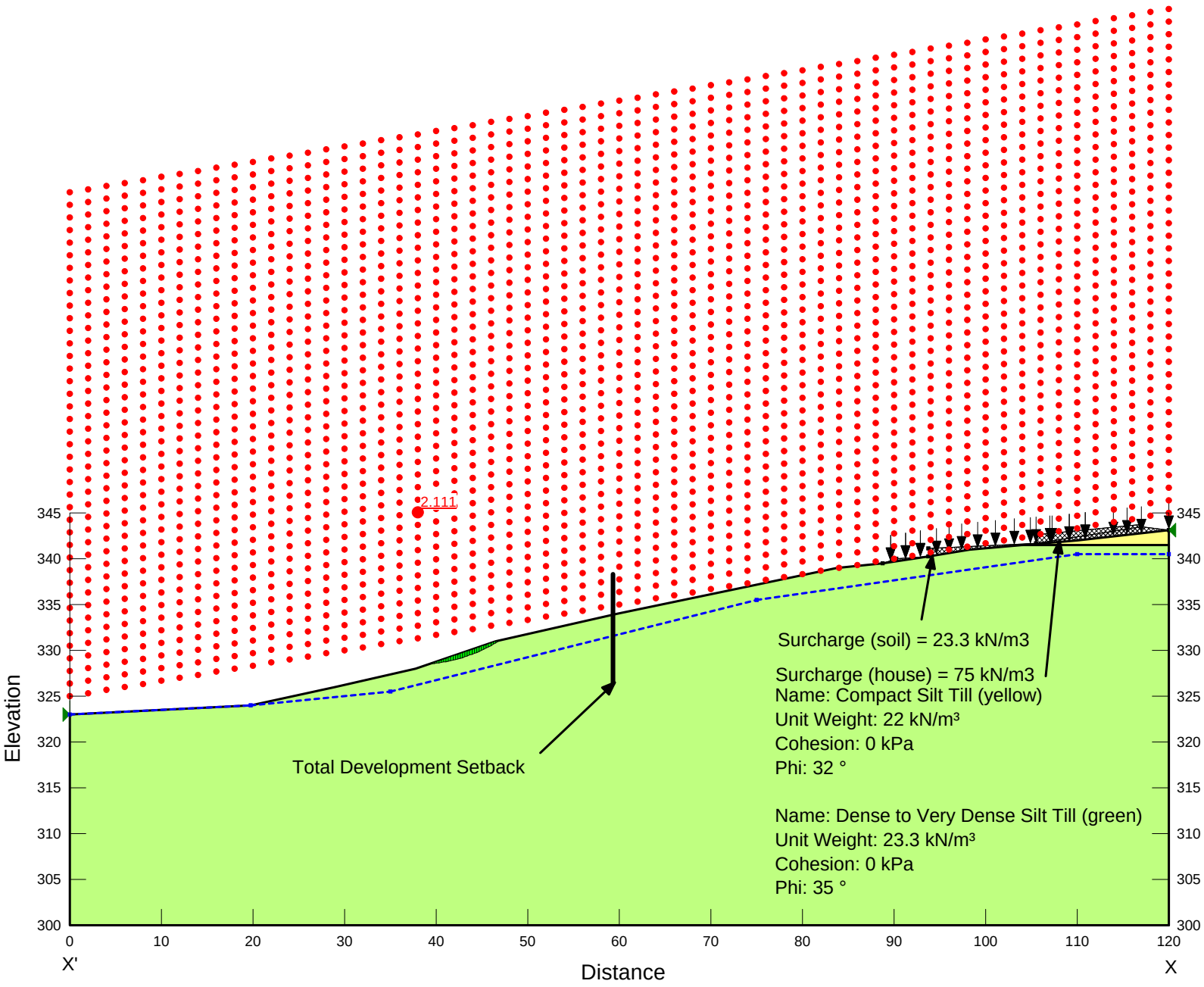


Slope Figure 13: Cross Section XX – Existing Conditions
Cityview Ridge Subdivision
Guelph, Ontario
160-P-0009857-0-02-101-GE-L-0001



Englobe

Slope Figure 14: Cross Section XX – Proposed Conditions
Cityview Ridge Subdivision
Guelph, Ontario
160-P-0009857-0-02-101-GE-L-0001



Englobe

SLOPE STABILITY RATING CHART

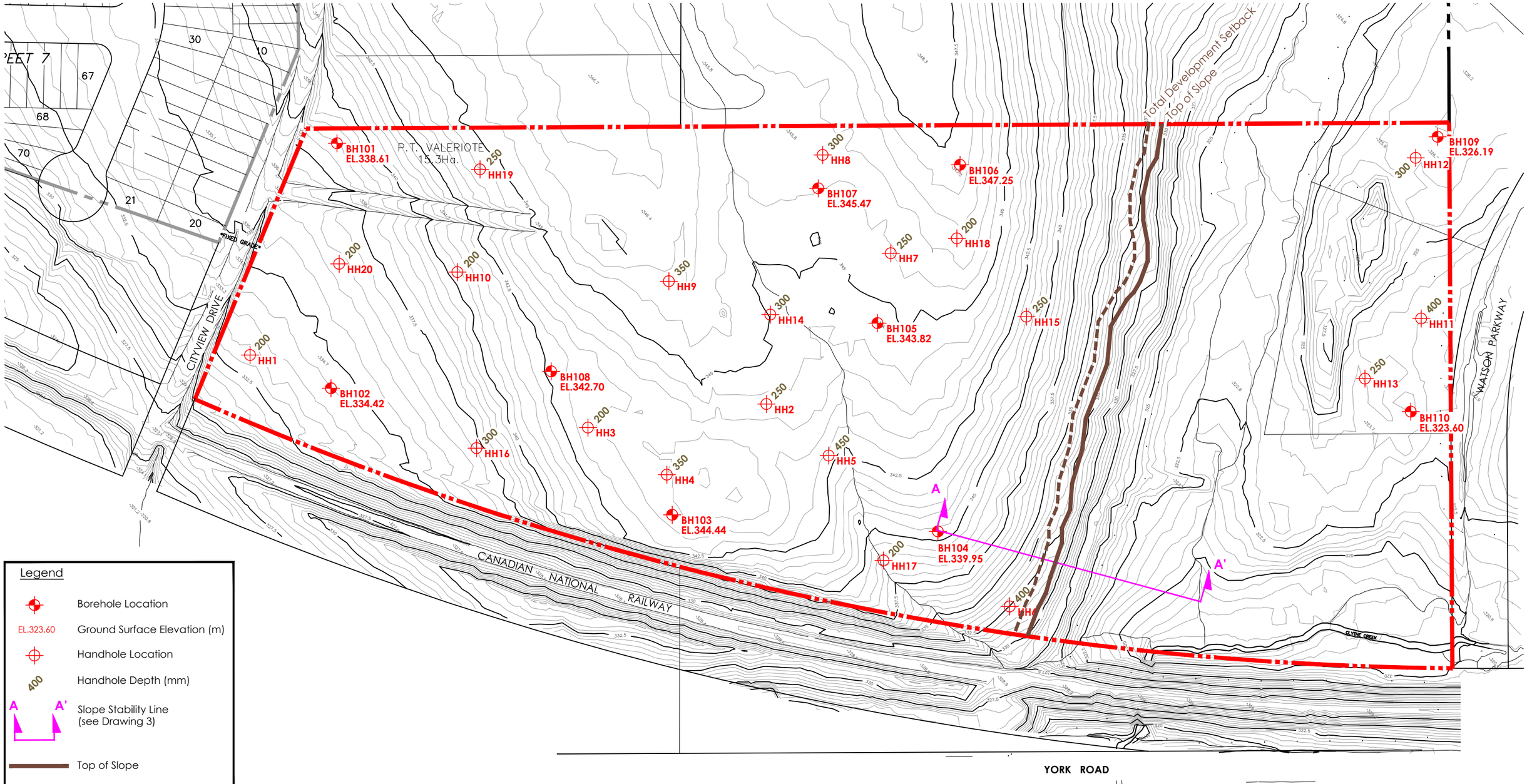
East Side Slope

Site Location:	Cityview Ridge Development	**Project No.:**	P-0009857-0-02-101
Client:	Carson Reid Homes	**Inspection Date:**	January 20, 2018
Inspected By:	D.Gonser	**Weather:**	Sun & Cloud, 5 degrees

1. SLOPE INCLINATION			
Degrees:	***Horizontal : Vertical***		
a) 18 or less	3 : 1 or flatter	0	
b) 18 – 26	2 : 1 to more than 3 : 1	6	
c) more than 26	steeper than 2 : 1	16	0
2. SOIL STRATIGRAPHY			
a) Shale, Limestone, Granite (Bedrock)		0	
b) Sand, Gravel		6	
c) Glacial Till		9	
d) Clay, Silt		12	
e) Fill		16	
f) Leda Clay		24	9
3. SEEPAGE FROM SLOPE FACE			
a) None or near bottom only		0	
b) Near mid-slope only		6	
c) Near crest only or from several levels		12	0
4. SLOPE HEIGHT			
a) 2.0 m or less		0	
b) 2.1 to 5.0 m		2	
c) 5.1 to 10.0 m		4	
d) more than 10.0 m		8	8
5. VEGETATION COVER ON SLOPE FACE			
a) Well vegetated, heavy shrubs or forested with mature trees		0	
b) Light vegetation, mostly grass, weeds, occasional trees, shrubs		4	
c) No vegetation, bare		8	0
6. TABLE LAND DRAINAGE			
a) Table land flat, no apparent drainage over slope		0	
b) Minor drainage over slope, no active erosion		2	
c) Drainage over slope, active erosion, gullies		4	2
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE			
a) 15 m or more from slope toe		0	
b) less than 15 m from slope toe		6	6
8. PREVIOUS LANDSLIDE ACTIVITY			
a) No		0	
b) Yes		6	0
SLOPE INSTABILITY RATING VALUES INVESTIGATION RATING SUMMARY		**TOTAL**	25

Reference: Ministry of Natural Resources, Technical Guide River & Stream Systems: Erosion Hazard Limit, Table 4.2

Englobe



Legend

- Borehole Location
- EL.323.60 Ground Surface Elevation (m)
- Handhole Location
- 400 Handhole Depth (mm)
- A A' Slope Stability Line (see Drawing 3)
- Top of Slope
- Total Development Setback Line

Drawing Reference: Base drawing provided by City of Guelph.

Note:
Locations of site features in this drawing are approximate based on available information. Exact locations must be verified in the field.

No.	Revisions	Date
0	Report Issued	Sept. 2006
1	Report Revised	Jan. 2012
2		
3		

NORTH

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

P.T. Valeriote Subdivision
Cityview Drive
Guelph, Ontario

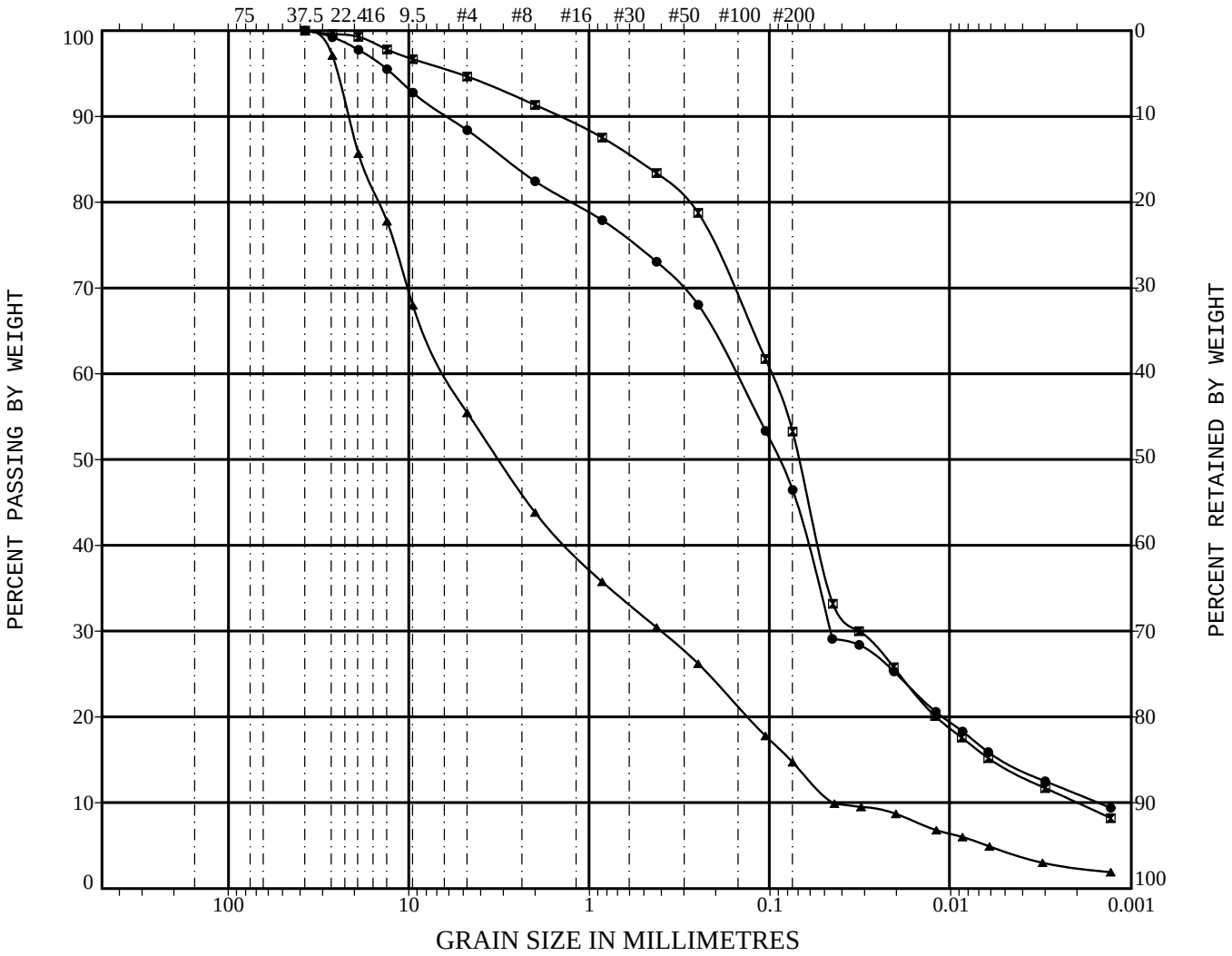
SITE PLAN

Date	Scale	Job No.	Drawing No.
Sept. 2006	1:2000	0353G4	2

F:\0353\0353G4\0353G4_02.dwg
August 31, 2006 (SR)

UNIFIED SOIL CLASSIFICATION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN MILLIMETRES			U.S. STANDARD SIEVE No.			HYDROMETER



PROJECT P.T. Valeriote Subdivision

LOCATION Cityview Drive, Guelph, Ontario JOB NO. 0353G4

CURVE ID	BOREHOLE/ TEST PIT	SAMPLE NO.	DEPTH (m)	SOIL DESCRIPTION
●	BH101	BS	1.85-3.05	SILT TILL: SILT and SAND, some Gravel, trace Clay
⊠	BH105	BS	1.22-2.13	SILT TILL: SAND and SILT, trace Gravel and Clay
▲	BH110	Sa2	5.00-6.50	SAND AND GRAVEL, some Silt

REMARKS

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Figure No. 1

FIGURE NO. 2

Naylor Engineering Associates Ltd. CONSULTING ENGINEERS

LABORATORY PROCTOR MOISTURE-DENSITY TEST

PROJECT: P.T. Valeriote Subdivision

LOCATION: Cityview Drive, Guelph, Ontario

JOB NO.: 0353G4

BOREHOLE NO.: BH105

DATE TESTED: August 21, 2006

SAMPLE DEPTH: 1.22 – 2.13

TESTED BY: WF

SOIL TYPE: SILT TILL

MOISTURE CONTENT: 14.9%

REMARKS:

STANDARD PROCTOR – ASTM D698-91

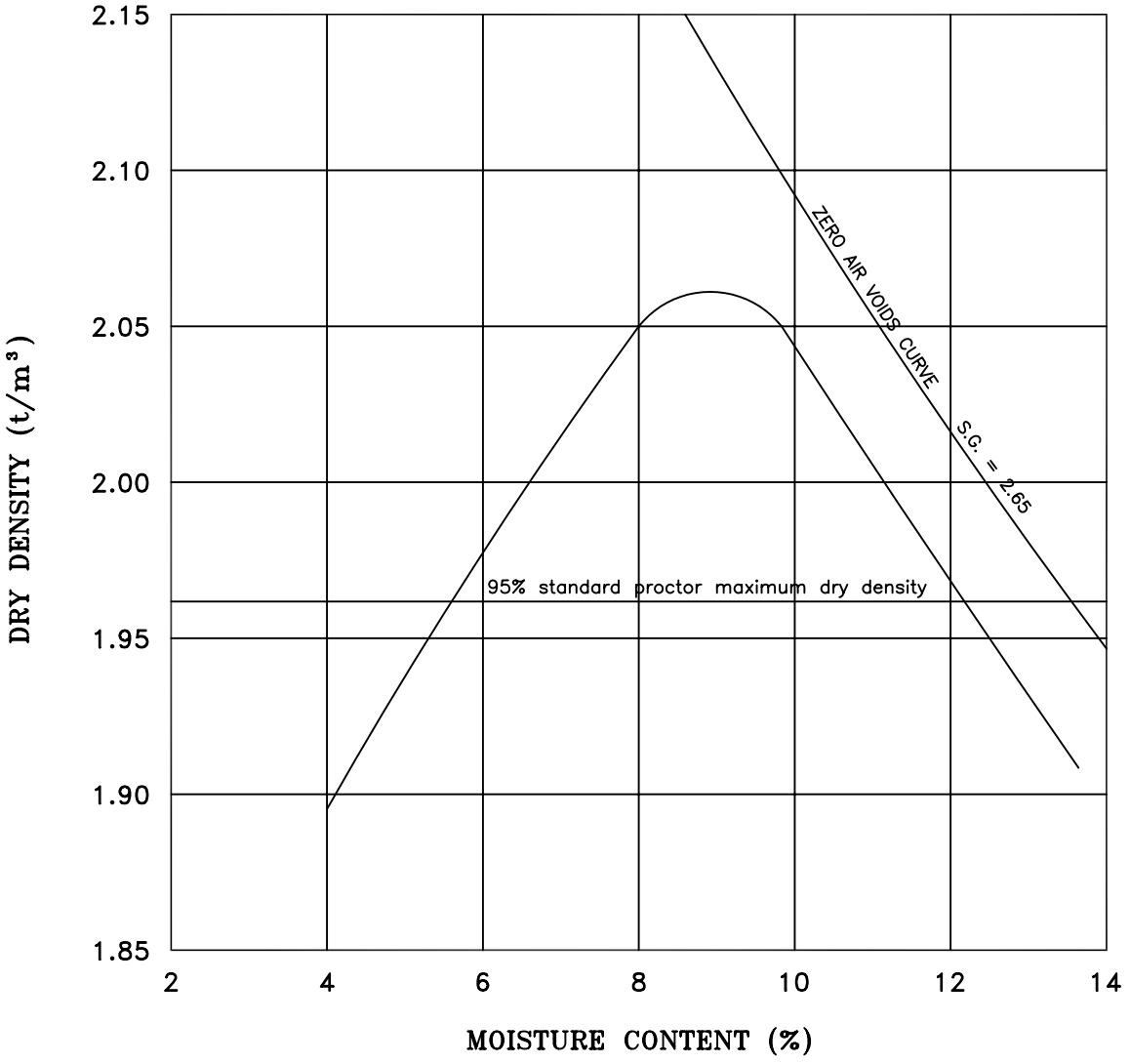
METHOD – A ☑ B ☐ C ☐ D ☐

MODIFIED PROCTOR – ASTM D1557-91

METHOD – A ☐ B ☐ C ☐ D ☐

MAXIMUM DRY DENSITY: 2.065 t/m³

OPTIMUM MOISTURE: 9.0%



F:\0353\0353G4\0353G4_Figure 1.dwg
August 25, 2006 (GRL)

FIGURE NO. 3

Naylor Engineering Associates
CONSULTING ENGINEERS

LABORATORY PROCTOR MOISTURE-DENSITY TEST

PROJECT P.T. Valeriote Subdivision

LOCATION Cityview Drive, Guelph, Ontario JOB NO. 0353G4

BOREHOLE NO. BH106 DATE TESTED August 21, 2006

SAMPLE DEPTH 1.52 – 3.05m TESTED BY KJ

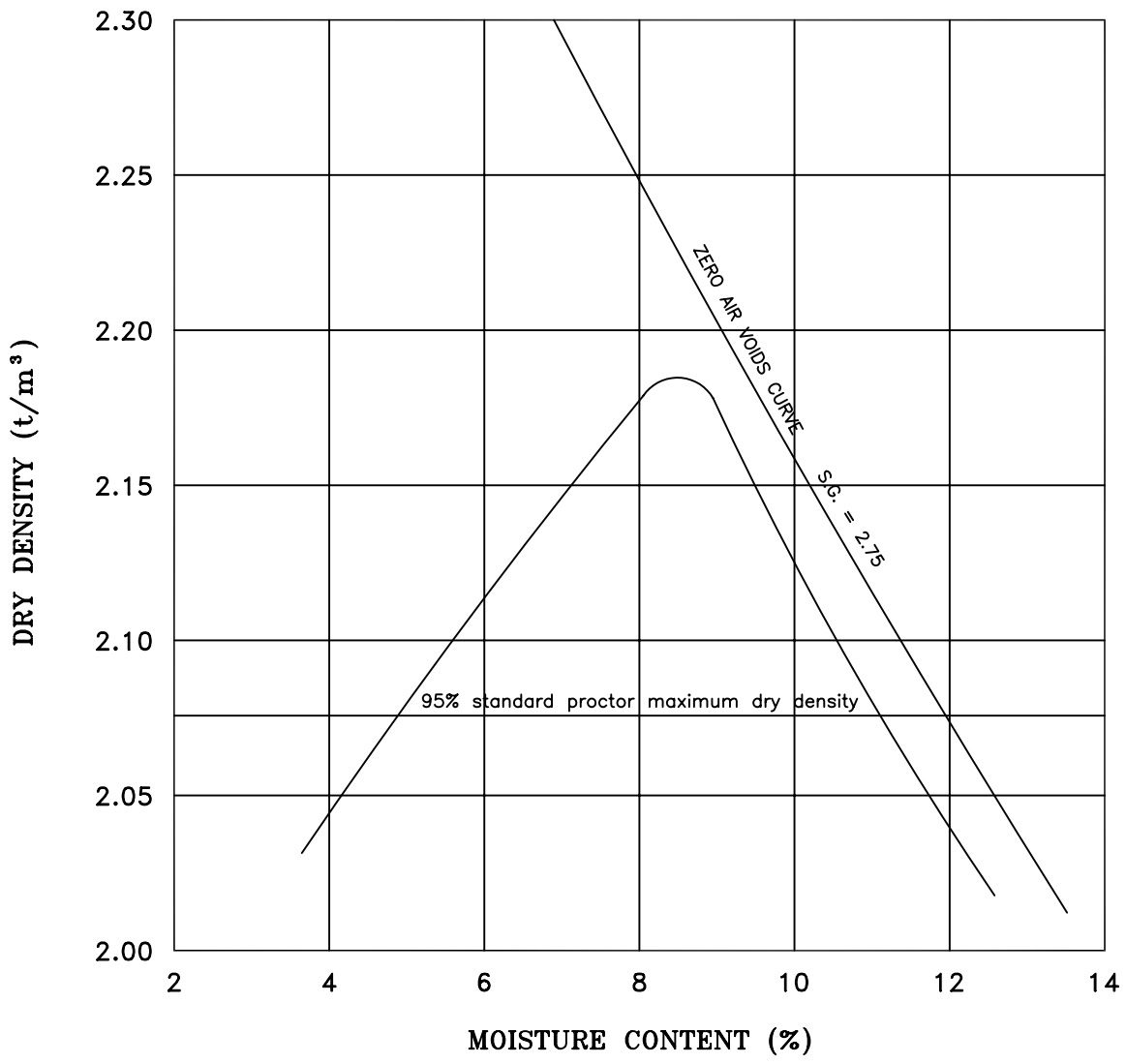
SOIL TYPE SILT TILL MOISTURE CONTENT 8.7%

REMARKS

STANDARD PROCTOR – ASTM D698-91
METHOD – A ☐ B ☐ C ☑ D ☐
MODIFIED PROCTOR – ASTM D1557-91
METHOD – A ☐ B ☐ C ☐ D ☐

MAXIMUM DRY DENSITY 2.185 t/m³

OPTIMUM MOISTURE 8.7%



F:\0353\0353G4\0353G4_Figure 2.dwg
August 28, 2006 (GRL)

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 101

Ground Elevation: ***338.61 m***

Project: ***P.T. Valeriote Subdivision***

Job No.: ***0353G4***

Location: ***Cityview Drive, Guelph, Ontario***

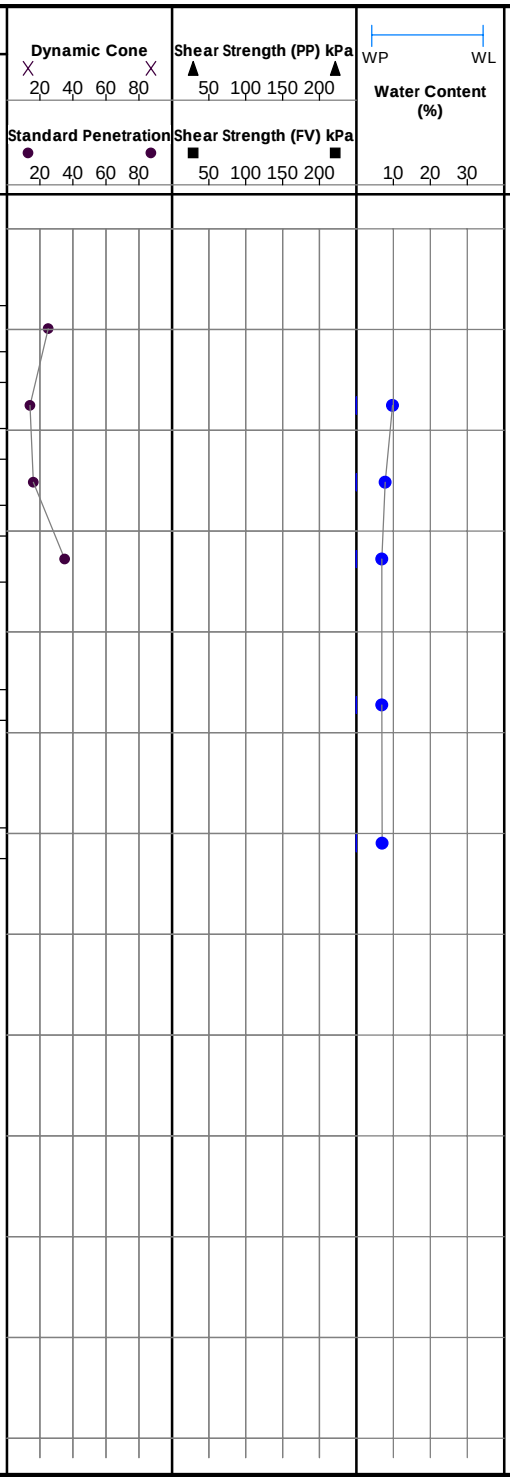
Drill Date: ***August 2, 2006***

SOIL PROFILE

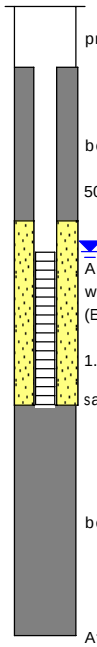
Depth (m)	Description	Symbol	Elevation (m)
	Ground Elevation		338.61
0.00	***TOPSOIL:*** dark brown silt, moist		
	SILT TILL: compact brown sandy silt, some gravel, moist		
1.00			338.00
2.00			337.00
	very moist		
3.00			336.00
	dense to very dense, moist		
4.00			335.00
5.00			334.00
6.00			333.00
	Borehole terminated at 6.25 m		
7.00			332.00
8.00			331.00
9.00			330.00
10.00			329.00
11.00			328.00
12.00			327.00

SAMPLE

Number	Type	N-Value
1	SS	25
2	SS	14
3	SS	16
4	SS	35
5	SS	45\150mm
6	SS	50\150mm



Groundwater Observations and Standpipe Details



Reviewed by: ***DN***

Drill Method: ***Solid Stem Auger***

Notes: ***Bulk sample taken from 1.83 to 3.05 m.***

Field Tech.: ***RM***

Sheet: ***1 of 1***

Drafted by: ***DC(01a)***

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 102

Ground Elevation: ***334.42 m***

Project: ***P.T. Valeriote Subdivision***

Job No.: ***0353G4***

Location: ***Cityview Drive, Guelph, Ontario***

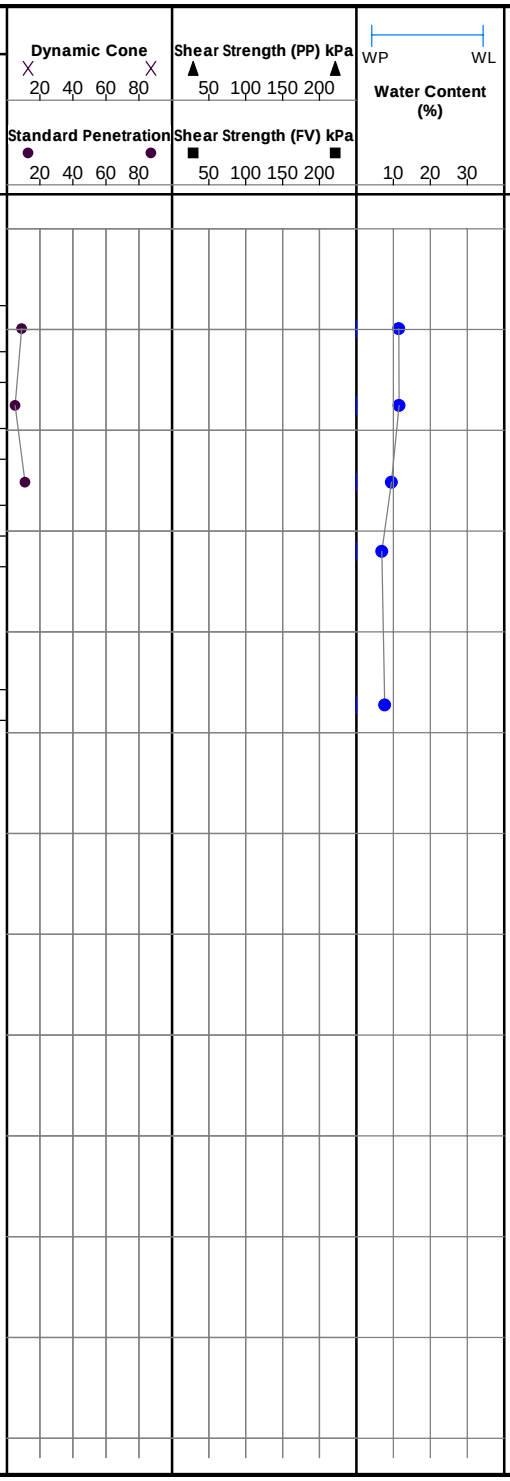
Drill Date: ***August 2, 2006***

SOIL PROFILE

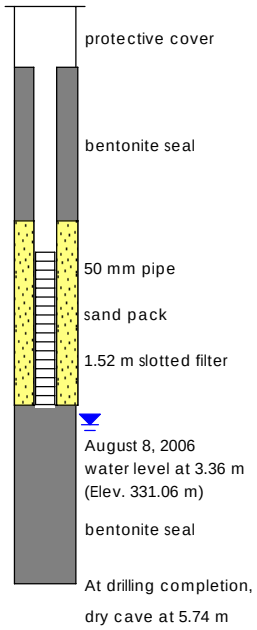
Depth (m)	Description	Symbol	Elevation (m)
	Ground Elevation		334.42
0.00	***TOPSOIL:*** dark brown silt, moist		
1.00	***SILT TILL:*** loose brown sandy silt, some gravel, trace clay, very moist		333.00
2.00	compact, very moist		332.00
3.00	very dense, moist		331.00
4.00			330.00
5.00	augering on weathered bedrock or boulder		329.00
6.00	Borehole terminated at 5.74 m upon auger refusal on bedrock or boulder		328.00
7.00			327.00
8.00			326.00
9.00			325.00
10.00			324.00
11.00			323.00
12.00			

SAMPLE

Number	Type	N-Value
1	SS	9
2	SS	5
3	SS	11
4	SS	50\150mm
5	SS	45\150mm



Groundwater Observations and Standpipe Details



Reviewed by: ***DN***

Drill Method: ***Solid Stem Auger***

Notes:

Field Tech.: ***RM***

Sheet: ***1 of 1***

Drafted by: ***DC(01a)***

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 103

Ground Elevation: ***344.44 m***

Project: ***P.T. Valeriote Subdivision***

Job No.: ***0353G4***

Location: ***Cityview Drive, Guelph, Ontario***

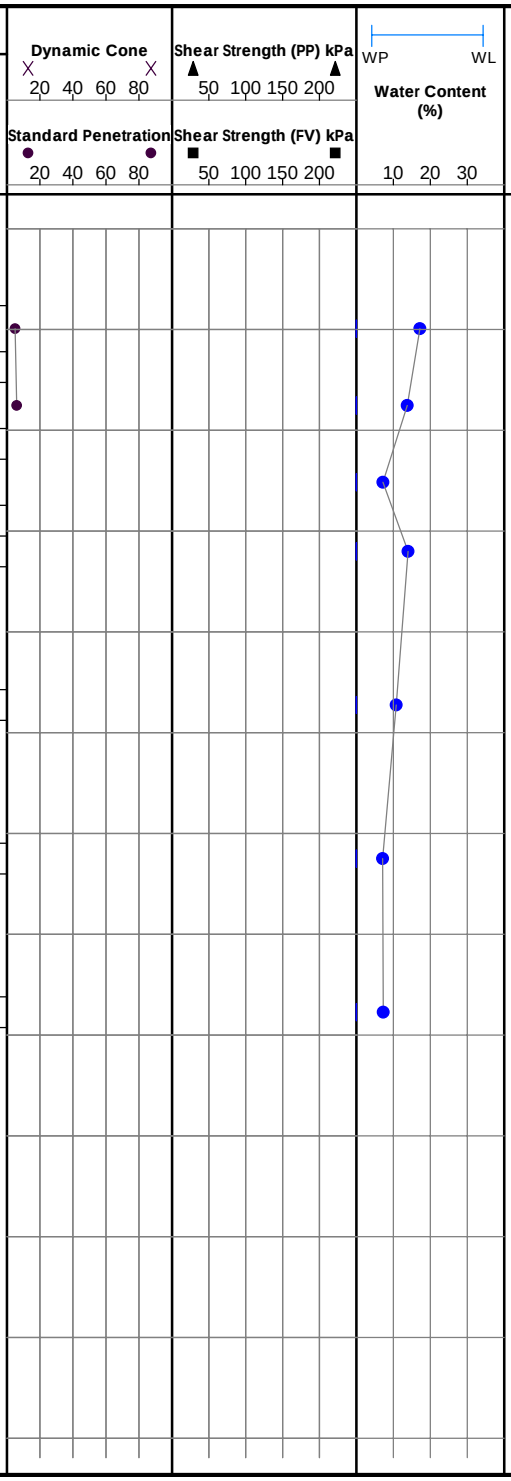
Drill Date: ***July 31, 2006***

SOIL PROFILE

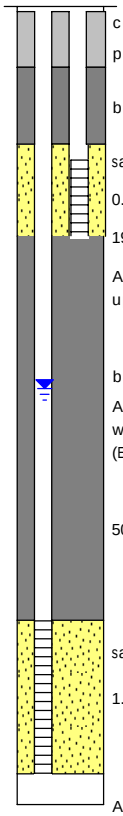
Depth (m)	Description	Symbol	Elevation (m)
	Ground Elevation		344.44
0.00	***TOPSOIL:*** dark brown silt, moist		
1.00	***SILT TILL:*** loose rusty brown silt, some sand, trace clay and gravel, trace tree roots, moist to very moist		343.00
2.00			342.00
3.00	dense to very dense brown sandy silt, some gravel, trace clay, moist		341.00
4.00			340.00
5.00			339.00
6.00	grey, moist		338.00
7.00			337.00
8.00	Borehole terminated at 7.92 m		336.00
9.00			335.00
10.00			334.00
11.00			333.00
12.00			

SAMPLE

Number	Type	N-Value
1	SS	5
2	SS	6
3	SS	*
4	SS	55\150mm
5	SS	45\150mm
6	SS	60\150mm
7	SS	75\150mm



Groundwater Observations and Standpipe Details



Reviewed by: ***DN***

Drill Method: ***Solid Stem Auger***

Notes: **** Sampler driving on gravel.***

Field Tech.: ***RM***

Sheet: ***1 of 1***

Drafted by: ***DC(01a)***

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 104

Ground Elevation: ***339.95 m***

Project: ***P.T. Valeriote Subdivision***

Job No.: ***0353G4***

Location: ***Cityview Drive, Guelph, Ontario***

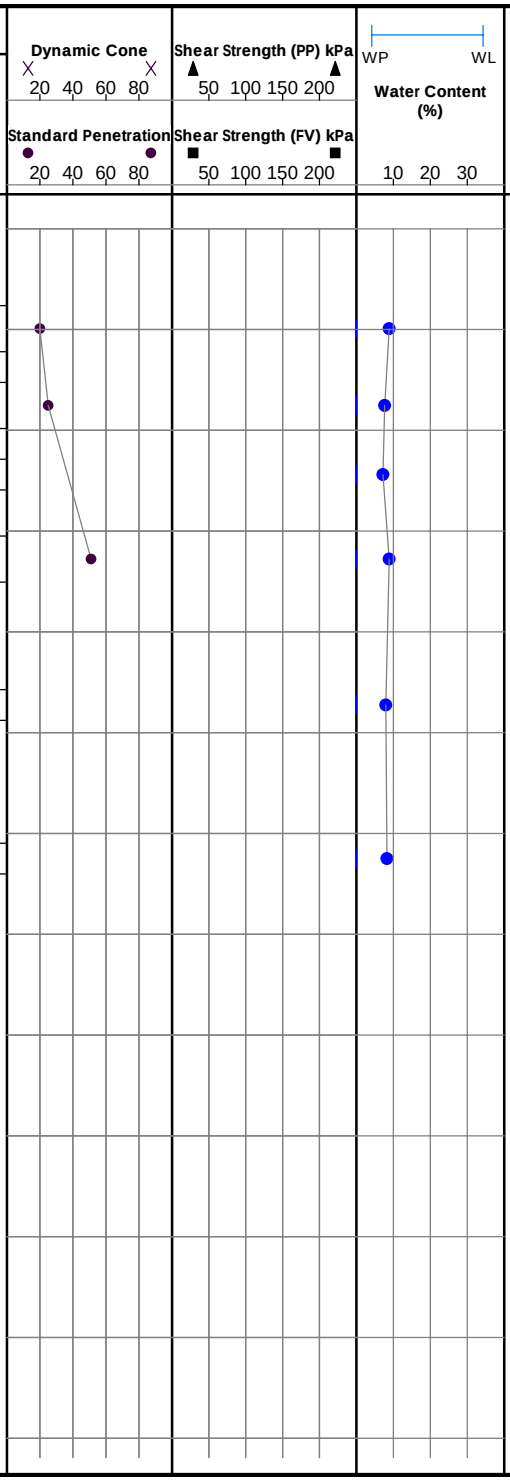
Drill Date: ***July 31, 2006***

SOIL PROFILE

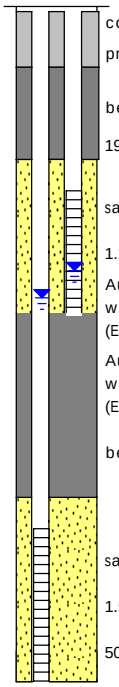
Depth (m)	Description	Symbol	Elevation (m)
	Ground Elevation		339.95
0.00	***TOPSOIL:*** dark brown silt, moist		
1.00	***SILT TILL:*** compact brown sandy silt, some gravel, trace clay, moist		339.00
2.00			338.00
	very dense, moist		
3.00			337.00
4.00			336.00
5.00			335.00
	cobbles, some dolostone		
6.00			334.00
	Borehole terminated at 6.71 m		
7.00			333.00
8.00			332.00
9.00			331.00
10.00			330.00
11.00			329.00
12.00			328.00

SAMPLE

Number	Type	N-Value
1	SS	20
2	SS	25
3	SS	30\150mm
4	SS	51
5	SS	45\150mm
6	SS	65\150mm



Groundwater Observations and Standpipe Details



At drilling completion, water level at 6.40 m

Reviewed by: ***DN***

Drill Method: ***Solid Stem Auger***

Notes:

Field Tech.: ***RM***

Sheet: ***1 of 1***

Drafted by: ***DC(01a)***

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 105

Ground Elevation: ***343.82 m***

Project: ***P.T. Valeriote Subdivision***

Job No.: ***0353G4***

Location: ***Cityview Drive, Guelph, Ontario***

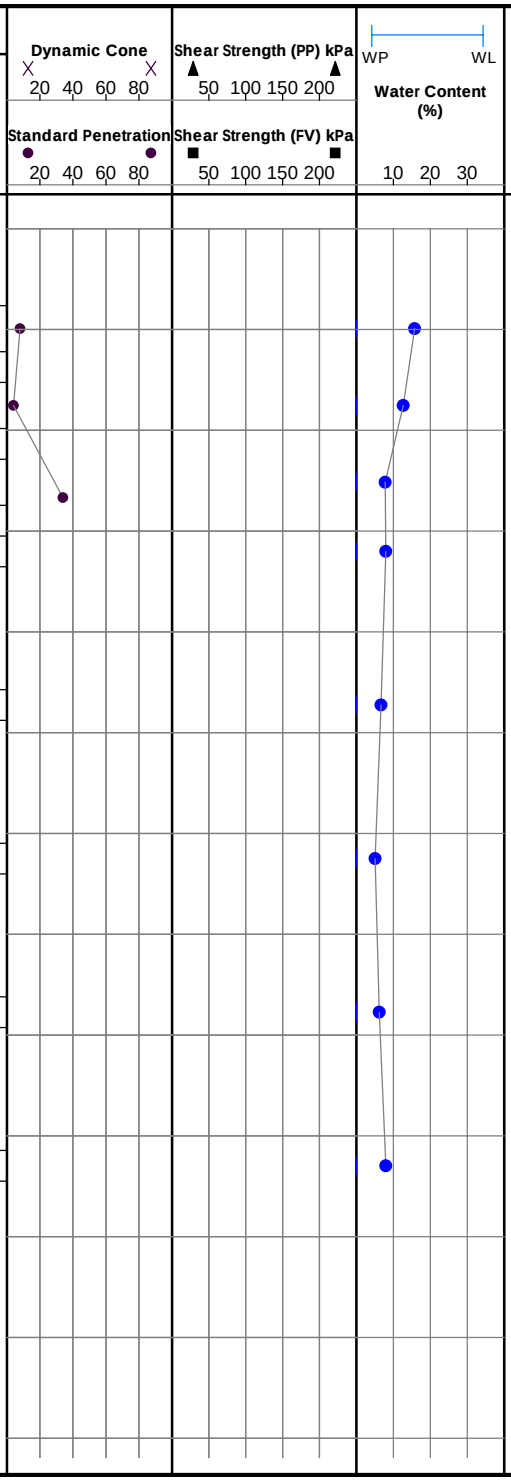
Drill Date: ***July 31, 2006***

SOIL PROFILE

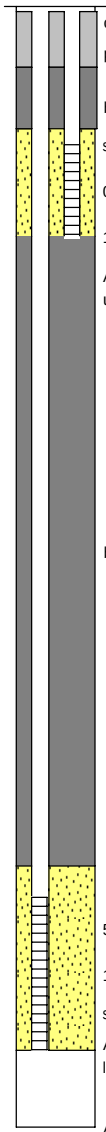
Depth (m)	Description	Symbol	Elevation (m)
	Ground Elevation		343.82
0.00	***TOPSOIL:*** dark brown silt, moist		
1.00	***SILT TILL:*** loose brown silt, some sand, trace clay and gravel, very moist		343.00
2.00	dense to very dense brown sandy silt		342.00
3.00			341.00
4.00			340.00
	some cobbles		
	grey, moist		339.00
5.00			
6.00			338.00
7.00			337.00
8.00			336.00
9.00			335.00
10.00			334.00
11.00	augering on bedrock or boulder		333.00
12.00	Borehole terminated at 11.13 m upon auger refusal on bedrock or boulder		332.00

SAMPLE

Number	Type	N-Value
1	SS	8
2	SS	4
3	SS	34
4	SS	50\150mm
5	SS	55\150mm
6	SS	70\150mm
7	SS	70\150mm
8	SS	60\150mm



Groundwater Observations and Standpipe Details



Reviewed by: ***DN***

Drill Method: ***Solid Stem Auger***

Notes: ***Bulk sample taken from 1.22 to 2.13 m.***

Field Tech.: ***RM***

Sheet: ***1 of 1***

Drafted by: ***DC(01a)***

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 106

Ground Elevation: ***347.25 m***

Project: ***P.T. Valeriote Subdivision***

Job No.: ***0353G4***

Location: ***Cityview Drive, Guelph, Ontario***

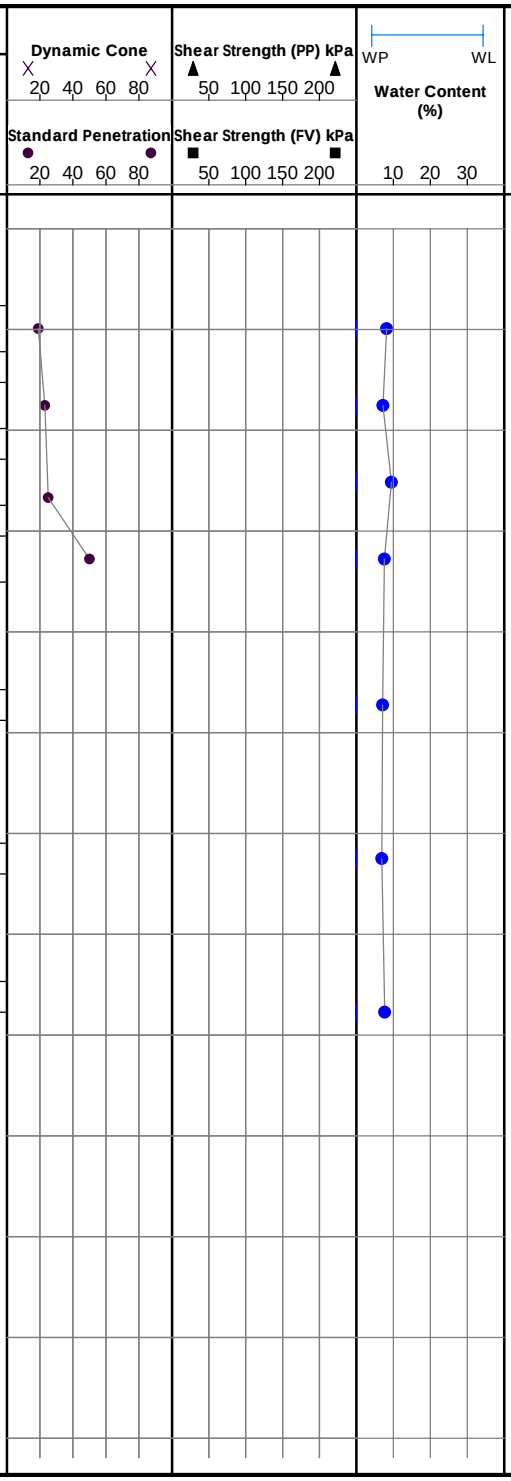
Drill Date: ***August 2, 2006***

SOIL PROFILE

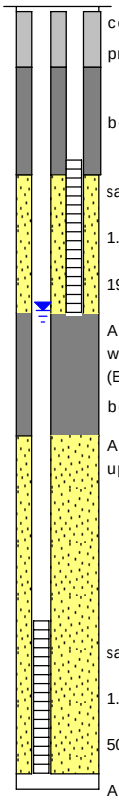
Depth (m)	Description	Symbol	Elevation (m)
	Ground Elevation		347.25
0.00	***TOPSOIL:*** dark brown silt, moist		
	SILT TILL: compact brown sandy silt, some gravel, trace clay, moist		
1.00	some cobbles		346.00
2.00	very moist		345.00
3.00	dense to very dense, moist		344.00
4.00			343.00
5.00			342.00
6.00			341.00
7.00			340.00
8.00	Borehole terminated at 7.77 m		339.00
9.00			338.00
10.00			337.00
11.00			336.00
12.00			335.00

SAMPLE

Number	Type	N-Value
1	SS	19
2	SS	23
3	SS	25
4	SS	50
5	SS	*
6	SS	40\150mm
7	SS	40\150mm



Groundwater Observations and Standpipe Details



Reviewed by: ***DN***

Drill Method: ***Solid Stem Auger***

Notes: ***Bulk sample taken from 1.52 to 3.05 m. *Sampler bouncing on gravel.***

Field Tech.: ***RM***

Sheet: ***1 of 1***

Drafted by: ***DC(01a)***

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 107

Ground Elevation: ***345.47 m***

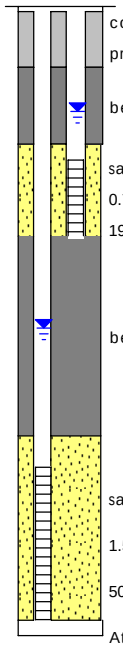
Project: ***P.T. Valeriote Subdivision***

Job No.: ***0353G4***

Location: ***Cityview Drive, Guelph, Ontario***

Drill Date: ***July 31, 2006***

SOIL PROFILE				SAMPLE			Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) / Shear Strength (FV) kPa (50 100 150 200)	Water Content (%) (WP – WL; 10 20 30)	Groundwater Observations and Standpipe Details
Depth (m)	Description	Symbol	Elevation (m)	Number	Type	N-Value				
	Ground Elevation		345.47							
0.00	***TOPSOIL:*** dark brown silt, moist									
1.00	***SILT TILL:*** loose brown silt, some sand, trace clay, very moist			1	SS	8				
	compact		344.00	2	SS	15				
2.00	compact to very dense brown sandy silt, some gravel									
			343.00	3	SS	35\150mm				
3.00				4	SS	50\150mm				
	grey, moist		342.00							
4.00										
			341.00	5	SS	*				
5.00										
			340.00							
6.00				6	SS	60\150mm				
	Borehole terminated at 6.25 m		339.00							
7.00										
			338.00							
8.00										
			337.00							
9.00										
			336.00							
10.00										
			335.00							
11.00										
			334.00							
12.00										



At drilling completion, dry cave at 6.10 m

August 8, 2006 water level in upper standpipe at 1.05 m (Elev. 344.42 m) water level in lower standpipe at 3.20 m (Elev. 342.27 m)

Reviewed by: ***DN***

Drill Method: ***Solid Stem Auger***

Notes: **** Sampler bouncing on gravel.***

Field Tech.: ***RM***

Sheet: ***1 of 1***

Drafted by: ***DC(01a)***

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Borehole Number: 108

Ground Elevation: ***342.70 m***

Project: ***P.T. Valeriote Subdivision***

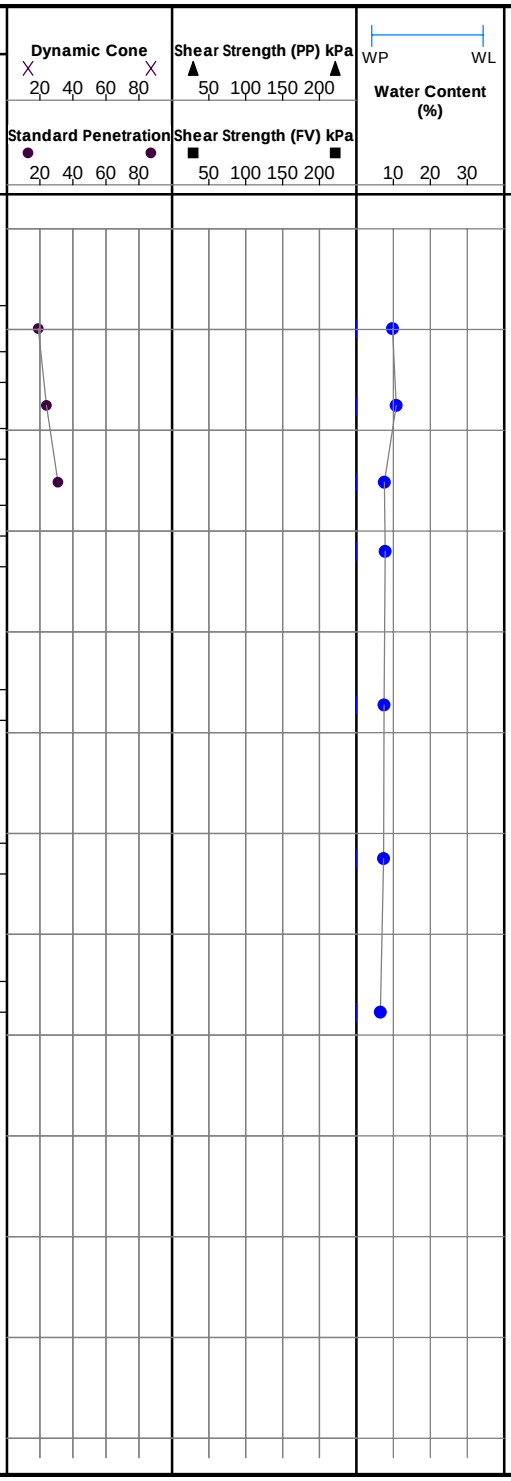
Job No.: ***0353G4***

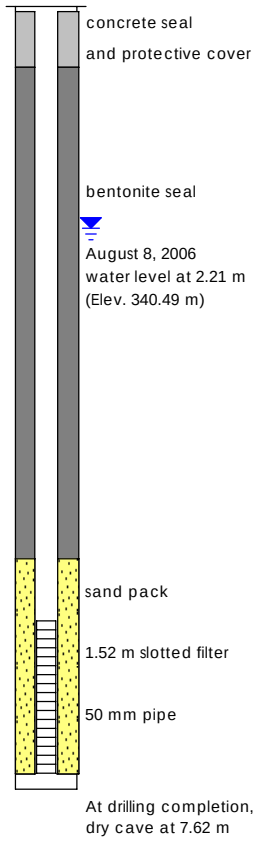
Location: ***Cityview Drive, Guelph, Ontario***

Drill Date: ***July 31, 2006***

Depth (m)	Description	Elevation (m)
	Ground Elevation	342.70
0.00	***TOPSOIL:*** dark brown silt, moist	
	SILT TILL: compact brown silt, some sand, gravel and clay, moist	
1.00		342.00
2.00		341.00
	dense to very dense, trace clay, moist	
3.00		340.00
	some cobbles	
4.00		339.00
	grey, moist	
5.00		338.00
6.00		337.00
7.00		336.00
8.00	Borehole terminated at 7.77 m	335.00
9.00		334.00
10.00		333.00
11.00		332.00
12.00		331.00

Number	Type	N-Value
1	SS	19
2	SS	24
3	SS	31
4	SS	45\150mm
5	SS	45\125mm
6	SS	58\150mm
7	SS	65\150mm





Reviewed by: ***DN***

Drill Method: ***Solid Stem Auger***

Notes: ***Bulk sample taken from 1.52 to 3.05 m.***

Field Tech.: ***RM***

Sheet: ***1 of 1***

Drafted by: ***DC(01a)***

March 1, 2019

Cityview Ridge Developments Inc.
c/o GM BluePlan Engineering Limited
330 Trillium Drive, Unit D
Kitchener, Ontario N2E 3J2
Attention: Ms. Angela Kroetsch, P.Eng.

Subject: Slope Stability Assessment of South-Facing Slope
Cityview Ridge Subdivision
Cityview Drive
Guelph, Ontario
Our ref.: 160-P-0009857-0-01-100-GE-L-0002-00

Ms. Angela Kroetsch:

Englobe Corp. (Englobe) is pleased to provide this letter report for the slope stability assessment completed for the proposed Cityview Ridge Subdivision on Cityview Drive, Guelph. The initial work for this investigation was authorized by Mr. Carson Reid of Cityview Ridge Developments Inc. on January 15, 2018 with additional analyses authorized on February 6, 2019.

The site being investigated comprises the area of the proposed stormwater management (SWM) facility, and adjacent rail corridor to the south of the site. The SWM facility construction will include the placement of fill near the top of the slope towards the east side of the site and cutting of the native soils towards the west side of the site.

The purpose of this slope stability assessment is to analyze the impact of the proposed development on the stability of the existing south slope at the site. Reference is made to Englobe letter 160-P-0009857-0-02-101-L-0001-0B dated April 4, 2018 for findings related to the east slope.

General Information

The subject site is located on Cityview Drive, Guelph Ontario and the area being investigated is located at the south side of the site, near the top of a slope. A rail line is located at the base of the south slope.

Naylor Engineering Associates Ltd. (NEA) previously completed a geotechnical investigation and slope stability assessment at the subject site including drilling of ten boreholes (Boreholes BH101 to BH110) to depths of 5.6 to 11.1 m for the general area of the proposed development. Based on the findings of this investigation, it is assumed that the existing slopes are comprised of native non-cohesive glacial silt till.

Groundwater was found to occur in saturated seams at variable depths within the silt till deposit. A slope stability analysis was carried out in the southeast portion of the site and the results of the slope stability analysis found that the slope had a factor of safety (FS) of greater than 1.5. We refer the reader to the geotechnical investigation for further information (NEA, Geotechnical Investigation, P.T. Valeriote Subdivision, Cityview Drive, Guelph, Ontario. 0353G4.R01_Rev. February 2012). The relevant borehole logs of the previous investigation are illustrated on Drawing 1 appended to this letter. Englobe recommends that a supplementary borehole investigation be conducted specifically for the purpose of slope stability assessment.

The proposed SWM facility will have a pond bottom at Elevation 339.35 m with a permanent pool water level at Elevation 339.75 m and a design regional storm event water level at Elevation 340.32 m. It is understood that the pond will be constructed with a clay liner to Elevation 340.64 m. It is assumed that the clay liner will be designed and constructed in a manner that the storm water management pond will not increase the moisture content of the underlying soil, causing excessive forces and reducing strength of the soil. Toward the west and central portions of the SWM facility, the existing grades are above the proposed finished grades and material will be cut for construction of the facility. Toward the east portion of the SWM facility, the existing grade is near the proposed pond base and material will placed to construct the berms along the outside of the pond. Based on conversation with GM BluePlan Engineering Limited (GMBP), it is understood that surplus onsite material (silt till) will be reused for construction of the SWM facility.

(Gamsby and Mannerow Engineers, Carson Reid Homes, Cityview Ridge, Project Number 105-172, Preliminary Site Grading and Drainage Plan [Drawings 1 & 2], Stormwater Pond Plan and Sections [Drawing 4), Stormwater Pond Cross-Sections [Drawing 5], and Trail Plan and Sections [Drawing 8], Revised June 6, 2017).

Slope Inspection

Englobe completed a site visit on January 20, 2018 to inspect the existing slope conditions. The slope inspection was carried out based on the guidance provided in the Ontario Ministry of Natural Resources (MNR) document: *Technical Guide, River & Stream Systems: Erosion Hazard Limit* and slope ratings for the south slope was produced in accordance with Table 4.2 of the MNR document. Based on the results of the slope inspection the south slope had a rating of 35 points, indicating Moderate Potential for slope instability.

Slope Stability Assessment

Cross-Section C-C' through F-F' were created based on topographic data provided by Gamsby and Mannerow Engineers and the location of the sections are shown on our Drawing 1– Site Plan – South Side. The cross-sections were created to represent worst case scenarios, where the slopes were the steepest and the proposed additional loading was greatest.

Following the GRCA policy, the design range for the FS must be 1.3 to 1.5 or greater. As per our meeting with GMBP on February 4, 2019, the proposed conditions for Cross-Sections C-C' to F-F' were analyzed for a minimum FS of 1.3 and a minimum FS of 1.5 to illustrate the required setback requirements for each FS. Englobe notes that an additional slope inspection during the Spring as well as additional borehole investigation including the installation of monitoring wells near the slope section at SWM facility is recommended if a FS of 1.3 is considered for use in the site plan design. The additional information collected would be analyzed in order to refine the geotechnical model for the cross-sections under discussion. It is further noted that Englobe is not able to comment if CN will permit a FS of 1.3.

The information from the existing boreholes and cross-sections were used for computer analyses of the slope stability using the Slope/W Program (Morgenstern-Price Method). The soil parameters used in this analysis have been estimated based on the information from the existing boreholes, site laboratory testing, local experience, and available literature correlations and are provided in Table 1.

Table 1: Soil Parameters

SOIL MATERIAL	UNIT WEIGHT (kN/m^3)	ANGLE OF INTERNAL FRICTION (°)	COHESION (kPa)
Silt Till, loose	22	32	0
Silt Till, compact	22-23	32	0
Silt Till, dense to very dense	23.3	35	0

Standard Proctor moisture-density testing carried out during the previously referenced NEA indicated that if the soil was compacted to 100% standard Proctor maximum dry density (SPMDD) at the approximate optimum moisture content, the bulk unit weight of the material would be in the range of 22 to 23.3 kN/m^3 and such, this range of unit weights were selected in the analysis.

Based on the gradation analyses carried out on samples of the glacial till during the NEA investigation, the material was found to comprise sand and silt with trace to some gravel, and traces of clay. Typically soils containing trace amounts of clay do not exhibit reliable and consistent cohesive strength, therefore, no cohesion was applied in the analyses.

The angle of internal frictions that were used in the analyses are based on the measured standard penetration testing (SPT) N-values obtained during the NEA investigation. The relative density of the glacial till soils, based on the SPT N-values was found to range from loose to very dense, and increased with depth. The soil layers modelled in the analysis were based on the relative densities as determined by the N-values. The angle of internal frictions that were utilized for each soil layer are based on local experience and laboratory testing performed on projects with similar soil conditions as well as published correlations summarized in the publication *Performance and use of the Standard Penetration Test in Geotechnical Engineering Practice* (McGregor, and Duncan, Centre for Geotechnical Practice and Research, Virginia Polytechnic Institute and State University, October 1998).

Suspected bedrock was encountered but was not proven by coring during the NEA investigation. Based on local area knowledge, bedrock outcrops are present to the south of the site in the area between the railroad tracks, York Road, and Cityview Drive South. Based on available bedrock mapping and water well records, it is anticipated that the bedrock surface is located at depths in excess of 20 m below ground surface to the north of the site. Based on the available data, bedrock is suspected to slope downwards towards the north but reliable data to determine the bedrock elevation on the site is not available and as such the soil was conservatively assumed to be continuous to Elevation 300 m.

The following additional assumptions have been made to assess the possible impact of the proposed structures on the slope stability at the subject site:

- Grades of the site will be raised (where applicable) with well compacted subgrade or structural fill utilizing the onsite glacial till. The fill is placed in 300 mm thick lifts and compacted to 95% SPMDD (subgrade fill) or 98% SPMDD (structural fill for residential buildings and below retaining walls) at a minimum.
- The proposed fill materials were conservatively assumed to exhibit a surcharge load of 23.3 kN/m^3 based on a compaction of 100% SPMDD.
- The assumed groundwater depth along the south-facing slope was modelled under consideration of the groundwater monitoring data provided by GMBP on February 5, 2019 (105-172 Updated_Water_Level_Data_Feb.2019.pdf). The provided groundwater data indicates fluctuations in the groundwater levels across the site with the seasonal high generally recorded during the Spring and localized water elevations near or above the ground surface. For the purpose of this preliminary analysis for the south-facing slopes the recorded high groundwater levels were considered. A supplementary borehole investigation with monitoring wells is recommended, to confirm the assumptions made for the slope stability assessment. It is further recommended that a slope inspection is completed during the Spring, 2019 to identify possible seepage zones within the slope.

A slope stability analysis was carried out on four representative cross-sections to identify critical slip surfaces and potential failure types using computer software (GeoStudio SLOPE/W – Morgenstern-Price Method). The various failures analyzed included shallow slumping type failure of the slope surface, medium depth rotational failures, and deep rotational failures. At each cross-section location, the existing and proposed conditions were modelled to determine the impact of the proposed development on the slope stability. The GeoStudio SLOPE/W results are summarized below in Table 2.

Table 2: Cross-Section Summary

CROSS-SECTION	EXISTING MINIMUM FS	MINIMUM FS UNDER PROPOSED CONDITIONS	STABLE SLOPE SETBACK* FOR FS OF 1.3	STABLE SLOPE SETBACK* FOR FS OF 1.5	EROSION SETBACK
Cross-Section C	1.32	1.32	N/A	9.5 m	N/A
Cross- Section D	1.02	1.20	5.9 m	12.1 m	N/A
Cross- Section E	1.05	1.06	9.1 m	14.1 m	N/A
Cross- Section F	1.33	1.33	N/A	4.6 m	N/A

Note: * Stable Slope Setback refers to setback from proposed top of slope.

The results of the slope stability assessment completed for slope sections CC, DD, EE, and FF, on the south side of the site, indicate the existing minimum FS are below 1.5 and/or 1.3, and therefore a stable slope setback should be applied as per Table 2. In addition to the stable slope setback, the GRCA policy recommends an access allowance ranging from 6 to 15 m and a 6 m access allowance setback is considered suitable for this site. It is noted that as long as access for maintenance to the slopes is provided this access allowance may be excluded from the total development setback. An erosion setback allowance was not considered in the analysis as no watercourse is present near the toe of the existing slope.

The top of slope and development setback lines for FS of 1.5 and 1.3 are shown on the attached Drawing 1. As portions of the proposed development are located beyond the stable slope and development setback limits for a FS of 1.5, the development will need to be modified and the slope should be re-analyzed under the actual proposed conditions when they are finalized. Alternatively, the results for a FS of 1.3 may be used for the site plan of the proposed development provided additional borehole investigation including monitoring wells and site inspection are being completed.

We trust that this information is complete and suitable for your present requirements. If you have any questions or require further information, please do not hesitate to contact our office.

Yours very truly,

LICENSED PROFESSIONAL ENGINEER
2019-03-01
K. E. THRAMS
100149439
PROVINCE OF ONTARIO

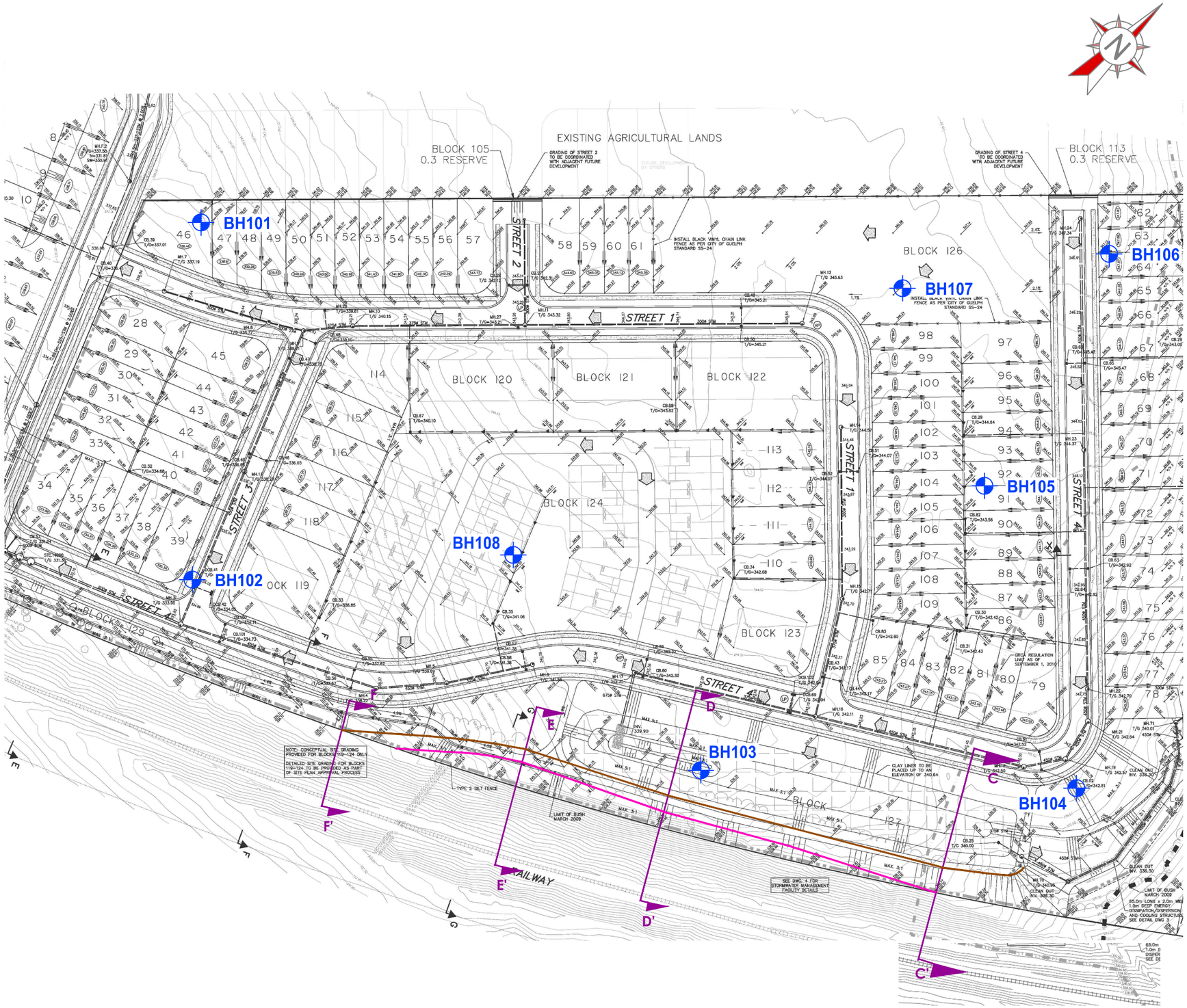
Karen Thrams, Dipl.-Ing., M.Eng, P.Eng.
Geotechnical Engineer

LICENSED PROFESSIONAL ENGINEER
2019-03-01
D. P TULASI
100229257
PROVINCE OF ONTARIO

Devi Tulasi, PE, P.Eng.
Director, Geotechnical Engineer

jw

Drawing 1 – Site Plan – South Side



LEGEND :

MONITORING WELL LOCATION
(Previous NEA Investigation, Project No.0353G4, 2006)

CROSS SECTION

STABLE SLOPE SETBACK FOR FS=1.3

STABLE SLOPE SETBACK FOR FS=1.5

0 10 20 30 40 50 m

SCALE 1:1500

NOTES :

1-REFERENCES : GAMSBY AND MANNEROW ENGINEERS, Carson Reid Homes Cityview Ridge, Preliminary Grading and Drainage Plan, Project Number 105-172, Drawing Number 1, Revised June 22, 2017.

2-Drawing scale may be distorted due to file conversion and/or copying. Measurements taken from the drawing must be verified in the field.

Project

Cityview Ridge Subdivision
Slope Stability Assessment

Guelph, Ontario

Title

SOUTH SIDE

Englobe Corp.
353, Bridge Street East
Kitchener (Ontario) N2K 2Y5
Telephone : 519.741.1313
Fax : 519.741.5422

Prepared	E.Ciochon	Discipline	GEOTECHNICAL
Drawn	E.Ciochon	Scale	1:1500
Checked	K.Thrams	Date	2019-02-26
Project manager	K.Thrams	Sequence no.	01 of 01

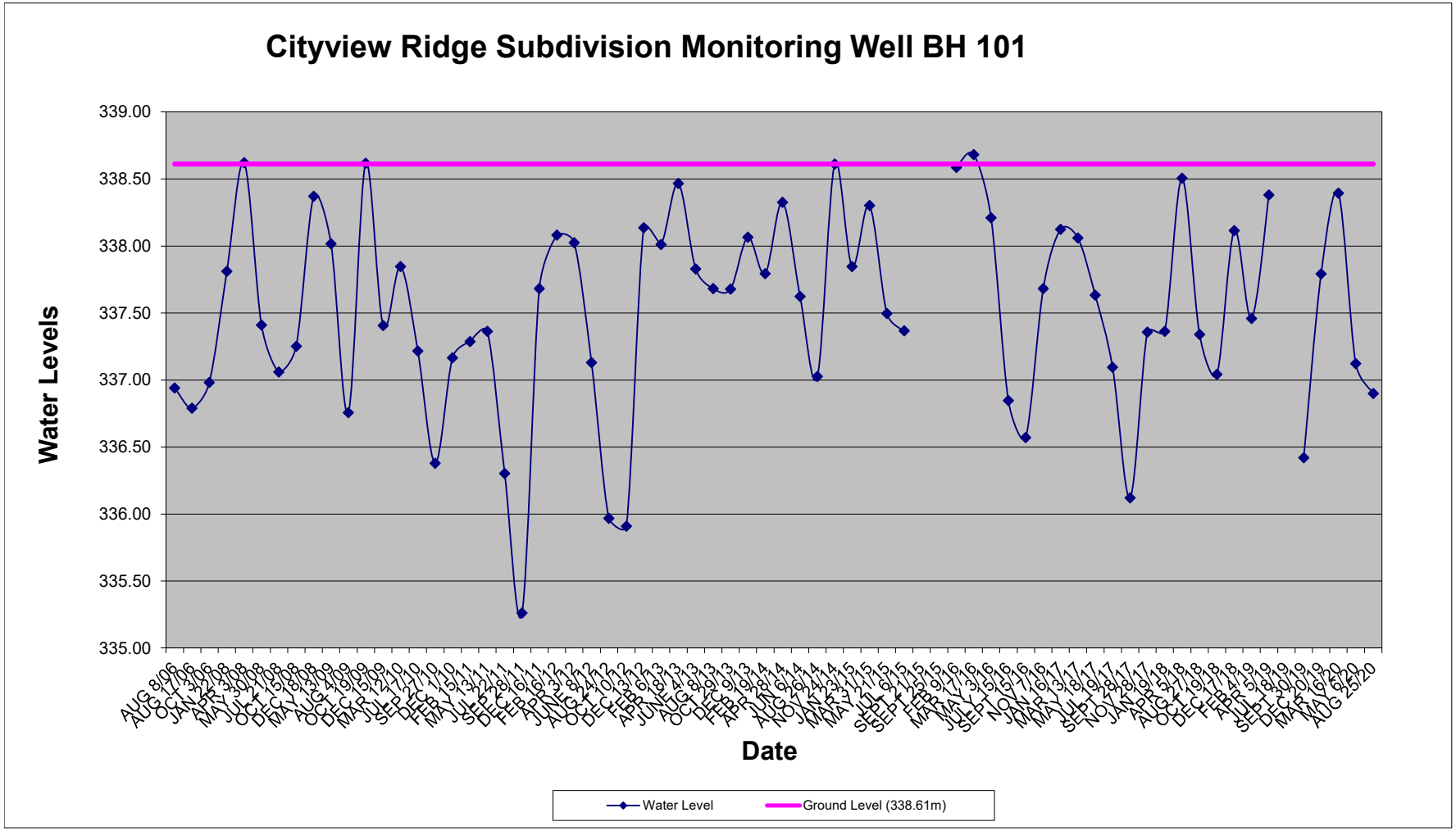
M. dept.	Project	Disc.	Dwg no.	Rev.
160	P-0009857-0-02-101	GE	001	00

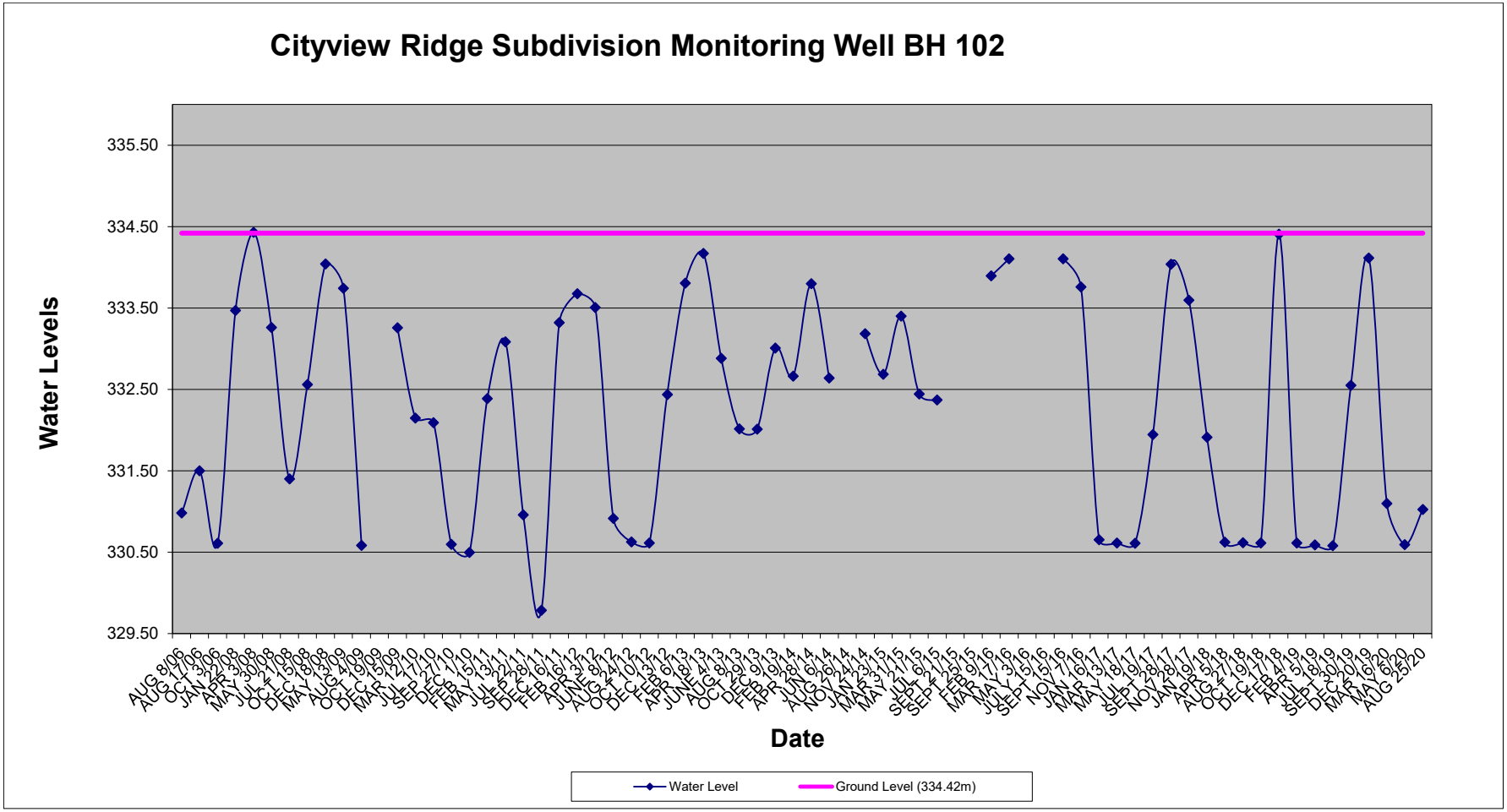
G:\160\P0009857\Z4_CAD\101\P-0009857-0-02-101_DWG001_L002.DWG

APPENDIX C:

GROUNDWATER ELEVATION MEASUREMENTS

COMPLETED BY GM BLUEPLAN ENGINEERING LIMITED
(AUGUST 2006 – AUGUST 2020)


Cityview Ridge Subdivision Monitoring Well BH 101
Water Levels
339.00
338.50
338.00
337.50
337.00
336.50
336.00
335.50
335.00
Date
Water Level
Ground Level (338.61m)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334.50
333.50
332.50
331.50
330.50
329.50
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OCT 3/06
JAN 22/08
APR 3/08
MAY 30/08
JUL 21/08
OCT 15/08
DEC 18/08
MAY 13/09
AUG 4/09
OCT 19/09
DEC 15/09
MAR 12/10
JUL 17/10
SEP 27/10
DEC 1/10
FEB 15/11
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JUL 22/11
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FEB 16/12
APR 3/12
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AUG 8/13
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MAY 3/16
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MAR 13/17
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OCT 19/18
DEC 17/18
FEB 4/19
APR 5/19
JUL 18/19
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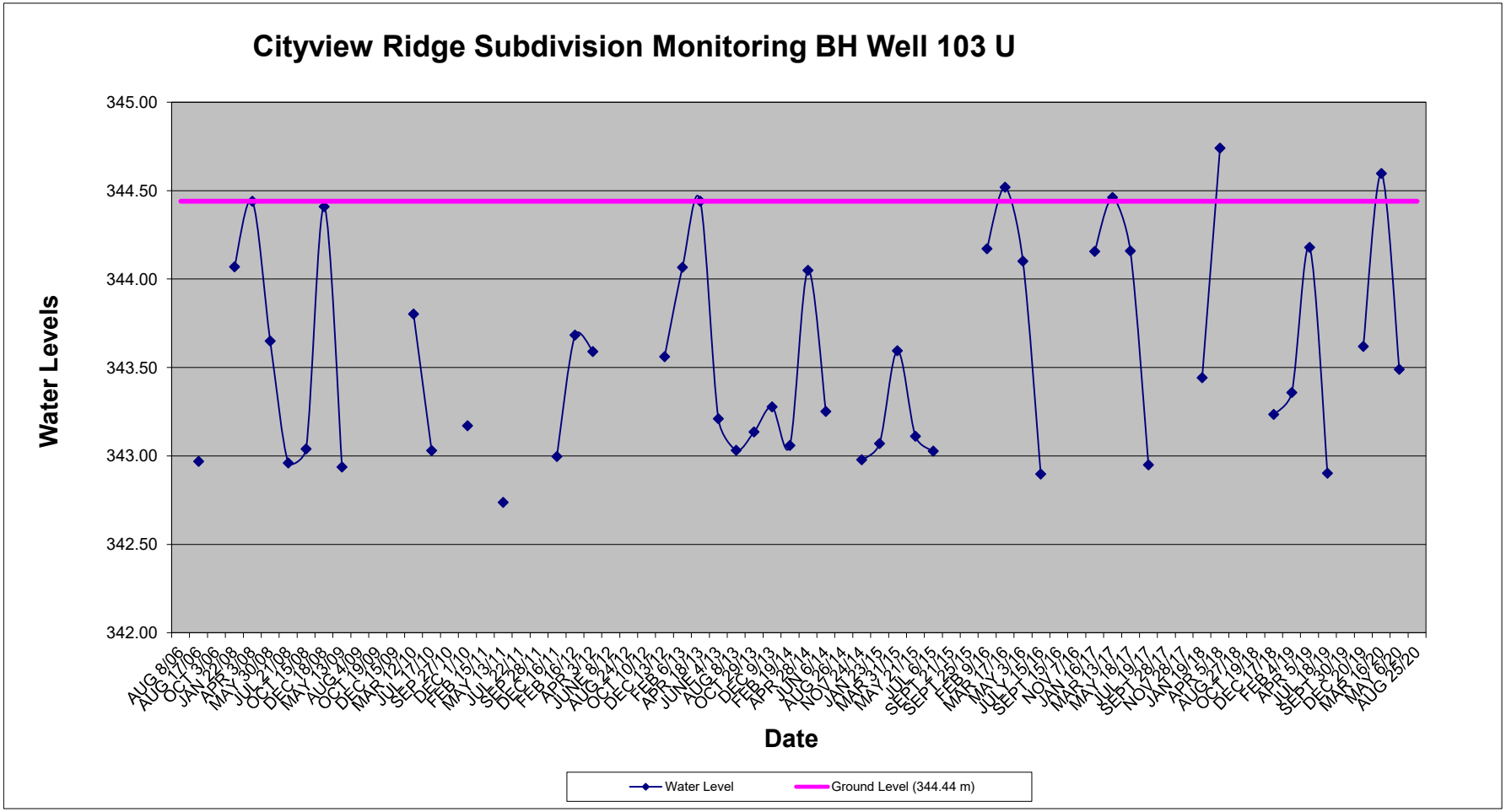
DEC 20/19
MAR 16/20
MAY 6/20
AUG 25/20
Date
Water Level
Ground Level (334.42m)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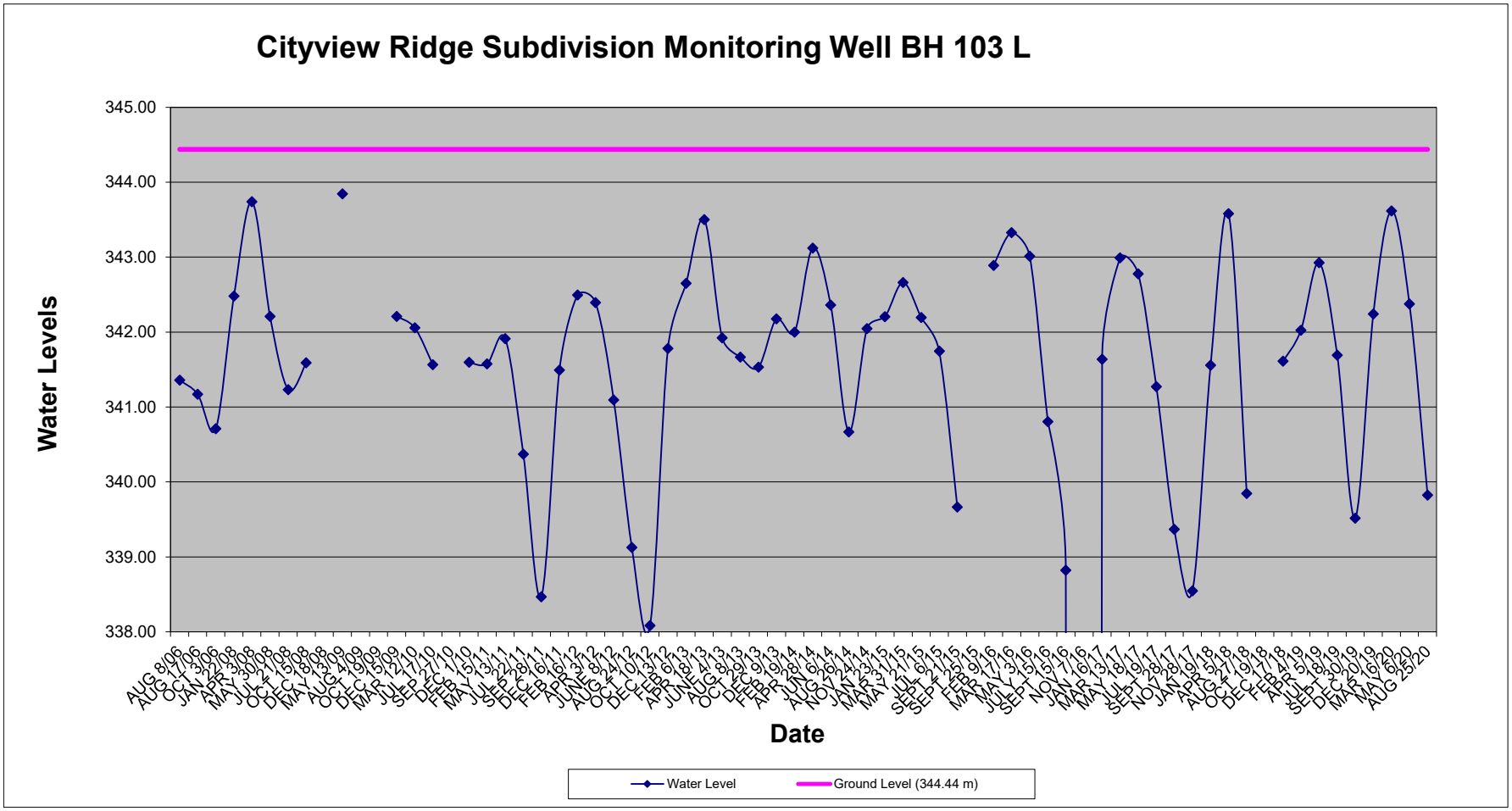
343.00
342.50
342.00
Date
Water Level
Ground Level (344.44 m)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Water Levels
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342.00
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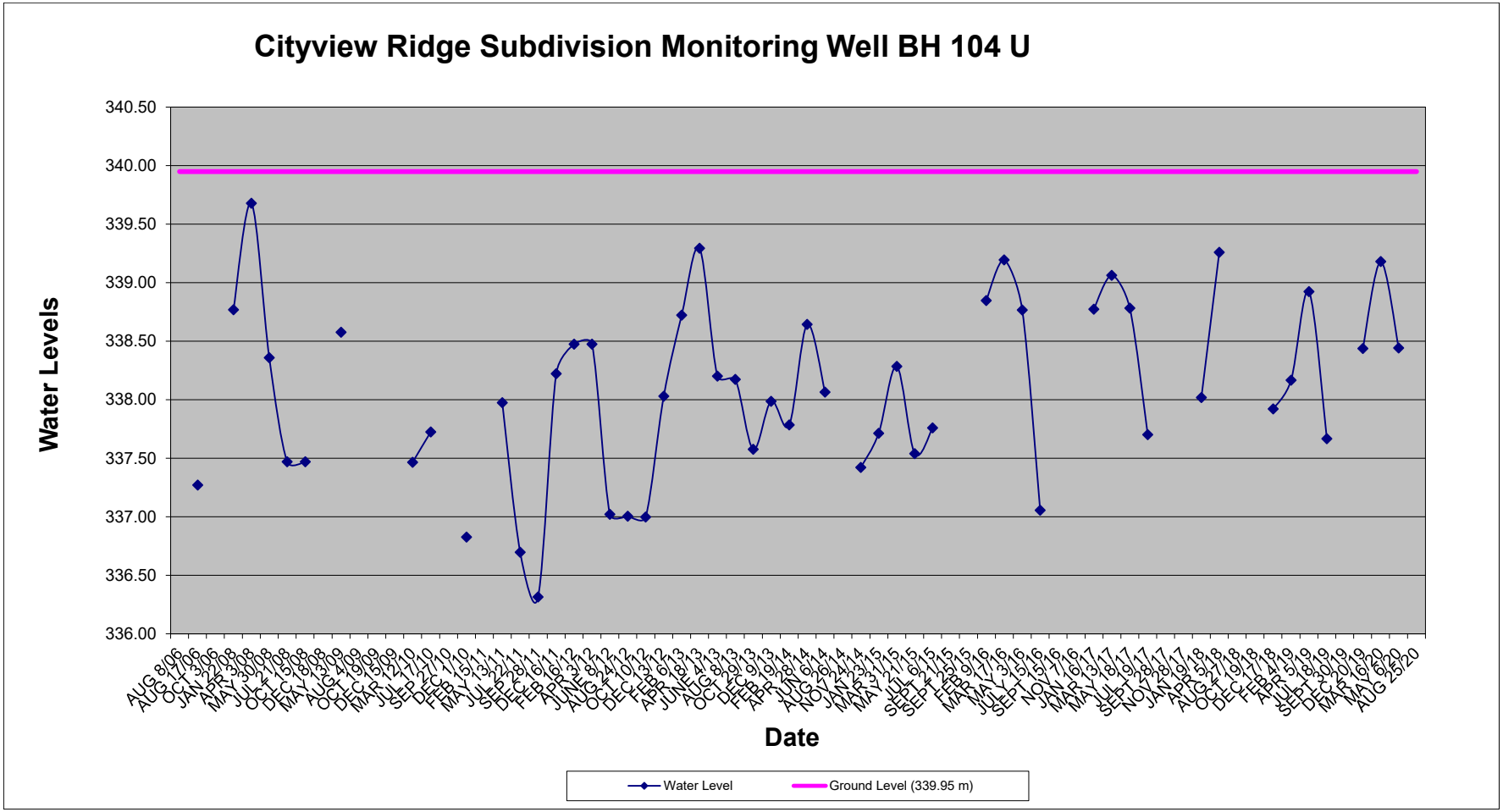
340.00
339.00
338.00
Date
Water Level
Ground Level (344.44 m)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Water Levels
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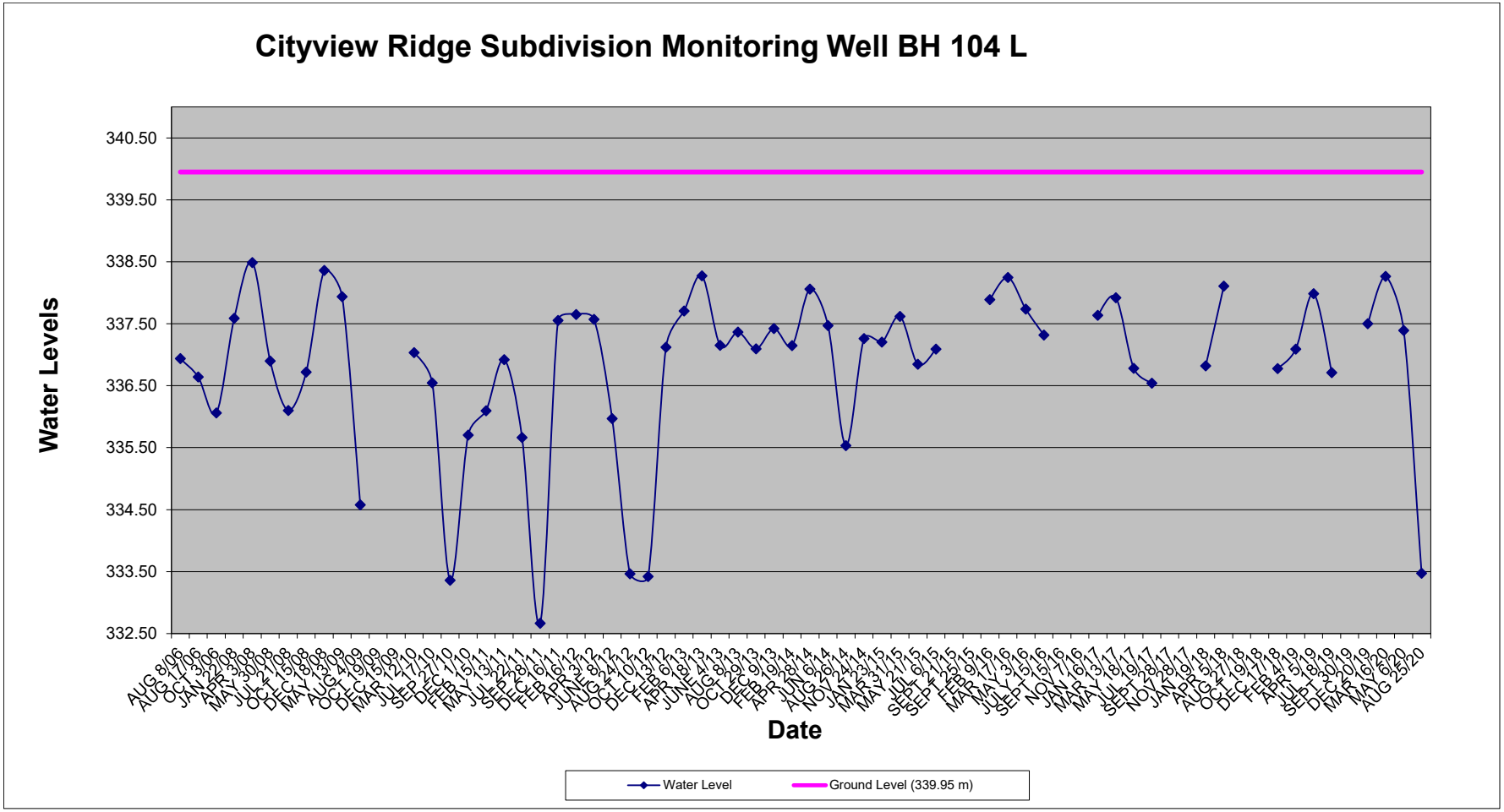
338.50
338.00
337.50
337.00
336.50
336.00
Date
Water Level
Ground Level (339.95 m)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337.50
336.50
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334.50
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MAY 30/08
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DEC 18/08
MAY 13/09
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MAR 12/10
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FEB 15/11
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DEC 17/18
FEB 4/19
APR 5/19
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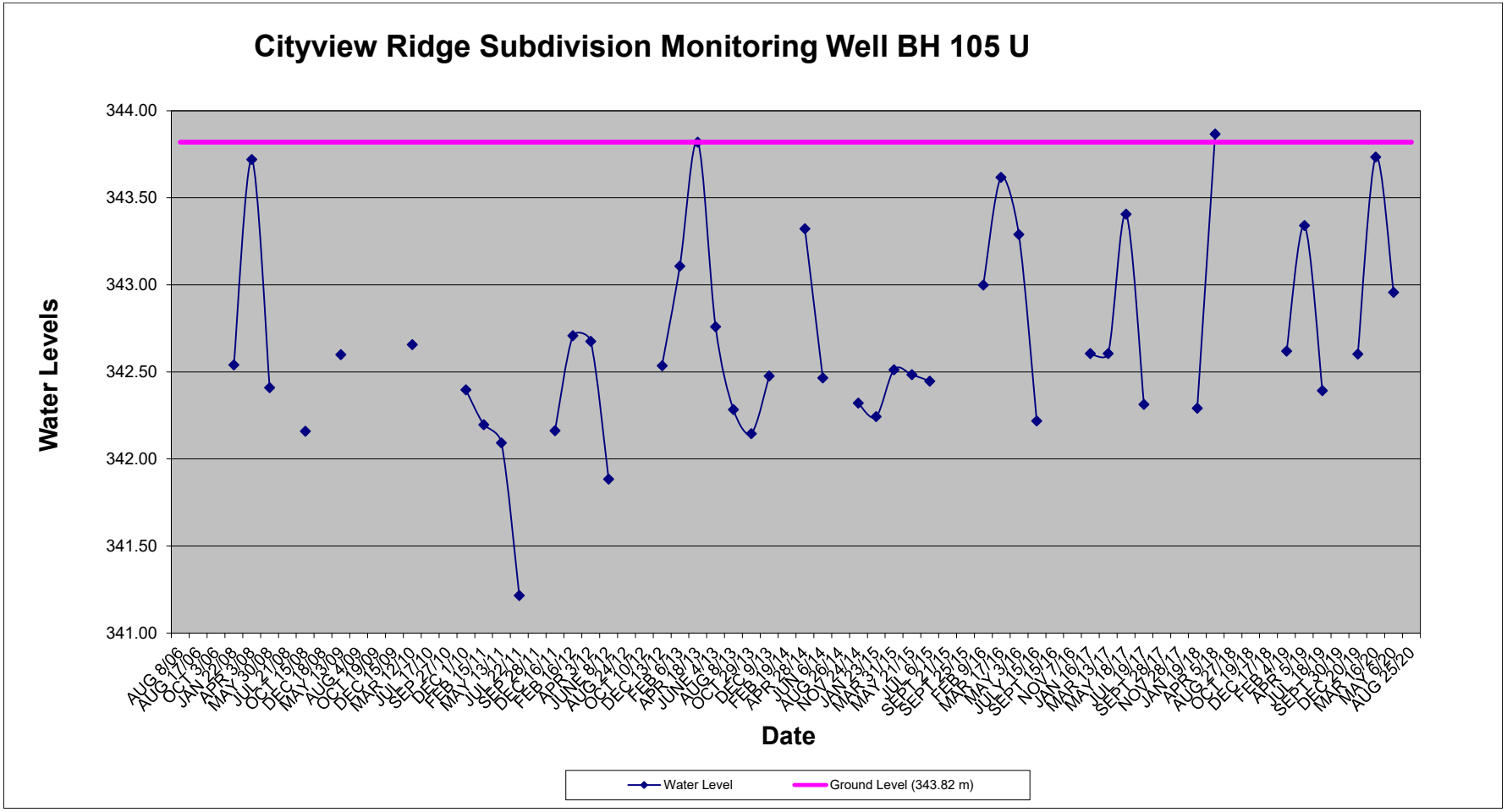
MAR 5/20
MAY 6/20
AUG 25/20
Date
Water Level
Ground Level (339.95 m)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343.50
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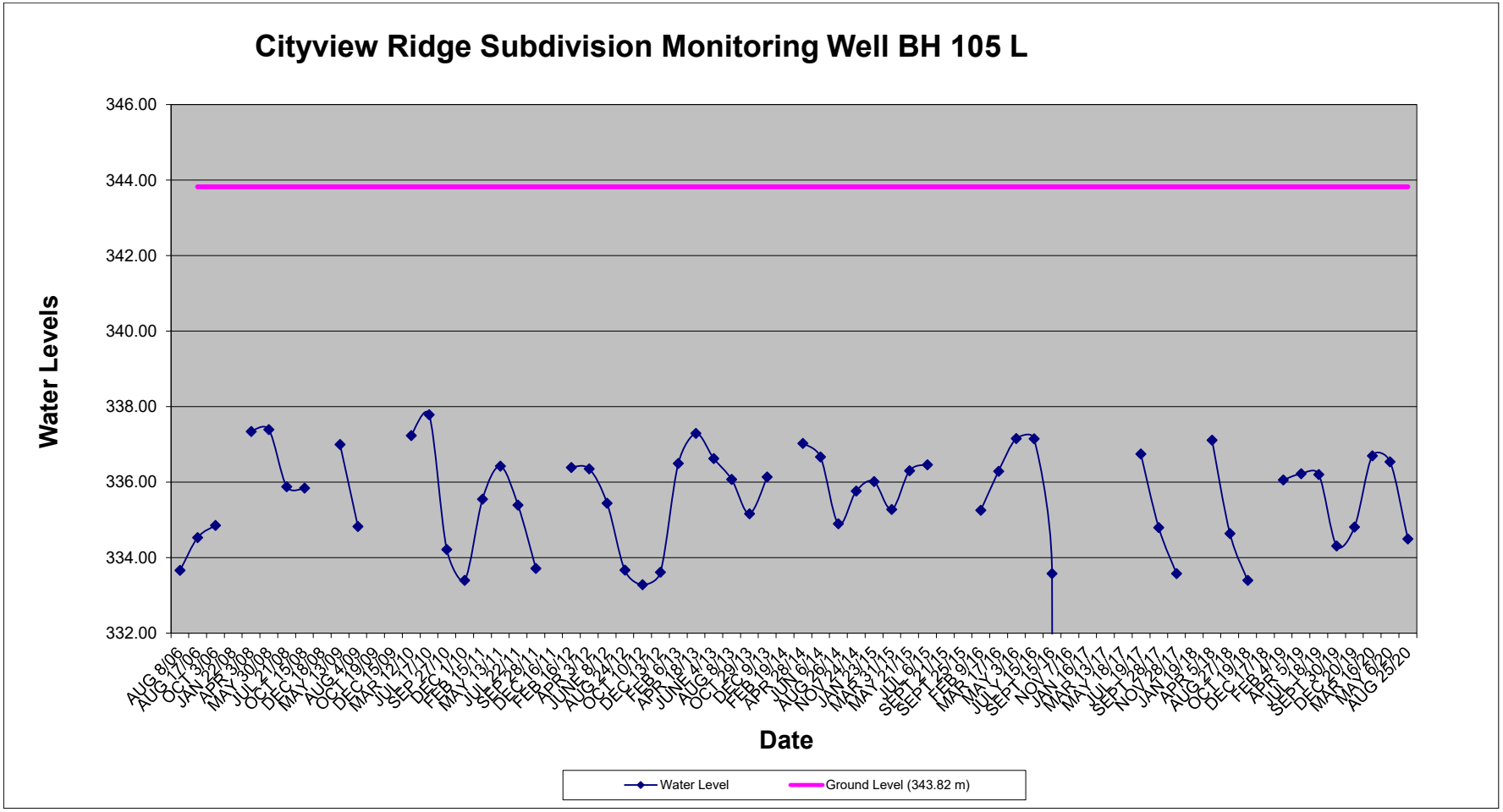
342.50
342.00
341.50
341.00
Date
Water Level
Ground Level (343.82 m)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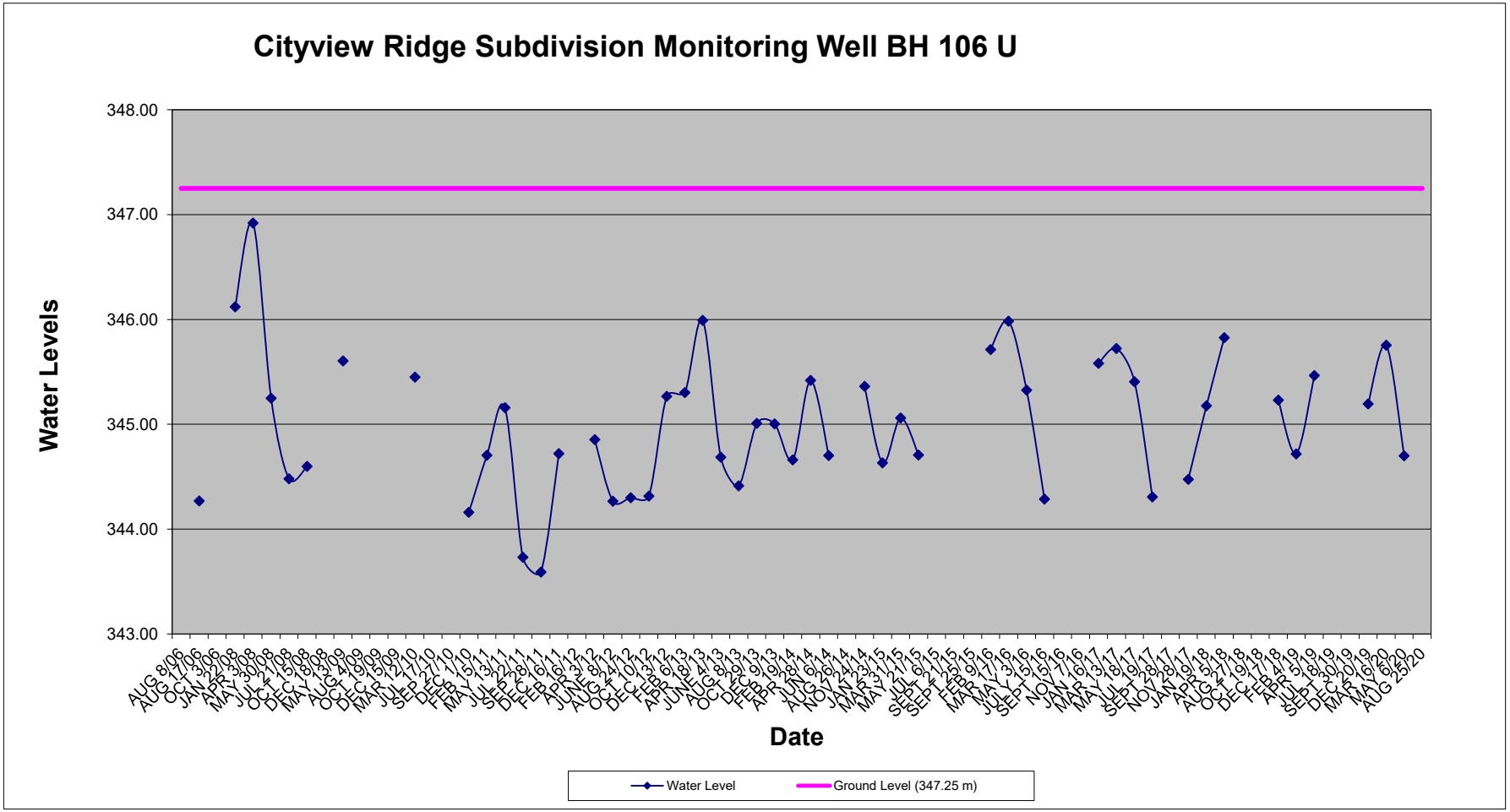
340.00
338.00
336.00
334.00
332.00
Date
Water Level
Ground Level (343.82 m)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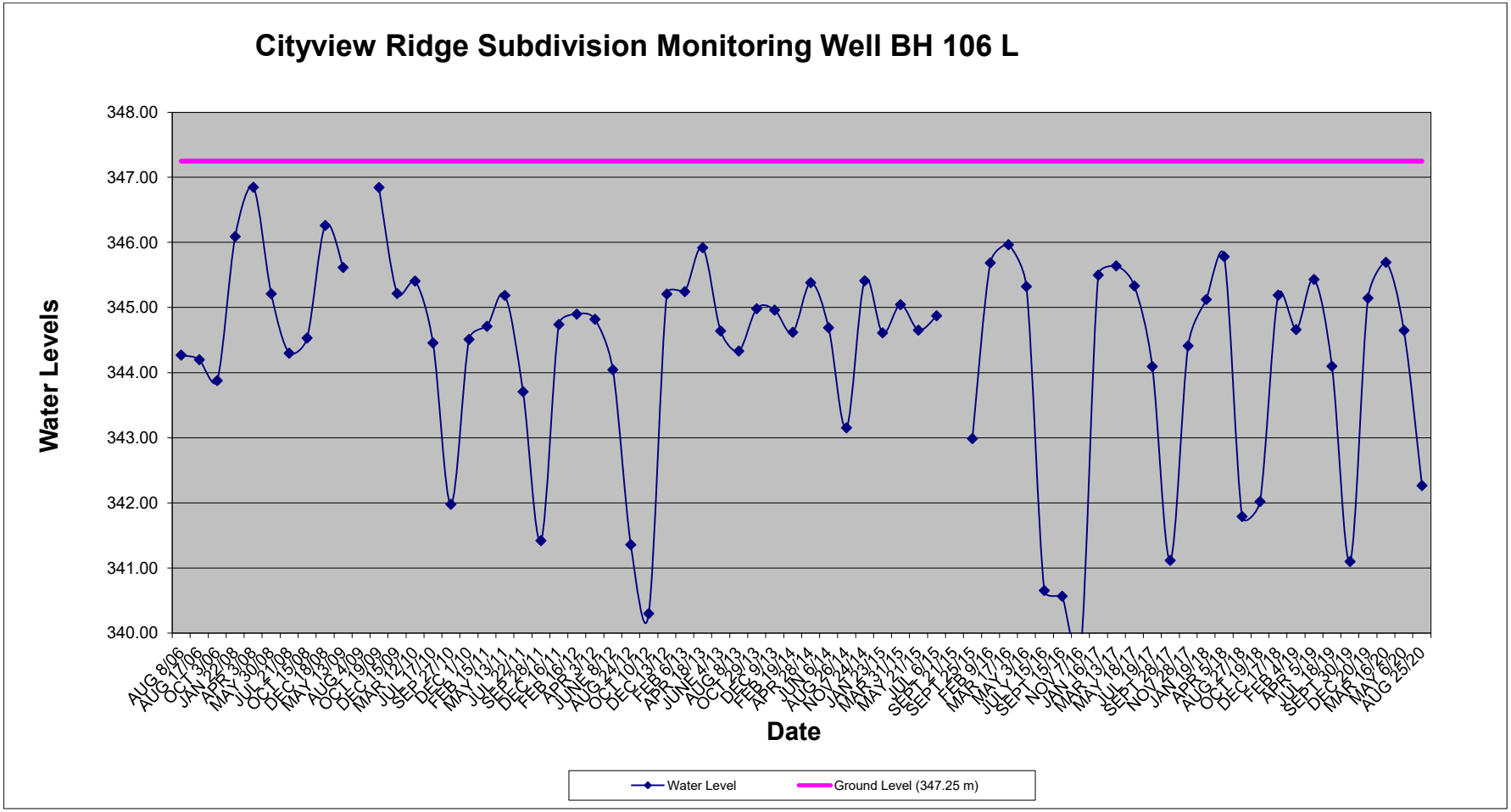
345.00
344.00
343.00
Date
Water Level
Ground Level (347.25 m)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Water Levels
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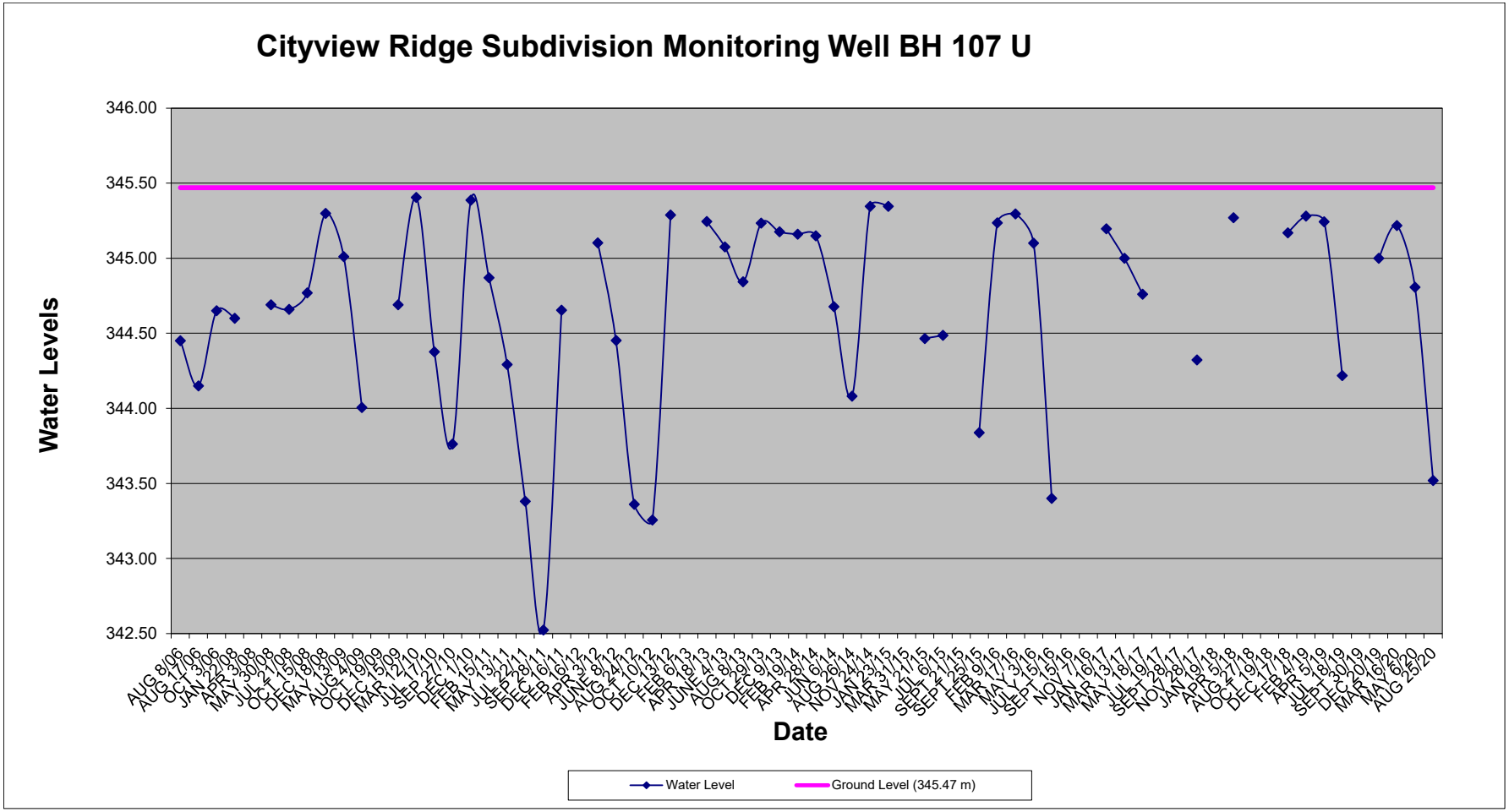
345.00
344.00
343.00
342.00
341.00
340.00
Date
Water Level
Ground Level (347.25 m)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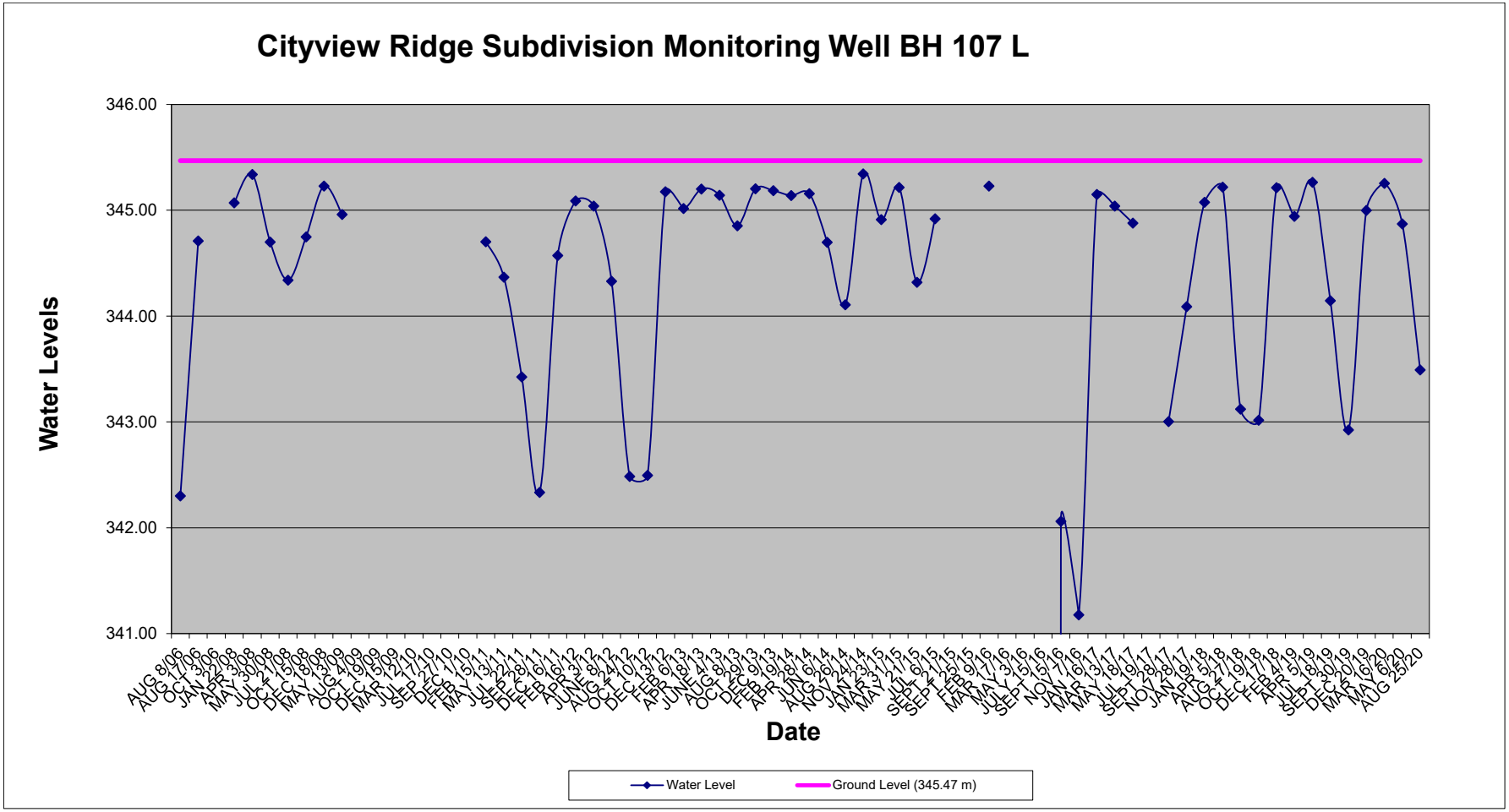
343.00
342.50
Date
Water Level
Ground Level (345.47 m)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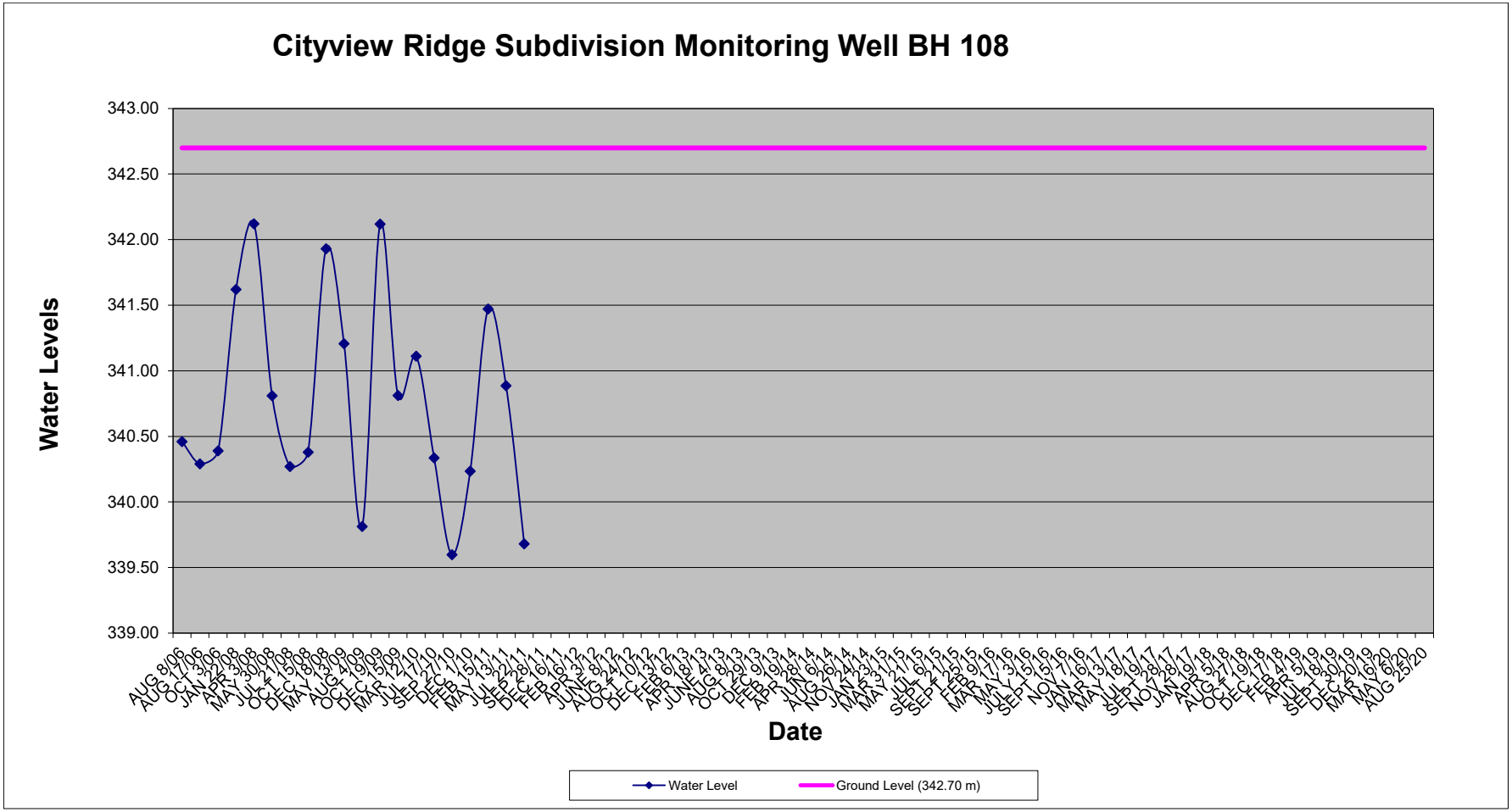
Date
Water Level
Ground Level (345.47 m)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Water Levels
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341.00
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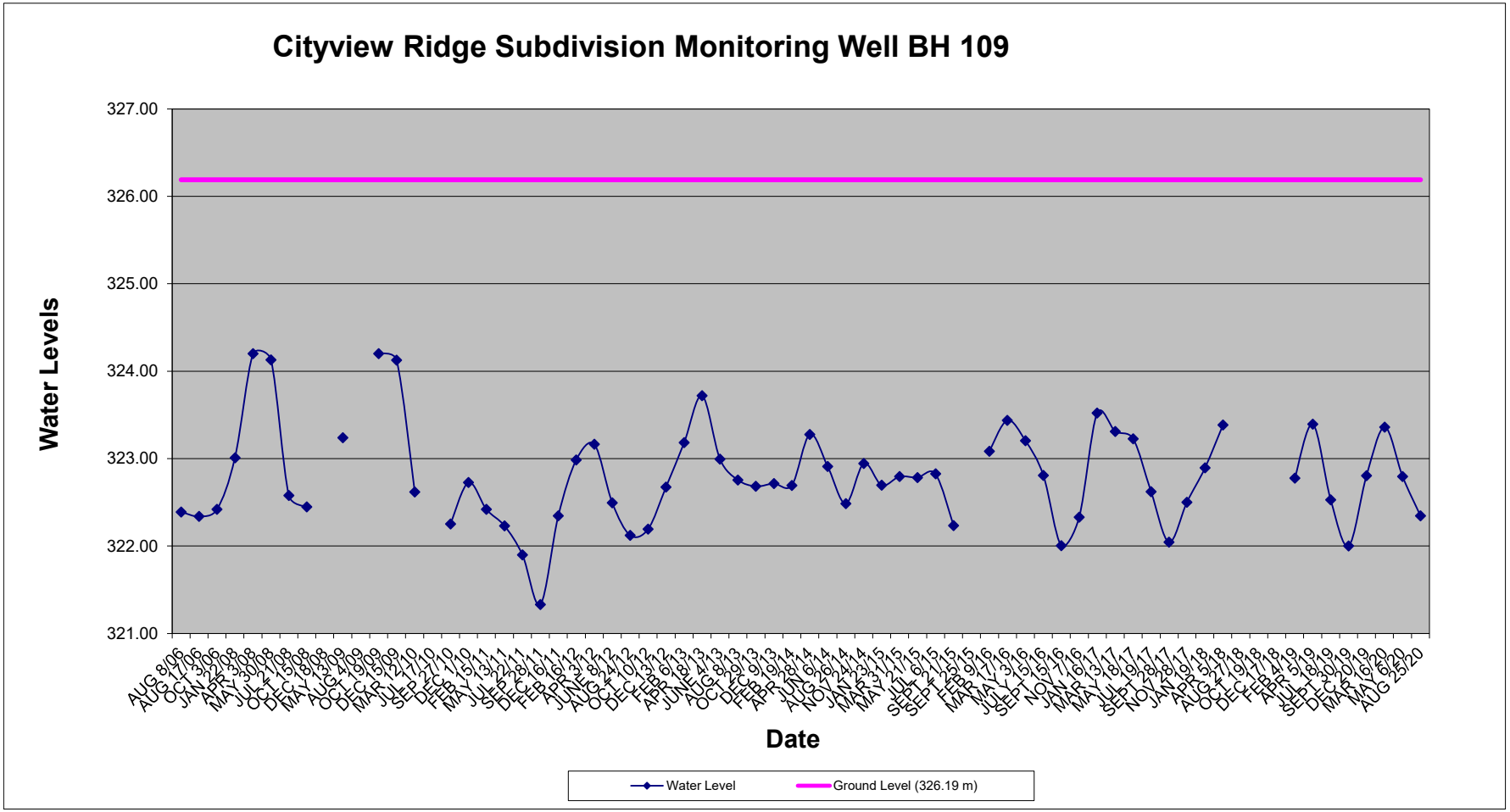
340.00
339.50
339.00
Date
Water Level
Ground Level (342.70 m)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Water Levels
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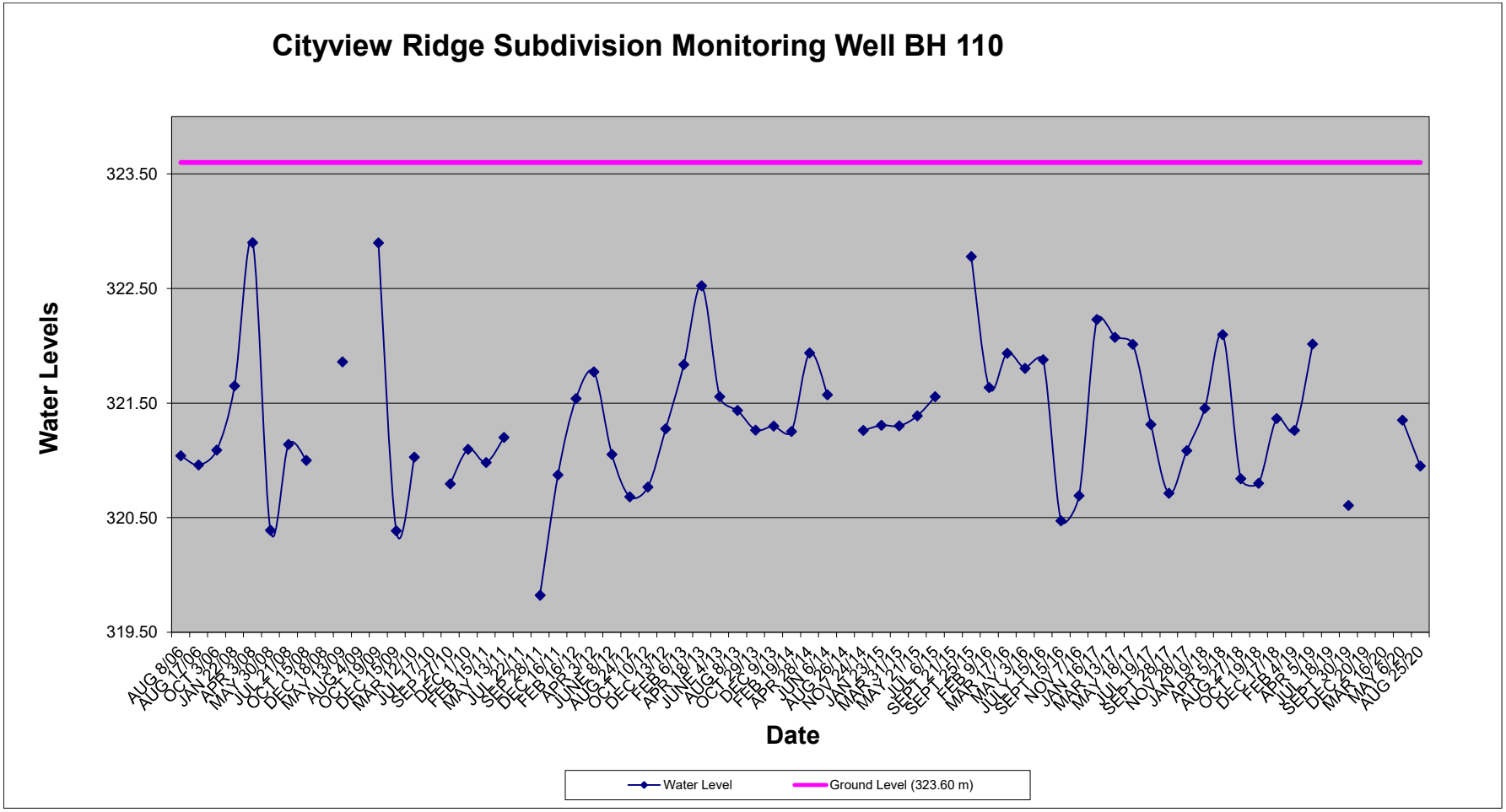
325.00
324.00
323.00
322.00
321.00
Date
Water Level
Ground Level (326.19 m)


Cityview Ridge Subdivision Monitoring Well BH 110
Water Levels
323.50
322.50
321.50
320.50
319.50
Date
Water Level
Ground Level (323.60 m)

APPENDIX D:

HYDROGEOLOGICAL INVESTIGATION
BANKS GROUNDWATER ENGINEERING LIMITED
(NOVEMBER 2014)

Technical Memorandum (DRAFT)

Banks Groundwater Engineering Limited
940 Watson Road South, RR 1 Puslinch, Ontario N0B 2J0
519.829.4808 www.banksgroundwater.ca

17 November 2014

To: Carson Reid – Cityview Ridge Developments Inc.

Copies: Angela Kroetsch – GM BluePlan Engineering Limited
Mirek Sharp – North-South Environmental Inc.
Nancy Shoemaker – Black, Shoemaker, Robinson & Donaldson Limited

From: Bill Banks

Re: Hydrogeological Investigation
Environmental Impact Study
Proposed Cityview Ridge Development, City of Guelph

---

1 Introduction

This Technical Memorandum presents the updated results of a hydrogeological investigation completed for this proposed development. The site is located immediately northwest of the intersection of York Road and Watson Parkway, adjacent to Cityview Drive, and north of the Canadian National Railway, in the City of Guelph.

The results of the hydrogeological investigation have been updated to include additional groundwater monitoring conducted on-site from December 2012 to October 2014. This investigation was also completed to support pre- and post-development water balance calculations, by providing estimates of current on-site infiltration of precipitation and groundwater discharge to an on-site wetland and adjacent creek. The results and the interpretation of hydrogeological conditions are provided for inclusion or reference in an Environmental Impact Study (EIS) for this proposed development. The hydrogeological investigation included the following tasks:

- Review of available information including: draft site plan, previous geotechnical investigation data, published geology maps and reports, City of Guelph groundwater study reports, aerial photography, wetland mapping and analyses, and stormwater management plans
- Site reconnaissance
- Initial installation of shallow piezometers in 2009 at three locations adjacent to an on-site wetland and creek, and the subsequent installation in 2012 of shallow piezometers at one additional location adjacent to the on-site wetland
- Initial short-term monitoring of groundwater levels in 2009 to determine hydraulic gradients and evaluate groundwater flows to the on-site wetland and adjacent creek
- Subsequent longer-term monitoring of groundwater levels in shallow piezometers to assess seasonal variations in groundwater discharge to the on-site wetland and adjacent creek
- Monitoring of groundwater levels in existing on-site monitoring wells
- Analysis of the results of the background review, groundwater monitoring and the local hydrogeological conditions

- Analysis of groundwater levels to establish depths to water table, directions and rates of groundwater flow, the need for stormwater management systems, and the interaction of groundwater and the wetland
- Consideration and evaluation of source water protection related to City of Guelph municipal wells.

Presented below is a summary of the geology and hydrogeology of the area in which the site is located, followed by the results of the groundwater monitoring, and analysis of groundwater recharge and discharge in relation to the wetland.

2 Surficial Geology

The study site is situated within the Guelph Drumlin Fields physiographic region, as defined by Chapman and Putnam (1984). The Guelph Drumlin Field consists of a series of northwest-southeast trending drumlins that are regionally situated to the northwest of the Paris Moraine. The drumlins are characterized by a series of elongated oval-shaped hills. The topography of the local area is dominated by three closely-spaced drumlins. The proposed residential development area of the site is located on the southern end of the middle drumlin. The eastern part of the site encompasses the slope of the drumlin and lower lying areas. Multiple residential development is proposed for the easternmost part of the site adjacent to Watson Parkway North.

The drumlins in the Guelph Drumlin Field are comprised of a sandy facies (up to 40 percent sand) of the Port Stanley Till, which is typically a silt to sandy silt till (Karrow, 1968, 1987). Overburden thickness is more than 30 m at the highest elevation of the drumlins. The overburden deposits in the lower areas comprise a series of terraced deposits of glacial outwash (sand and gravel) and lacustrine (sand) materials. The overburden thins to less than 4 m in the lower-lying areas. Wetland areas are generally found associated with the glacial outwash deposits within these lower lying areas. A wetland occurs in the south-eastern area of the site at the base of the drumlin, and is interpreted to drain to the adjacent Clythe Creek.

The results of a previous geotechnical investigation of this site, which included drilling and soil sampling at 10 locations on-site, confirmed the shallow soils on the drumlin comprise a sandy silt till and the shallow soils in the eastern part of the site comprise sand and gravel (Naylor Engineering Associates, 2006).

3 Overburden Hydrogeology

Groundwater occurs within the bedrock formations and overburden deposits throughout the region and flows horizontally and vertically under hydraulic gradients. The rate of groundwater flow is dependent on the hydraulic conductivity of the deposits and formations, as well as the magnitude of the local and regional hydraulic gradients. The rate of groundwater flow is typically very slow relative to the flow of surface water in creeks, streams, and rivers.

Groundwater flow in the local area is interpreted to be southerly towards discharge to the Eramosa River, which is about 700 metres south of the site. A component of localized groundwater flow on-site is expected to be south-easterly towards discharge to the wetland and Clythe Creek.

Drumlins comprising a silt to sandy silt glacial till typically have limited intergranular porosity and hydraulic conductivity. These deposits do not transmit water readily and will likely act to limit the flow of groundwater. The logs of the eight boreholes drilled on the drumlin indicate the sandy silt till increased in density with depth, with borehole depths ranging from 5.7 to 11.1 metres. Given the characteristics of the drumlin at this site it is interpreted that a limited amount of precipitation infiltrates in the upland portion and to a lesser extent along the slopes. This infiltration would recharge the local groundwater system, but it is expected that most of this shallow groundwater would flow towards the sand and gravel deposits situated around the southerly and easterly base

of the drumlin. Infiltration in the area of the sand and gravel surficial deposits would be significantly greater. Groundwater flow in the sand and gravel deposits on-site is interpreted to be southerly towards discharge to the wetland and Clythe Creek. Groundwater seeps (i.e. surface discharge areas) were observed at several locations up-gradient of the wetland.

4 Groundwater Monitoring

4.1 Wetland Piezometers (2009)

To confirm the occurrence of groundwater flow and discharge to the wetland located in the southeast area of the site, shallow piezometers were installed at two locations (Refer to Plates 1 and 2). Shallow piezometers were also installed at a third location to determine if shallow groundwater discharge was occurring adjacent to Clythe Creek along the southern boundary of the site (Refer to Plate 3). The locations were selected during a site reconnaissance in early May 2009, when the groundwater seeps were visible and the area upgradient of the wetland was saturated.

At each site the piezometers were installed in pairs, with one set at a shallow depth (about 0.5 m) and another at an intermediate depth (about 1.1 m), to provide for measurement of the vertical hydraulic gradient at various times. Groundwater levels were measured in each piezometer and recorded relative to adjacent ground surface on three occasions: 13 and 25 May, and 4 June 2009.

Plate 1: Piezometer Station 1

Plate 2: Piezometer Station 2

On each occasion the monitoring at Stations 1 and 2 confirmed groundwater discharge conditions adjacent to the wetland and upgradient. Confirmation of local groundwater discharge to the wetland is based on the observation of groundwater seeps along the upgradient slope on the north edge of the wetland on each monitoring occasion. Shallow groundwater flow to the wetland is also confirmed by the groundwater levels in piezometers that were observed at or just above ground surface. On these three monitoring occasions a downward gradient was observed, as the groundwater level in the intermediate piezometer was below the adjacent groundwater level in the shallow piezometer.

This initial short-term monitoring indicated that the upgradient groundwater seeps, combined with shallow groundwater flow along the fringe of the wetland are important in terms of maintaining water levels in the wetland. These observations demonstrated the wetland's dependence on groundwater flow during this brief monitoring period.

Plate 3: Piezometer Station 3

The third pair of shallow piezometers located along the southern edge of the site, just west of the Clythe Creek culvert under the railway, indicated groundwater was at a depth of 1.2 m on 13 May, but declined below the intermediate piezometer soon after. The shallow piezometer was dry on each occasion. The monitoring confirmed there was no shallow groundwater discharge at this location on these occasions. It is considered possible that groundwater is discharging directly to Clythe Creek in this area.

These monitoring results confirmed that the shallow groundwater system was discharging to the wetland along the base of the drumlin during the mid- to late-spring 2009 monitoring period. It is expected that these conditions occur each spring; however, due to the limited period of monitoring it was uncertain if these discharge conditions continue during drier seasonal periods.

4.2 Wetland Piezometers (2012 - 2014)

In recognition of the need for seasonal monitoring of groundwater levels and discharge to the wetland, a second period of monitoring was initiated in December 2012. Prior to the start of this monitoring, another pair of shallow piezometers was installed at a third location that was at the edge of the wetland and downgradient of a groundwater seep area. Plate 4 is a photograph of Station 4 in December 2012. The groundwater discharge in this area is visible where the warmer groundwater is melting the recently-fallen snow. The approximate locations of the three piezometer stations are shown in the appended Figure 1.

Plate 4: Piezometer Station 4

Groundwater levels were then measured and recorded in piezometers at Stations 1, 2 and 4 on 14 December 2012. The groundwater in piezometers is typically frozen in January and February, and therefore was not measured during these months in 2013. Monitoring resumed on 15 March 2013 and continued on a monthly basis until 12 December 2013. During 2014 monitoring occurred in April, July and October. The groundwater monitoring data and discharge observations for 2009 and 2012 to 2014 are summarized in the appended Table 1.

Groundwater level monitoring and discharge observations from December 2012 to October 2014 confirmed that groundwater levels in the shallow piezometers were close to, and on some occasions above, ground surface. This confirmed that groundwater was flowing toward and discharging into the wetland on all monitoring occasions. Without continuous monitoring it cannot be concluded that discharge was constant; however, observations made during months with below-average precipitation during 2013 (i.e. March, May, August, September, November and December) confirmed discharge was occurring during "drier" periods. The quarterly monitoring events in 2014 occurred during months of above-average total precipitation, thus resulting in higher groundwater levels and flow conditions.

4.3 Monitoring Wells

Groundwater levels were also measured in each of the 10 on-site monitoring wells on 13 May 2009, for the purpose of assessing horizontal and vertical flow directions. At five locations pairs of monitoring wells were installed in the same borehole to provide for measurement of the vertical hydraulic gradient at various times. Groundwater elevations were representative of spring levels, with depths to groundwater ranging from 0.5 to 1.6 metres below ground surface in the seven shallow monitors (i.e. completed at depths less than 4.0 m). Groundwater levels ranged from 0.5 to 6.8 metres below ground surface in the eight deeper monitors. The lowest groundwater elevation occurred in the central part of the site in the deepest monitor, which is completed at a depth of about 10 metres at the crest of the southern slope of the drumlin.

Groundwater elevations in the shallow monitors confirm groundwater flow directions are radial from the top of the drumlin towards the base (i.e. ranging from southwest to east). A comparison of shallow and deeper groundwater elevations indicates a downward hydraulic gradient in the drumlin, as would be expected.

5 Groundwater Recharge and Discharge

Based on a review of local geology and hydrogeology and the results of the shallow groundwater monitoring, it is evident that there is limited groundwater recharge on the drumlin that dominates much of the site. It is interpreted that the rate of groundwater recharge and flow is more significant in the lower-lying, eastern part of the site, where the outwash sand and gravel deposit occurs at surface. The limited amount of groundwater that discharges along the eastern base of the drumlin likely flows through the outwash deposit, eventually discharging into the on-site wetland. It is further interpreted that a portion of the surface water runoff from up the slope and on the top of the drumlin also flows to the wetland.

The average annual precipitation has been estimated from an averaging of precipitation normals from meteorological stations in Guelph and the surrounding area, for the period 1981 to 2010. The average annual precipitation, for the area in which the study site is located, is estimated to be about 925 mm. It has also been estimated that the average annual evapotranspiration for this area is about 555 mm; however, evapotranspiration rates across a site will vary in relation to the depth to water table, soil texture, topography, extent of vegetation cover, and type of vegetation. Based on the results of research conducted in other parts of the Eramosa River and Speed River subwatersheds, estimates of evapotranspiration rates can be made for this site. It is estimated that evapotranspiration rates on the drumlin will average about 555 mm/year, whereas in the well-drained outwash sand and gravel deposit the rate is estimated to be about 495 mm/year. The net water available for infiltration and surface runoff is 370 mm on the drumlin and 430 mm in the sand and gravel area, on an annual average basis.

For the purpose of estimating recharge to the groundwater system, on and adjacent to the drumlin, that maintains discharge to the wetland, it is estimated that the average annual groundwater recharge on the drumlin under current conditions is 180 mm. The remaining 190 mm is the average annual surface runoff. These estimates are based on previous analyses completed for developments in Guelph where drumlins exist. The average annual rate of recharge in the eastern sand and gravel area is estimated to be as high as 380 mm, with the remaining 50 mm allocated to surface runoff.

The total area of the subject lands comprises 17.682 ha. However, a total area of 18.28 ha has been used for the purposes of a water budget, which includes the southern section of Cityview Drive. Reference should be made to the site description and maps included in the Preliminary Servicing and Stormwater Management Report (Gamsby and Mannerow Limited, 2012). The western and central parts of the development site (i.e. on top of the drumlins and on the western slope, which includes Catchments 10 and 20 of the existing conditions drainage area) represents an area of 11.80 ha. Accounting for no infiltration on a 0.56 ha impervious area within this part of the site, the average annual rate of recharge on this part of the site under existing conditions is estimated to be 20 230 m^3/year. It is interpreted that the recharge in this part of the site maintains local groundwater levels and groundwater flow in the overburden deposits in a southerly direction from the site.

The eastern 6.48 ha of the site (i.e. Catchment 30 of the existing conditions drainage area) comprises an area of about 2.1 ha along the eastern slope of the drumlin and about 4.38 ha in the sand and gravel outwash deposit area. Accounting for these areas and the differences in surficial soil types and slopes, the average annual rate of recharge in the eastern part of the site is estimated to be 20 420 m^3/year. It is interpreted that much of the recharge occurring in the eastern part of the site would maintain the shallow groundwater discharging to the wetland and Clythe Creek. The net total recharge for the site under existing conditions is therefore estimated to be about 40 650 m^3/year.

Surface water runoff onsite under existing conditions is estimated to be about 31 600 m^3/year, of which 25 420 m^3/year occurs in the western and central parts of the site (i.e. Catchments 10 and 20), and 6 180 m^3/year occurs in the eastern part of the site (i.e. Catchment 30).

It is anticipated that a monthly water budget under existing conditions will be requested by the City of Guelph at a later stage in the review/approval process. This will provide a comparison of pre- and post-development monthly and annual rates of recharge and runoff, that will be based on the stormwater management systems proposed for this site.

6 Stormwater Management

It is understood that stormwater management facilities will be designed to manage surface water runoff in the developed areas of the site (i.e. post-development catchments 100, 201, and 202). Based on the proposed development plan, groundwater recharge and surface water runoff on the eastern slope of the drumlin and within the eastern part of the site are expected to remain unchanged following development. The multiple residential development within a 0.68 ha area of the north-eastern part of the site will require separate stormwater management facilities designed to maintain the current rate of groundwater recharge in this area that will contribute to discharge to the wetland located on-site and to Clythe Creek.

The remaining part of the eastern low-lying area is to remain in the current natural state and it is expected that stormwater management in this area is not required. It can therefore be concluded that surface water runoff and shallow groundwater flow in the undeveloped area will continue to contribute to the maintenance of the wetland and flow in Clythe Creek.

7 Future Groundwater Monitoring

An on-site groundwater monitoring program is recommended to assess changes in groundwater elevations and quality during and following development of the site, as well as to assess the performance of the stormwater management facilities. The locations for groundwater monitoring would be established during preparation of the Environmental Implementation Report for review and consideration by City of Guelph staff.

Initially, groundwater levels should be monitored on a quarterly basis at a minimum in all available on-site monitoring wells before and, where possible, during grading of the site. The preferred monitoring periods would be January, April, July and October. Groundwater samples should be collected each spring and analyzed for general chemical parameters. Similar to other local sites, monitoring of groundwater levels and quality should continue for a period of up to two years following 75 percent completion of the development.

A review of the Ontario Ministry of the Environment on-line well record information service indicates there are (or were) several private water supply wells located in the vicinity of the site. The records for wells in this local area indicate each well has been completed in, and derives its' water supply from, the underlying bedrock aquifer. The records indicate the overburden in this area ranges in thickness from less than 10 m to more than 30 m, and wells are completed at depths ranging from about 20 m to more than 60 m below ground surface. If any of these wells are currently in use, the quantity and quality of water obtained from each well should not be affected by the proposed development, as groundwater flow in the overburden beneath the site is to the south and southeast. It is also noted that a number of water supply wells have been decommissioned and presumably residents are now obtaining their water from the municipal supply system.

If concerns are expressed by well owners regarding the potential for changes in quality and/or quantity of their water supply, baseline testing could be conducted before grading begins on the development site. This would provide background data that could be referenced in the event a well owner indicates they believe their water supply has been affected either during, or following,

development in this area. Municipal water supply is available to all local residences and businesses within this part of the City of Guelph. If it were confirmed that the water quality and/or quantity available from a private well was detrimentally affected by local land development, a municipal water supply could be readily provided.

8 Source Water Protection

The Grand River Source Protection Area Approved Assessment Report (Lake Erie Region Source Protection Committee, 2012) includes mapping of Wellhead Protection Areas (WHPA) and Groundwater Vulnerability for the City of Guelph Municipal Well System. There are currently several municipal wells in the northeast part of Guelph and the mapping indicates part of the proposed residential development site is located within the WHPA-B zone (i.e. 2-year time-of-travel capture zone) for one or more of these wells. The Groundwater Vulnerability mapping indicates the site is located in an area with a vulnerability score that ranges from a value of 6 (i.e. medium) to a value of 10 (i.e. the highest value). It is therefore apparent that there may be source water protection implications related to this proposed development.

Proposed Source Protection Policies have been developed by the City of Guelph and submitted for approval by the Ontario Ministry of the Environment. Once approved (likely in 2015), the requirements of these policies can be expected to apply to this site. Various measures may be required to manage the risk of potential threats to groundwater quality, such as on-going educational measures directed at residents regarding the Province's ban on the use of cosmetic pesticides.

9 Summary

On the basis of an assessment of current site conditions, the net total average annual, pre-development, groundwater recharge for the site is estimated to be about 40 650 m^3/year. It is estimated that the average annual rate of recharge to the groundwater system in the western and central parts of the site, comprising an area of 11.80 ha (i.e. Catchments 10 and 20), is 20 230 m^3/year. It is also estimated that the average annual rate of recharge to the groundwater system in the eastern 6.48 ha of the site, including part of the eastern slope of the drumlin (i.e. Catchment 30), is 20 420 m^3/year.

It is interpreted that much of the recharge in the eastern area currently maintains the shallow groundwater discharging to the wetland and Clythe Creek occurring in the south-eastern part of the site. Under the proposed development, only a limited area along the top of the eastern slope of the drumlin will be developed for residential use and most of this area will comprise rear yards. Groundwater recharge along most of the eastern slope of the drumlin is expected to remain unchanged. Groundwater recharge within the remaining eastern part of the site should also remain unchanged as much of this area will not be developed.

The proposed multiple residential lands within a 0.68 ha area of the north-eastern part of the site will require stormwater management facilities designed to maintain the current rate of groundwater recharge in this area. Groundwater discharge to the wetland located on-site and to Clythe Creek should therefore continue to be maintained following the proposed development of this site. It is anticipated that a monthly water budget under existing conditions will be requested by the City of Guelph at a later stage in the review/approval process. This will provide a comparison of pre- and post-development monthly and annual rates of recharge and runoff, that will be based on the stormwater management systems proposed for this site.

An on-site groundwater monitoring program is recommended to assess any changes in groundwater elevations and quality during and following development of the site, as well as to assess the performance of the stormwater management facilities. The locations for groundwater

monitoring would be established during preparation of the Environmental Implementation Report for review and consideration by City of Guelph staff.

There may be several private water supply wells located in the vicinity of the site. If concerns are expressed by well owners regarding the potential for changes in quality and/or quantity of their water supply, baseline testing could be conducted before grading begins on the development site. This would provide background data that could be referenced in the event a well owner indicates they believe their water supply has been affected either during, or following, development in this area. Municipal water supply is available to all local residences and businesses within this part of the City of Guelph.

Based on recent Source Water Protection mapping for the City of Guelph municipal well system, it is apparent that there may be source water protection implications related to this proposed development. Once Source Protection Policies are approved in the coming year, various measures may be required to manage the risk of potential threats to groundwater quality, and these will be explored as part of the detailed Environmental Implementation Report.

10 References

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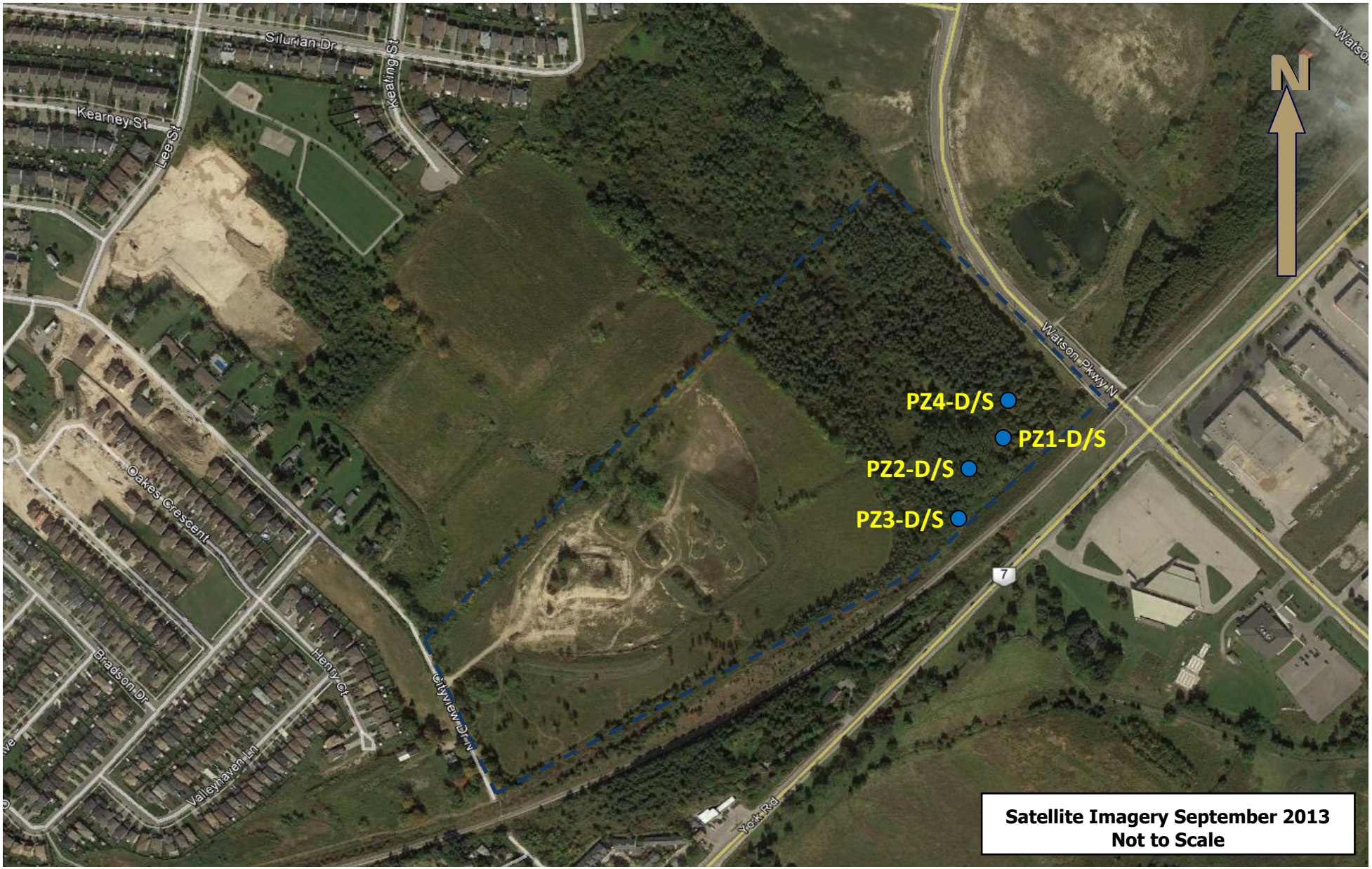
Respectfully submitted,
Banks Groundwater Engineering Limited

final version to be signed by:

William D. Banks, P.Eng.
Principal Hydrogeologist



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Hydrogeological Investigation
Environmental Impact Study
Proposed Cityview Ridge Development
City of Guelph

Piezometer Locations

Figure 1

Table 1: Groundwater Levels Measured (metres below ground level*)

Date	PZ1-D	PZ1-S	PZ2-D	PZ2-S	PZ3-D	PZ3-S	PZ4-D	PZ4-S	Groundwater Discharge Observations
13-May-09	0.03	0.08	0.90	0.01	0.95	dry	-	-	low to moderate flow from seeps
25-May-09	0.01	-0.01	0.75	0.02	1.10	dry	-	-	low to moderate flow from seeps
04-Jun-09	0.01	-0.01	0.69	0.05	dry	dry	-	-	low to moderate flow from seeps
14-Dec-12	0.04	0.07	0.26	0.10	-	-	-0.07	-0.04	low to moderate flow from seeps
15-Mar-13	0.00	0.02	0.24	0.06	-	-	-0.11	-0.04	higher flows from seeps
26-Apr-13	0.00	0.02	0.23	0.06	-	-	-0.10	-0.04	higher flows from seeps
15-May-13	0.01	0.01	0.23	0.06	-	-	-0.09	-0.03	moderate flow from seeps
11-Jun-13	0.01	0.00	0.23	0.07	-	-	-0.08	-0.03	low to moderate flow from seeps
11-Jul-13	0.00	0.00	0.22	0.08	-	-	-0.09	-0.03	higher flows from seeps
09-Aug-13	0.00	0.00	0.22	0.04	-	-	-0.08	-0.02	low to moderate flow from seeps
09-Sep-13	0.01	0.00	0.20	0.06	-	-	-0.06	-0.02	lower flow from seeps
08-Oct-13	0.01	-0.01	0.20	0.05	-	-	-0.07	-0.02	lower flow from seeps
14-Nov-13	0.00	-0.02	0.20	0.06	-	-	-0.06	-0.02	low to moderate flow from seeps
12-Dec-13	0.01	-0.01	0.21	0.06	-	-	-0.06	-0.02	low to moderate flow from seeps
30-Apr-14	0.02	0.04	0.19	0.04	-	-	-0.09	-0.02	higher flows from seeps
16-Jul-14	0.03	0.04	0.18	0.08	-	-	-0.06	-0.01	very low flow from seeps
23-Oct-14	0.02	0.03	0.18	0.05	-	-	-0.07	-0.01	moderate flow from seeps

* negative values indicate groundwater above ground level

APPENDIX E:
STORMWATER MANAGEMENT ANALYSIS

EXISTING CONDITION MODELLING FILES
HADATI CREEK ALLOWABLE MODELLING FILES
FIGURE NO. 8 – HADATI CREEK MODELLING SCHEMATIC
HADATI CREEK POST-DEVELOPMENT MODELLING FILES (WESTERN PORTION OF CITYVIEW RIDGE SUBDIVISION)
STAGE/STORAGE/DISCHARGE TABLES
POST DEVELOPMENT CONTROLLED CONDITION MODELLING FILES (EASTERN PORTION OF CITYVIEW RIDGE SUBDIVISION)
COOLING TRENCH CALCULATIONS
OIL/GRIT SEPARATOR SIZING CALCULATIONS

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"            1   Equal length"
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"        7.020   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
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"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.562   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
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"        1.500   Impervious Depression storage"
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"              Surface Area            6.458      0.562      7.020      hectare"
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"              Time to Centroid        98.613     85.041     90.917     minutes"
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"              Rainfall volume         2183.97    189.91     2373.88    c.m"
"              Rainfall losses         31.709     2.082      29.339     mm"
"              Runoff depth            2.107      31.734     4.477      mm"
"              Runoff volume           136.09     178.22     314.31     c.m"
"              Runoff coefficient      0.000      0.000      0.000      "
"              Maximum flow            0.073      0.119      0.130      c.m/sec"
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"            4   Add Runoff "
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"        0.250   Pervious Lag constant (hours)"
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"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                       0.054     0.000     0.130     0.130 c.m/sec"
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"             Surface Area           4.780      0.000      4.780      hectare"
"             Time of concentration  28.300     2.768      28.300     minutes"
"             Time to Centroid       98.613     85.041     98.613     minutes"
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"             Rainfall volume        1616.40    0.00       1616.40    c.m"
"             Rainfall losses        31.709     2.082      31.709     mm"
"             Runoff depth           2.107      31.734     2.107      mm"
"             Runoff volume          100.72     0.00       100.72     c.m"
"             Runoff coefficient     0.000      0.000      0.000      "
"             Maximum flow           0.054      0.000      0.054      c.m/sec"
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"        0.000   % Impervious"
"        6.480   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
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"       45.000   Flow length"
"        2.000   Overland Slope"
"        6.458   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.562   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.492     0.000     0.000     0.000 c.m/sec"
"             Catchment 10            Pervious   Impervious Total Area "
"             Surface Area            6.458      0.562      7.020      hectare"
"             Time of concentration  19.590      2.510      15.110     minutes"
"             Time to Centroid       92.382      83.161     89.963     minutes"
"             Rainfall depth         46.775      46.775     46.775     mm"
"             Rainfall volume        3020.92     262.69     3283.61    c.m"
"             Rainfall losses        35.903      2.312      33.216     mm"
"             Runoff depth           10.872      44.463     13.559     mm"
"             Runoff volume          702.15      249.70     951.85     c.m"
"             Runoff coefficient     0.000       0.000      0.000      "
"             Maximum flow           0.443       0.162      0.492      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
```

```
"                                105172 Ex Cond 5year
"                     0.492     0.492     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.492     0.492     0.492     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Discharge"
"             Maximum flow                  0.492    c.m/sec"
"             Hydrograph volume           951.854    c.m"
"                     0.492     0.492     0.492     0.492"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.492     0.000     0.492     0.492"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           20   Catchment 20 - To Clythe Creeek"
"        0.000   % Impervious"
"        4.780   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        4.780   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.328     0.000     0.492     0.492 c.m/sec"
"             Catchment 20          Pervious   Impervious Total Area "
"             Surface Area          4.780      0.000      4.780      hectare"
"             Time of concentration 19.590     2.510      19.590     minutes"
"             Time to Centroid      92.382     83.161     92.382     minutes"
"             Rainfall depth        46.775     46.775     46.775     mm"
"             Rainfall volume       2235.84    0.00       2235.85    c.m"
"             Rainfall losses       35.903     2.312      35.903     mm"
"             Runoff depth          10.872     44.463     10.872     mm"
"             Runoff volume         519.68     0.00       519.68     c.m"
"             Runoff coefficient    0.000      0.000      0.000      "
"             Maximum flow          0.328      0.000      0.328      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.328     0.328     0.492     0.492"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30 - To Clythe Creek"
"        0.000   % Impervious"
"        6.480   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
```

```
"        6.480   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.444     0.328     0.492     0.492 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           6.480      0.000      6.480      hectare"
"             Time of concentration  19.590     2.510      19.590     minutes"
"             Time to Centroid       92.382     83.161     92.382     minutes"
"             Rainfall depth         46.775     46.775     46.775     mm"
"             Rainfall volume        3031.02    0.00       3031.02    c.m"
"             Rainfall losses        35.903     2.312      35.903     mm"
"             Runoff depth           10.872     44.463     10.872     mm"
"             Runoff volume          704.50     0.00       704.50     c.m"
"             Runoff coefficient     0.000      0.000      0.000      "
"             Maximum flow           0.444      0.000      0.444      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.444     0.772     0.492     0.492"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.444     0.772     0.772     0.492"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Discharge"
"             Maximum flow                  1.265    c.m/sec"
"             Hydrograph volume          2176.031    c.m"
"                     0.444     0.772     0.772     1.265"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
"                Total Discharge"
"             Maximum flow                  1.265    c.m/sec"
"             Hydrograph volume          2176.031    c.m"
"                     0.444     1.265     0.772     0.000"
" 38          START/RE-START TOTALS 1"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        18.280    hectare"
"             Total Impervious area                        0.562    hectare"
"             Total % impervious                           3.072"
" 19          EXIT"
```

```
                                105172 Ex Cond 25year
"                 MIDUSS Output ----------------------------------------------->"
"                 MIDUSS version                          Version 2.07  rev. 379"
"                 MIDUSS created                                  April 25, 2005"
"            10   Units used:                                            ie METRIC"
"                 Job folder:                 Y:\SPrimmer\Miduss Modelling\105172"
"                 Output filename:                  105172 Ex Cond 25year REV.out"
"                 Licensee name:                                                 ."
"                 Company                             Gamsby and Mannerow Limited"
"                 Date & Time last used:                04/04/2011 at 12:00:32 PM"
" 31           TIME PARAMETERS"
"         5.000   Time Step"
"       210.000   Max. Storm length"
"      1500.000   Max. Hydrograph"
" 32           STORM Chicago storm"
"             1   Chicago storm"
"      3158.000   Coefficient A"
"        15.000   Constant B"
"         0.936   Exponent C"
"         0.400   Fraction R"
"       210.000   Duration"
"         1.000   Time step multiplier"
"              Maximum intensity           169.546    mm/hr"
"              Total depth                  69.476    mm"
"             6   025hyd   Hydrograph extension used in this file"
" 33           CATCHMENT 10"
"             1   Triangular SCS"
"             1   Equal length"
"             2   Horton equation"
"            10   Catchment 10 - To Hadati Creek"
"         8.000   % Impervious"
"         7.020   Total Area"
"        45.000   Flow length"
"         2.000   Overland Slope"
"         6.458   Pervious Area"
"        45.000   Pervious length"
"         2.000   Pervious slope"
"         0.562   Impervious Area"
"        45.000   Impervious length"
"         2.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        75.000   Pervious Max.infiltration"
"        12.500   Pervious Min.infiltration"
"         0.250   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.050   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                      1.344     0.000     0.000     0.000 c.m/sec"
"              Catchment 10            Pervious   Impervious Total Area "
"              Surface Area            6.458      0.562      7.020      hectare"
"              Time of concentration   14.371     2.291      12.330     minutes"
"              Time to Centroid        105.688    98.958     104.551    minutes"
"              Rainfall depth          69.476     69.476     69.476     mm"
"              Rainfall volume         4487.06    390.18     4877.24    c.m"
"              Rainfall losses         40.830     2.498      37.763     mm"
"              Runoff depth            28.647     66.978     31.713     mm"
"              Runoff volume           1850.11    376.15     2226.26    c.m"
"              Runoff coefficient      0.000      0.000      0.000      "
"              Maximum flow            1.257      0.234      1.344      c.m/sec"
" 40           HYDROGRAPH Add Runoff "
"             4   Add Runoff "
```

```
"                    1.344     1.344     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    1.344     1.344     1.344     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
                 Total Discharge"
"             Maximum flow                  1.344    c.m/sec"
"             Hydrograph volume          2226.261    c.m"
"                    1.344     1.344     1.344     1.344"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    1.344     0.000     1.344     1.344"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           20   Catchment 20 - To Clythe Creeek"
"        0.000   % Impervious"
"        4.780   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        4.780   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.931     0.000     1.344     1.344 c.m/sec"
"             Catchment 20          Pervious   Impervious Total Area "
"             Surface Area          4.780      0.000      4.780      hectare"
"             Time of concentration 14.371     2.291      14.371     minutes"
"             Time to Centroid      105.688    98.958     105.688    minutes"
"             Rainfall depth        69.476     69.476     69.476     mm"
"             Rainfall volume       3320.97    0.00       3320.97    c.m"
"             Rainfall losses       40.830     2.498      40.830     mm"
"             Runoff depth          28.647     66.978     28.647     mm"
"             Runoff volume         1369.31    0.00       1369.31    c.m"
"             Runoff coefficient    0.000      0.000      0.000      "
"             Maximum flow          0.930      0.000      0.931      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.931     0.931     1.344     1.344"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30 - To Clythe Creek"
"        0.000   % Impervious"
"        6.480   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
```

```
"        6.480   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.261     0.931     1.344     1.344 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           6.480      0.000      6.480      hectare"
"             Time of concentration  14.371     2.291      14.371     minutes"
"             Time to Centroid       105.688    98.958     105.688    minutes"
"             Rainfall depth         69.476     69.476     69.476     mm"
"             Rainfall volume        4502.07    0.00       4502.07    c.m"
"             Rainfall losses        40.830     2.498      40.830     mm"
"             Runoff depth           28.647     66.978     28.647     mm"
"             Runoff volume          1856.30    0.00       1856.30    c.m"
"             Runoff coefficient     0.000      0.000      0.000      "
"             Maximum flow           1.261      0.000      1.261      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.261     2.192     1.344     1.344"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     1.261     2.192     2.192     1.344"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Discharge"
"             Maximum flow                  3.536    c.m/sec"
"             Hydrograph volume          5451.871    c.m"
"                     1.261     2.192     2.192     3.536"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
"                Total Discharge"
"             Maximum flow                  3.536    c.m/sec"
"             Hydrograph volume          5451.870    c.m"
"                     1.261     3.536     2.192     0.000"
" 38          START/RE-START TOTALS 1"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                       18.280    hectare"
"             Total Impervious area                       0.562    hectare"
"             Total % impervious                          3.072"
" 19          EXIT"
```

```
                                105172 Ex Cond 100year
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                          Version 2.07  rev. 379"
"                MIDUSS created                                  April 25, 2005"
"           10   Units used:                                            ie METRIC"
"                Job folder:                Y:\SPrimmer\Miduss Modelling\105172"
"                Output filename:                105172 Ex Cond 100year REV.out"
"                Licensee name:                                               ."
"                Company                           Gamsby and Mannerow Limited"
"                Date & Time last used:              04/04/2011 at 12:01:05 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      210.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     4688.000   Coefficient A"
"       17.000   Constant B"
"        0.962   Exponent C"
"        0.400   Fraction R"
"      210.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           213.574    mm/hr"
"             Total depth                  88.830    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           10   Catchment 10 - To Hadati Creek"
"        8.000   % Impervious"
"        7.020   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        6.458   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.562   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     2.160     0.000     0.000     0.000 c.m/sec"
"             Catchment 10           Pervious   Impervious Total Area "
"             Surface Area           6.458      0.562      7.020      hectare"
"             Time of concentration  11.869     2.089      10.485     minutes"
"             Time to Centroid       104.828    98.071     103.872    minutes"
"             Rainfall depth         88.830     88.830     88.830     mm"
"             Rainfall volume        5736.98    498.87     6235.85    c.m"
"             Rainfall losses        43.360     2.670      40.105     mm"
"             Runoff depth           45.470     86.160     48.725     mm"
"             Runoff volume          2936.64    483.87     3420.51    c.m"
"             Runoff coefficient     0.000      0.000      0.000      "
"             Maximum flow           1.965      0.297      2.160      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
```

```
"                                105172 Ex Cond 100year
"                        2.160     2.160     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                        2.160     2.160     2.160     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Discharge"
"             Maximum flow                    2.160    c.m/sec"
"             Hydrograph volume            3420.511    c.m"
"                        2.160     2.160     2.160     2.160"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                        2.160     0.000     2.160     2.160"
" 33          CATCHMENT 20"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           20   Catchment 20 - To Clythe Creeek"
"        0.000   % Impervious"
"        4.780   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        4.780   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                        1.454     0.000     2.160     2.160 c.m/sec"
"             Catchment 20            Pervious   Impervious Total Area "
"             Surface Area            4.780      0.000      4.780      hectare"
"             Time of concentration   11.869     2.089      11.869     minutes"
"             Time to Centroid        104.828    98.071     104.828    minutes"
"             Rainfall depth          88.830     88.830     88.830     mm"
"             Rainfall volume         4246.06    0.00       4246.07    c.m"
"             Rainfall losses         43.360     2.670      43.360     mm"
"             Runoff depth            45.470     86.160     45.470     mm"
"             Runoff volume           2173.47    0.00       2173.47    c.m"
"             Runoff coefficient      0.000      0.000      0.000      "
"             Maximum flow            1.454      0.000      1.454      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                        1.454     1.454     2.160     2.160"
" 33          CATCHMENT 30"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           30   Catchment 30 - To Clythe Creek"
"        0.000   % Impervious"
"        6.480   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
```

```
"        6.480   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.971     1.454     2.160     2.160 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           6.480      0.000      6.480      hectare"
"             Time of concentration  11.869     2.089      11.869     minutes"
"             Time to Centroid       104.828    98.071     104.828    minutes"
"             Rainfall depth         88.830     88.830     88.830     mm"
"             Rainfall volume        5756.17    0.01       5756.17    c.m"
"             Rainfall losses        43.360     2.670      43.360     mm"
"             Runoff depth           45.470     86.160     45.470     mm"
"             Runoff volume          2946.46    0.01       2946.46    c.m"
"             Runoff coefficient     0.000      0.000      0.000      "
"             Maximum flow           1.971      0.000      1.971      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     1.971     3.425     2.160     2.160"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     1.971     3.425     3.425     2.160"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Discharge"
"             Maximum flow                  5.585    c.m/sec"
"             Hydrograph volume          8540.444    c.m"
"                     1.971     3.425     3.425     5.585"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
"                Total Discharge"
"             Maximum flow                  5.585    c.m/sec"
"             Hydrograph volume          8540.444    c.m"
"                     1.971     5.585     3.425     0.000"
" 38          START/RE-START TOTALS 1"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      18.280    hectare"
"             Total Impervious area                      0.562    hectare"
"             Total % impervious                         3.072"
" 19          EXIT"
```

```
                                105172 Ex Cond Regional
"                 MIDUSS Output ----------------------------------------------->"
"                 MIDUSS version                            Version 2.07  rev. 379"
"                 MIDUSS created                                   April 25, 2005"
"            10   Units used:                                            ie METRIC"
"                 Job folder:                 Y:\SPrimmer\Miduss Modelling\105172"
"                 Output filename:                105172 Ex Cond Regional REV.out"
"                 Licensee name:                                                 ."
"                 Company                                Gamsby and Mannerow Limited"
"                 Date & Time last used:                   04/04/2011 at 12:01:39 PM"
" 31           TIME PARAMETERS"
"       60.000   Time Step"
"     2880.000   Max. Storm length"
"     3600.000   Max. Hydrograph"
" 32           STORM Historic"
"            5   Historic"
"     2880.000   Duration"
"       48.000   Rainfall intensity values"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.026     2.026     2.206     2.028"
"                  2.026     6.000     4.000     6.000    13.000"
"                 17.000    13.000    23.000    13.000    13.000"
"                 53.000    38.000    13.000"
"             Maximum intensity            53.000    mm/hr"
"             Total depth                 285.180    mm"
"            6   001hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"           10   Catchment 10 - To Hadati Creek"
"        8.000   % Impervious"
"        7.020   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        6.458   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.562   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.587     0.000     0.000     0.000 c.m/sec"
"             Catchment 10          Pervious   Impervious Total Area "
"             Surface Area          6.458      0.562      7.020      hectare"
"             Time of concentration 21.969     3.647      18.018     minutes"
"             Time to Centroid      2780.245   2236.863   2663.074   minutes"
"             Rainfall depth        285.180    285.180    285.180    mm"
"             Rainfall volume       1.8418     0.1602     2.0020     ha-m"
"             Rainfall losses       207.172    38.558     193.683    mm"
```

```
"            Runoff depth           78.008     246.622    91.497     mm"
"            Runoff volume          5038.08    1385.03    6423.11    c.m"
"            Runoff coefficient     0.000      0.000      0.000      "
"            Maximum flow           0.537      0.071      0.587      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.587     0.587     0.000     0.000"
" 40         HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.587     0.587     0.587     0.000"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Total Discharge"
"            Maximum flow                  0.587    c.m/sec"
"            Hydrograph volume          6423.105    c.m"
"                   0.587     0.587     0.587     0.587"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                   0.587     0.000     0.587     0.587"
" 33         CATCHMENT 20"
"           1   Triangular SCS"
"           1   Equal length"
"           2   Horton equation"
"          20   Catchment 20 - To Clythe Creeek"
"       0.000   % Impervious"
"       4.780   Total Area"
"      45.000   Flow length"
"       2.000   Overland Slope"
"       4.780   Pervious Area"
"      45.000   Pervious length"
"       2.000   Pervious slope"
"       0.000   Impervious Area"
"      45.000   Impervious length"
"       2.000   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious Max.infiltration"
"      12.500   Pervious Min.infiltration"
"       0.250   Pervious Lag constant (hours)"
"       5.000   Pervious Depression storage"
"       0.015   Impervious Manning 'n'"
"       0.000   Impervious Max.infiltration"
"       0.000   Impervious Min.infiltration"
"       0.050   Impervious Lag constant (hours)"
"       1.500   Impervious Depression storage"
"                   0.397     0.000     0.587     0.587 c.m/sec"
"            Catchment 20           Pervious   Impervious Total Area "
"            Surface Area           4.780      0.000      4.780      hectare"
"            Time of concentration  21.969     3.647      21.969     minutes"
"            Time to Centroid       2780.245   2236.863   2780.243   minutes"
"            Rainfall depth         285.180    285.180    285.180    mm"
"            Rainfall volume        1.3632     0.0000     1.3632     ha-m"
"            Rainfall losses        207.172    38.558     207.172    mm"
"            Runoff depth           78.008     246.622    78.008     mm"
"            Runoff volume          3728.78    0.01       3728.80    c.m"
"            Runoff coefficient     0.000      0.000      0.000      "
"            Maximum flow           0.397      0.000      0.397      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.397     0.397     0.587     0.587"
" 33         CATCHMENT 30"
"           1   Triangular SCS"
"           1   Equal length"
```

```
"            2   Horton equation"
"           30   Catchment 30 - To Clythe Creek"
"        0.000   % Impervious"
"        6.480   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        6.480   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.538     0.397     0.587     0.587 c.m/sec"
"             Catchment 30           Pervious   Impervious Total Area "
"             Surface Area           6.480      0.000      6.480      hectare"
"             Time of concentration  21.969     3.647      21.969     minutes"
"             Time to Centroid       2780.244   2236.863   2780.243   minutes"
"             Rainfall depth         285.180    285.180    285.180    mm"
"             Rainfall volume        1.8480     0.0000     1.8480     ha-m"
"             Rainfall losses        207.172    38.558     207.172    mm"
"             Runoff depth           78.008     246.622    78.008     mm"
"             Runoff volume          5054.92    0.02       5054.94    c.m"
"             Runoff coefficient     0.000      0.000      0.000      "
"             Maximum flow           0.538      0.000      0.538      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.538     0.936     0.587     0.587"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.538     0.936     0.936     0.587"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Total Discharge"
"             Maximum flow                  1.522    c.m/sec"
"             Hydrograph volume         15206.841    c.m"
"                     0.538     0.936     0.936     1.522"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
"                Total Discharge"
"             Maximum flow                  1.522    c.m/sec"
"             Hydrograph volume         15206.841    c.m"
"                     0.538     1.522     0.936     0.000"
" 38          START/RE-START TOTALS 1"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                       18.280    hectare"
"             Total Impervious area                       0.562    hectare"
"             Total % impervious                          3.072"
" 19          EXIT"
```

Hadati Creek Watershed - Allowable

```
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
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O

 OOO     T      T    H   H    Y    M   M   OOO
```


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

Input filename: C:\Program Files\Visual OTTHYMO 2.3.2\voin.dat

Output filename: Y:\SPrimmer\Miduss Modelling\105172\Cityview Ridge - Ex Pond Allowable\Hadati Creek Watershed - Allowable.out
Summary filename: Y:\SPrimmer\Miduss Modelling\105172\Cityview Ridge - Ex Pond Allowable\Hadati Creek Watershed - Allowable.sum

DATE: 8/7/2012 TIME: 2:54:51 PM

USER:

COMMENTS: _____

```
----------------------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: Y:\SPrimmer\Miduss Modelling\105172\Ci
|                  |              tyview Ridge\25mm4hr.stm
| Ptotal= 25.00 mm |    Comments: 25 mm - 4 hour - 10 Minute Time Step
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	.53	1.17	17.57	2.17	2.95	3.17	.76
.33	.71	1.33	61.55	2.33	2.19	3.33	.65
.50	.99	1.50	24.02	2.50	1.69	3.50	.57
.67	1.51	1.67	11.16	2.67	1.34	3.67	.49
.83	2.57	1.83	6.44	2.83	1.09	3.83	.44
1.00	5.31	2.00	4.20	3.00	.90	4.00	.38

Hadati Creek Watershed - Allowable

```
--------------------
| CALIB            |
| STANDHYD  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .90          .23
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=      50.00        40.00
     Mannings n           =       .013         .300

         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
                .083     .53 | 1.083   17.57 | 2.083    2.95 | 3.08     .76
                .167     .53 | 1.167   17.57 | 2.167    2.95 | 3.17     .76
                .250     .71 | 1.250   61.55 | 2.250    2.19 | 3.25     .65
                .333     .71 | 1.333   61.55 | 2.333    2.19 | 3.33     .65
                .417     .99 | 1.417   24.02 | 2.417    1.69 | 3.42     .57
                .500     .99 | 1.500   24.02 | 2.500    1.69 | 3.50     .57
                .583    1.51 | 1.583   11.16 | 2.583    1.34 | 3.58     .49
                .667    1.51 | 1.667   11.16 | 2.667    1.34 | 3.67     .49
                .750    2.57 | 1.750    6.44 | 2.750    1.09 | 3.75     .44
                .833    2.57 | 1.833    6.44 | 2.833    1.09 | 3.83     .44
                .917    5.31 | 1.917    4.20 | 2.917     .90 | 3.92     .38
               1.000    5.31 | 2.000    4.20 | 3.000     .90 | 4.00     .38

     Max.Eff.Inten.(mm/hr)=      61.55          .00
                over (min)        5.00       325.00
     Storage Coeff.  (min)=       2.45 (ii)  320.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00       325.00
     Unit Hyd. peak  (cms)=        .30          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .15          .00          .151 (iii)
     TIME TO PEAK    (hrs)=       1.33          .00         1.33
     RUNOFF VOLUME    (mm)=      23.50          .00        18.56
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .00          .74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.99         3.00
     Dep. Storage     (mm)=       1.50         5.00
```

```
     Average Slope      (%)=        .55          .55
     Length             (m)=     200.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55          .00
                over (min)        5.00       325.00
     Storage Coeff.  (min)=       5.63 (ii)  323.64 (ii)
     Unit Hyd. Tpeak (min)=       5.00       325.00
     Unit Hyd. peak  (cms)=        .20          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.77          .00         1.767 (iii)
     TIME TO PEAK    (hrs)=       1.33          .00          1.33
     RUNOFF VOLUME    (mm)=      23.50          .00         18.56
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .00           .74

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD  (0542)  |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      20.20         5.05
     Dep. Storage      (mm)=       1.50         5.00
     Average Slope      (%)=        .55          .55
     Length             (m)=     350.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55          .00
                over (min)       10.00       330.00
     Storage Coeff.  (min)=       7.87 (ii)  325.88 (ii)
     Unit Hyd. Tpeak (min)=      10.00       330.00
     Unit Hyd. peak  (cms)=        .13          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.41          .00         2.408 (iii)
     TIME TO PEAK    (hrs)=       1.42          .00          1.42
     RUNOFF VOLUME    (mm)=      23.50          .00         18.56
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .00           .74

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0510)  |   Area    (ha)=  16.00
```

```
                          Hadati Creek Watershed - Allowable
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.80          3.20
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=        .50           .20
     Length            (m)=     400.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      61.55           .00
                over (min)      10.00        440.00
     Storage Coeff.  (min)=       8.77 (ii)  439.54 (ii)
     Unit Hyd. Tpeak (min)=      10.00        440.00
     Unit Hyd. peak  (cms)=        .12           .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.48           .00        1.475 (iii)
     TIME TO PEAK    (hrs)=       1.42           .00         1.42
     RUNOFF VOLUME    (mm)=      23.50           .00        18.56
     TOTAL RAINFALL   (mm)=      25.00         25.00        25.00
     RUNOFF COEFFICIENT   =        .94           .00          .74

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     112.24        131.76
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=        .80           .80
     Length            (m)=    1275.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      42.79          5.28
                over (min)      20.00         55.00
     Storage Coeff.  (min)=      17.67 (ii)    51.28 (ii)
     Unit Hyd. Tpeak (min)=      20.00         55.00
     Unit Hyd. peak  (cms)=        .06           .02
                                                          *TOTALS*
     PEAK FLOW       (cms)=       5.07           .82        5.342 (iii)
     TIME TO PEAK    (hrs)=       1.58          2.17         1.58
     RUNOFF VOLUME    (mm)=      23.50          2.25         7.77
     TOTAL RAINFALL   (mm)=      25.00         25.00        25.00
     RUNOFF COEFFICIENT   =        .94           .09          .31


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70          .93
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     150.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55          .00
                over (min)        5.00       325.00
     Storage Coeff.  (min)=       4.73 (ii)  322.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00       325.00
     Unit Hyd. peak  (cms)=        .22          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .57          .00          .569 (iii)
     TIME TO PEAK    (hrs)=       1.33          .00          1.33
     RUNOFF VOLUME    (mm)=      23.50          .00         18.56
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .00           .74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0484) |   Area    (ha)=  12.60
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.29         7.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)       10.00        35.00
     Storage Coeff.  (min)=       7.96 (ii)   30.70 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .13          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .32          .07          .334 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.83          1.42
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
```

```
        Fc    (mm/hr)= 12.50      Cum.Inf.    (mm)=    .00
  (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
       THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0565) |   Area     (ha)=  11.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.66         6.44
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)       10.00        35.00
     Storage Coeff.  (min)=       7.96 (ii)   30.70 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .13          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .28          .06          .294 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.83          1.42
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo    (mm/hr)= 75.00            K  (1/hr)=  4.14
            Fc    (mm/hr)= 12.50      Cum.Inf.    (mm)=    .00
  (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  (0481) |   Area     (ha)=   5.90
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.48         3.42
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)       10.00        35.00
     Storage Coeff.  (min)=       7.96 (ii)   30.70 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .13          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .15          .03          .156 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.83          1.42
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27
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```
      (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (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  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16        14.04
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     401.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       5.80 (ii)   28.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .20          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .75          .14          .770 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


      (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (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  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.10         2.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.86         2.86
     Length            (m)=     185.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         8.82
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       3.27 (ii)   21.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .27          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .17          .04          .179 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.67          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
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     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =        .94          .09            .27

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98        11.02
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     365.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       5.48 (ii)   28.22 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .20          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .60          .11          .614 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09            .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       4.96 (ii)   27.70 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .22          .04
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                                                                  *TOTALS*
     PEAK FLOW        (cms)=        .53          .10              .540 (iii)
     TIME TO PEAK     (hrs)=       1.33         1.75              1.33
     RUNOFF VOLUME     (mm)=      23.50         2.16              6.64
     TOTAL RAINFALL    (mm)=      25.00        25.00             25.00
     RUNOFF COEFFICIENT   =        .94          .09               .27

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       6.01         8.31
     Dep. Storage      (mm)=       1.50         5.00
     Average Slope      (%)=       2.00         2.00
     Length             (m)=     287.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       4.74 (ii)   27.48 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .22          .04
                                                                  *TOTALS*
     PEAK FLOW        (cms)=        .47          .09              .479 (iii)
     TIME TO PEAK     (hrs)=       1.33         1.75              1.33
     RUNOFF VOLUME     (mm)=      23.50         2.16              6.64
     TOTAL RAINFALL    (mm)=      25.00        25.00             25.00
     RUNOFF COEFFICIENT   =        .94          .09               .27

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      21.55        29.77
     Dep. Storage      (mm)=       1.50         5.00
     Average Slope      (%)=       2.00         2.00
     Length             (m)=     550.00        40.00
     Mannings n            =       .013         .300
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     Max.Eff.Inten.(mm/hr)=      61.55          7.05
                over (min)        5.00         30.00
     Storage Coeff.  (min)=       7.01 (ii)   29.75 (ii)
     Unit Hyd. Tpeak (min)=       5.00         30.00
     Unit Hyd. peak  (cms)=        .17           .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.50           .30        1.538 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.75         1.33
     RUNOFF VOLUME    (mm)=      23.50          2.16         6.64
     TOTAL RAINFALL   (mm)=      25.00         25.00        25.00
     RUNOFF COEFFICIENT   =        .94           .09          .27

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      49.35         68.15
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     885.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      61.55          7.05
                over (min)       10.00         35.00
     Storage Coeff.  (min)=       9.32 (ii)   32.06 (ii)
     Unit Hyd. Tpeak (min)=      10.00         35.00
     Unit Hyd. peak  (cms)=        .12           .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.82           .62        2.960 (iii)
     TIME TO PEAK    (hrs)=       1.42          1.83         1.42
     RUNOFF VOLUME    (mm)=      23.50          2.16         6.64
     TOTAL RAINFALL   (mm)=      25.00         25.00        25.00
     RUNOFF COEFFICIENT   =        .94           .09          .27

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.17          7.13
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       1.60          1.60
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                        Hadati Creek Watershed - Allowable
     Length              (m)=     286.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       5.06 (ii)   29.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .21          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .40          .07          .405 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         5.04
                over (min)        5.00        40.00
     Storage Coeff.  (min)=       6.35 (ii)   38.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        40.00
     Unit Hyd. peak  (cms)=        .19          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .49          .07          .499 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.92          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
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                              IMPERVIOUS    PERVIOUS (i)
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Hadati Creek Watershed - Allowable

Surface Area	(ha)=	11.10	18.90	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	447.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.	(mm/hr)=	61.55	2.81	
over	(min)	5.00	40.00	
Storage Coeff.	(min)=	6.19 (ii)	39.07 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	40.00	
Unit Hyd. peak	(cms)=	.19	.03	
				TOTALS
PEAK FLOW	(cms)=	.83	.08	.834 (iii)
TIME TO PEAK	(hrs)=	1.33	1.92	1.33
RUNOFF VOLUME	(mm)=	23.50	1.27	5.50
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.94	.05	.22

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0395)	Area (ha)= 51.20		
ID= 1 DT= 5.0 min	Total Imp(%)= 10.00	Dir. Conn.(%)= 5.00	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	5.12	46.08	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	900.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.	(mm/hr)=	61.55	.00	
over	(min)	10.00	230.00	
Storage Coeff.	(min)=	9.42 (ii)	225.31 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	230.00	
Unit Hyd. peak	(cms)=	.12	.00	
				TOTALS
PEAK FLOW	(cms)=	.29	.00	.292 (iii)
TIME TO PEAK	(hrs)=	1.42	.00	1.42
RUNOFF VOLUME	(mm)=	23.50	.00	1.17
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.94	.00	.05

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(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  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.33         7.37
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.71         1.71
     Length            (m)=     300.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       5.11 (ii)   28.94 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .21          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .41          .07          .417 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.12        20.88
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.03         2.03
     Length            (m)=     465.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       6.31 (ii)   28.95 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .19          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.09          .21         1.117 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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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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| CALIB            |
| STANDHYD  (0480) |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10        25.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)       10.00        35.00
     Storage Coeff.  (min)=       7.96 (ii)   30.70 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .13          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.09          .23         1.142 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.83          1.42
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00      5.34      1.58    7.77
     ==================================================
     MAJOR SYS.(ID= 2):    .00       .00       .00     .00
     MINOR SYS.(ID= 3): 244.00      5.34      1.58    7.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0566) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
```

```
                         Hadati Creek Watershed - Allowable
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0484):    12.60    .334     1.42     6.64
        + ID2= 2 (0565):    11.10    .294     1.42     6.64
          ==================================================
          ID = 3 (0566):    23.70    .628     1.42     6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0410):    24.20    .770     1.33     6.64
        + ID2= 2 (0415):     4.99    .179     1.33     6.64
          ==================================================
          ID = 3 (0420):    29.19    .948     1.33     6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |  1.0000      1.0000
                            .0100      .0100    | 20.0000      1.1000
                            .0120      .1000    |   .0000       .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)     19.000       .614        1.33        6.64
     OUTFLOW: ID= 1 (0111)     19.000       .024        2.92        6.63

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.93
                   TIME SHIFT OF PEAK FLOW         (min)= 95.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .1111

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

--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0101):    16.32    .540     1.33     6.64
        + ID2= 2 (0102):    14.32    .479     1.33     6.64
          ==================================================
          ID = 3 (0103):    30.64   1.019     1.33     6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   .5000       .4000
                            .0100      .0100    |  6.6000       .8000
                            .0260      .2300    |   .0000       .0000
```

Hadati Creek Watershed - Allowable

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0105)	51.320	1.538	1.33	6.64
OUTFLOW: ID= 1 (0106)	51.320	.155	2.42	6.63

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.08
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= .2763

ROUTE CHN (0358)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	.40	1.33	6.64	.11	.72
OUTFLOW: ID= 1 (0358)	12.30	.15	1.58	6.59	.08	.52

ROUTE CHN (0353)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel

5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	.50	1.33	6.64	.12	.78
OUTFLOW: ID= 1 (0353)	16.30	.22	1.58	6.60	.09	.57

ROUTE CHN (0362)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36

.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	.83	1.33	5.50	.14	.96
OUTFLOW: ID= 1 (0362)	30.00	.41	1.50	5.48	.11	.71

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--------------------
| ADD HYD   (0465) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0455):	12.70	.417	1.33	6.64
+ ID2= 2 (0460):	36.00	1.117	1.33	6.64
ID = 3 (0465):	48.70	1.534	1.33	6.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0510):	16.00	1.475	1.42	18.56
+ ID2= 2 (0505):	244.00	5.342	1.58	7.77
ID = 3 (0515):	260.00	6.307	1.58	8.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |
--------------------
```

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	101.50	.0500	
1.00	100.70	.0500	
1.50	100.55	.0500 / .0300	Main Channel
2.00	99.50	.0300	Main Channel
3.50	99.60	.0300	Main Channel
4.50	100.65	.0300 / .0500	Main Channel
6.00	101.45	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.10	99.60	.353E+02	.0	.19	43.69

.19	99.69	.112E+03	.1	.37	22.76
.29	99.79	.195E+03	.2	.49	17.03
.38	99.88	.285E+03	.3	.59	14.23
.48	99.98	.381E+03	.5	.67	12.51
.57	100.07	.484E+03	.7	.74	11.32
.67	100.17	.594E+03	.9	.80	10.43
.76	100.26	.710E+03	1.2	.86	9.74
.86	100.36	.832E+03	1.5	.91	9.18
.95	100.45	.961E+03	1.8	.96	8.72
1.05	100.55	.110E+04	2.2	1.00	8.32
1.16	100.66	.127E+04	2.7	1.07	7.80
1.28	100.78	.148E+04	3.4	1.14	7.31
1.39	100.89	.170E+04	4.1	1.20	6.94
1.50	101.00	.195E+04	4.9	1.25	6.65
1.61	101.11	.221E+04	5.8	1.30	6.41
1.72	101.22	.250E+04	6.7	1.34	6.22
1.84	101.34	.280E+04	7.7	1.38	6.04
1.95	101.45	.313E+04	8.8	1.41	5.90

**** WARNING: INFLOW HYDROGRAPH IS DRY!!

ROUTE CHN (0563)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

<------ DATA FOR SECTION (2.2) ------>

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.573E+01	.0	.67	2.23
.11	.11	.135E+02	.1	.99	1.51
.16	.16	.232E+02	.3	1.23	1.22
.21	.21	.349E+02	.5	1.42	1.06
.26	.26	.486E+02	.9	1.58	.95
.32	.32	.643E+02	1.2	1.73	.87
.37	.37	.820E+02	1.7	1.86	.81
.42	.42	.102E+03	2.2	1.98	.76
.47	.47	.123E+03	2.9	2.10	.71
.53	.53	.147E+03	3.6	2.21	.68
.58	.58	.173E+03	4.4	2.31	.65
.63	.63	.200E+03	5.4	2.42	.62
.68	.68	.230E+03	6.4	2.51	.60
.74	.74	.262E+03	7.6	2.61	.58
.79	.79	.295E+03	8.9	2.70	.56
.84	.84	.331E+03	10.3	2.79	.54
.89	.89	.369E+03	11.8	2.88	.52
.95	.95	.408E+03	13.5	2.97	.51
1.00	1.00	.450E+03	15.2	3.05	.49

	<---- hydrograph ---->			<-pipe / channel->	
AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)

```
     INFLOW : ID= 2 (0566)   23.70      .63    1.42   6.64       .22      1.45
     OUTFLOW: ID= 1 (0563)   23.70      .65    1.42   6.64       .23      1.47

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  29.19       .95      1.33    6.64
     ==================================================
     MAJOR SYS.(ID= 2):    .00       .00       .00     .00
     MINOR SYS.(ID= 3):  29.19       .95      1.33    6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.0000      .5000
                            .0100      .0100    |  10.0000      .6000
                            .0150      .1332    |    .0000      .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0103)     30.640     1.019        1.33        6.64
     OUTFLOW: ID= 1 (0104)     30.640      .097        2.33        6.63

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.52
                    TIME SHIFT OF PEAK FLOW         (min)= 60.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .1639

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--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0358):    12.30    .153     1.58     6.59
        + ID2= 2 (0353):    16.30    .216     1.58     6.60
          ==================================================
          ID = 3 (0359):    28.60    .369     1.58     6.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0363) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0359):    28.60    .369     1.58     6.60
        + ID2= 2 (0362):    30.00    .406     1.50     5.48
          ==================================================
          ID = 3 (0363):    58.60    .769     1.50     6.03

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

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--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH 0425 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH 0003 = HYDROGRAPH 0001
*** W A R N I N G :  HYDROGRAPH 0003 = HYDROGRAPH 0001
          ID1= 1 (0465):    48.70   1.534     1.33     6.64
        + ID2= 2 (0425):      .00    .000      .00      .00
          ==================================================
          ID = 3 (0470):    48.70   1.534     1.33     6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 260.00      6.31      1.58    8.44
     ====================================================
     MAJOR SYS.(ID= 2):  59.59      3.26      1.58    8.44
     MINOR SYS.(ID= 3): 200.41      3.05      1.33    8.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0561) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00          1.00         .0350
                   2.00           .50         .0350
                   4.00           .00     .0350 / .0350  Main Channel
                   4.50           .00         .0350      Main Channel
                   5.00           .00     .0350 / .0350  Main Channel
                   7.00           .50         .0350
                   9.00          1.00         .0350

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .05      .05    .319E+01        .1           .87        .95
        .11      .11    .748E+01        .2          1.26        .66
        .16      .16    .129E+02        .4          1.54        .54
        .21      .21    .194E+02        .7          1.75        .48
        .26      .26    .270E+02       1.0          1.93        .43
        .32      .32    .357E+02       1.5          2.08        .40
        .37      .37    .456E+02       2.0          2.22        .38
        .42      .42    .565E+02       2.6          2.34        .36
        .47      .47    .686E+02       3.4          2.46        .34
        .53      .53    .817E+02       4.2          2.57        .32
        .58      .58    .960E+02       5.1          2.68        .31
        .63      .63    .111E+03       6.2          2.78        .30
        .68      .68    .128E+03       7.3          2.87        .29
        .74      .74    .145E+03       8.6          2.97        .28
        .79      .79    .164E+03      10.0          3.06        .27
```

.84	.84	.184E+03	11.6	3.14	.27
.89	.89	.205E+03	13.2	3.23	.26
.95	.95	.227E+03	15.0	3.31	.25
1.00	1.00	.250E+03	17.0	3.40	.25

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->			<-pipe / channel->	
INFLOW : ID= 2 (0563)	23.70	.65	1.42	6.64	.21	1.73
OUTFLOW: ID= 1 (0561)	23.70	.66	1.42	6.64	.21	1.73

```
--------------------
| ADD HYD   (0114) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0111):	19.00	.024	2.92	6.63
+ ID2= 2 (0104):	30.64	.097	2.33	6.63
ID = 3 (0114):	49.64	.118	2.42	6.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0365):	117.50	2.960	1.42	6.64
+ ID2= 2 (0363):	58.60	.769	1.50	6.03
ID = 3 (0380):	176.10	3.653	1.42	6.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61

1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02
1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29
2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0470)	48.70	1.53	1.33	6.64	.26	.91
OUTFLOW: ID= 1 (0475)	48.70	1.10	1.42	6.64	.23	.87

```
--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0520):	59.59	3.257	1.58	8.44
+ ID2= 2 (0525):	.00	.001	.00	*******
ID = 3 (0526):	59.59	3.257	1.58	8.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0561):	23.70	.656	1.42	6.64
+ ID2= 2 (0481):	5.90	.156	1.42	6.64
ID = 3 (0492):	29.60	.812	1.42	6.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0114):	49.64	.118	2.42	6.63
+ ID2= 2 (0106):	51.32	.155	2.42	6.63
ID = 3 (0115):	100.96	.273	2.42	6.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| RESERVOIR (0390) |
```

Hadati Creek Watershed - Allowable

| IN= 2---> OUT= 1 |
| DT= 5.0 min |

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	3.653	1.42	6.44
OUTFLOW: ID= 1 (0390)	176.100	.982	2.25	6.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 26.88
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= .5820

| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	313.20	.0500	
140.00	312.40	.0500 / .0300	Main Channel
140.50	310.80	.0300	Main Channel
141.50	310.80	.0300	Main Channel
142.00	312.40	.0300 / .0500	Main Channel
160.00	313.20	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.12	310.92	.575E+02	.1	.40	18.86
.25	311.05	.119E+03	.2	.57	13.13
.37	311.17	.185E+03	.3	.69	10.87
.49	311.29	.256E+03	.4	.78	9.61
.62	311.42	.330E+03	.6	.86	8.77
.74	311.54	.409E+03	.8	.92	8.17
.86	311.66	.492E+03	1.1	.97	7.70
.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0526)	59.59	3.26	1.58	8.44	1.66	1.16
OUTFLOW: ID= 1 (0527)	59.59	2.80	1.67	8.44	1.54	1.21

| RESERVOIR (0482) |

Hadati Creek Watershed - Allowable

| IN= 2---> OUT= 1 |
| DT= 5.0 min |

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.2910	.3795
.2590	.0579	.2970	.4503
.2660	.1180	1.6320	.5232
.2720	.1802	4.1680	.5983
.2790	.2445	7.5660	.6756
.2850	.3109	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0492)	29.600	.812	1.42	6.64
OUTFLOW: ID= 1 (0482)	29.600	.262	2.00	6.64

PEAK FLOW REDUCTION [Qout/Qin](%)= 32.30
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= .0866

| ADD HYD (0400) |
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0390):	176.10	.982	2.25	6.43
+ ID2= 2 (0395):	51.20	.292	1.42	1.17
ID = 3 (0400):	227.30	1.022	1.58	5.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN (0403) |
| IN= 2---> OUT= 1 |

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97

2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0400)	227.30	1.02	1.58	5.25	.17	.73
OUTFLOW:	ID= 1 (0403)	227.30	.88	3.17	5.25	.16	.71

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--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0115):	100.96	.273	2.42	6.63
+ ID2= 2 (0403):	227.30	.881	3.17	5.25
ID = 3 (0407):	328.26	1.112	2.83	5.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.6000	6.4000
1.1000	2.9000	9.1000	10.0000
1.3000	4.3000	12.0000	20.0000

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW :	ID= 2 (0407)	328.260	1.112	2.83	5.67
OUTFLOW:	ID= 1 (0113)	328.260	.354	5.83	5.67

PEAK FLOW REDUCTION [Qout/Qin](%)= 31.88
TIME SHIFT OF PEAK FLOW (min)=180.00
MAXIMUM STORAGE USED (ha.m.)= .9343

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--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0425):	29.19	.948	1.33	6.64
+ ID2= 2 (0113):	328.26	.354	5.83	5.67
ID = 3 (0430):	357.45	.951	1.33	5.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |
```

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	325.40	.0600	
120.00	324.60	.0600	
126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0430)	357.45	.95	1.33	5.75	.20	1.02
OUTFLOW:	ID= 1 (0440)	357.45	.72	1.42	5.75	.18	.98

ADD HYD (0485)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0440):	357.45	.720	1.42	5.75
+ ID2= 2 (0475):	48.70	1.101	1.42	6.64
ID = 3 (0485):	406.15	1.820	1.42	5.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0490)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0485):	406.15	1.820	1.42	5.86

```
        + ID2= 2 (0480):    43.10   1.142     1.42     6.64
          ==================================================
          ID = 3 (0490):   449.25   2.962     1.42     5.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0491) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0482):    29.60    .262     2.00     6.64
        + ID2= 2 (0490):   449.25   2.962     1.42     5.93
          ==================================================
          ID = 3 (0491):   478.85   3.142     1.42     5.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   7.0800      2.4860
                            .2760      .0600    |   8.1000      3.3240
                           1.2000      .3400    |   9.7980      4.6420
                           2.0400      .6182    |  10.4940      7.4397
                           2.6400     1.1630    |  11.6850     10.3000
                           3.1200     1.7070    |  12.3480     11.4000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)    478.850      3.142        1.42        5.98
     OUTFLOW: ID= 1 (0483)    478.850      1.356        2.00        5.98

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 43.16
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .3923

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--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0540):     4.63    .569     1.33    18.56
        + ID2= 2 (0483):   478.85   1.356     2.00     5.98
          ==================================================
          ID = 3 (0530):   483.48   1.402     2.00     6.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0527):    59.59   2.796     1.67     8.44
        + ID2= 2 (0530):   483.48   1.402     2.00     6.10
          ==================================================
```

```
          ID = 3 (0545):   543.07   4.103     1.67     6.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0542):    25.25   2.408     1.42    18.56
        + ID2= 2 (0545):   543.07   4.103     1.67     6.35
          ==================================================
          ID = 3 (0546):   568.32   5.491     1.58     6.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0543):    14.99   1.767     1.33    18.56
        + ID2= 2 (0546):   568.32   5.491     1.58     6.90
          ==================================================
          ID = 3 (0547):   583.31   6.172     1.50     7.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0544):     1.13    .151     1.33    18.56
        + ID2= 2 (0547):   583.31   6.172     1.50     7.20
          ==================================================
          ID = 3 (0548):   584.44   6.233     1.50     7.22

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************


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|    READ STORM    |    Filename: Y:\SPrimmer\Miduss Modelling\105172\Ci
|                  |              tyview Ridge\5yrSCS12hr.stm
| Ptotal= 53.41 mm |    Comments: 5 year SCS Type II 12hour design storm
--------------------
                 TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .25    1.34 |  3.25    2.14 |  6.25    9.61 |  9.25    1.87
                  .50    1.34 |  3.50    2.14 |  6.50    9.61 |  9.50    1.87
                  .75    1.34 |  3.75    2.14 |  6.75    4.27 |  9.75    1.87
                 1.00    1.34 |  4.00    2.14 |  7.00    4.27 | 10.00    1.87
                 1.25    1.34 |  4.25    3.20 |  7.25    3.20 | 10.25    1.07
                 1.50    1.34 |  4.50    3.20 |  7.50    3.20 | 10.50    1.07
                 1.75    1.34 |  4.75    4.27 |  7.75    3.20 | 10.75    1.07
```

2.00	1.34	5.00	4.27	8.00	3.20	11.00	1.07
2.25	1.60	5.25	6.41	8.25	1.87	11.25	1.07
2.50	1.60	5.50	6.41	8.50	1.87	11.50	1.07
2.75	1.60	5.75	25.64	8.75	1.87	11.75	1.07
3.00	1.60	6.00	70.50	9.00	1.87	12.00	1.07

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| CALIB            |
| STANDHYD  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
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		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.90	.23
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	.55	.55
Length	(m)=	50.00	40.00
Mannings n	=	.013	.300

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
.083	1.34	3.083	2.14	6.083	9.61	9.08	1.87
.167	1.34	3.167	2.14	6.167	9.61	9.17	1.87
.250	1.34	3.250	2.14	6.250	9.61	9.25	1.87
.333	1.34	3.333	2.14	6.333	9.61	9.33	1.87
.417	1.34	3.417	2.14	6.417	9.61	9.42	1.87
.500	1.34	3.500	2.14	6.500	9.61	9.50	1.87
.583	1.34	3.583	2.14	6.583	4.27	9.58	1.87
.667	1.34	3.667	2.14	6.667	4.27	9.67	1.87
.750	1.34	3.750	2.14	6.750	4.27	9.75	1.87
.833	1.34	3.833	2.14	6.833	4.27	9.83	1.87
.917	1.34	3.917	2.14	6.917	4.27	9.92	1.87
1.000	1.34	4.000	2.14	7.000	4.27	10.00	1.87
1.083	1.34	4.083	3.20	7.083	3.20	10.08	1.07
1.167	1.34	4.167	3.20	7.167	3.20	10.17	1.07
1.250	1.34	4.250	3.20	7.250	3.20	10.25	1.07
1.333	1.34	4.333	3.20	7.333	3.20	10.33	1.07
1.417	1.34	4.417	3.20	7.417	3.20	10.42	1.07
1.500	1.34	4.500	3.20	7.500	3.20	10.50	1.07
1.583	1.34	4.583	4.27	7.583	3.20	10.58	1.07
1.667	1.34	4.667	4.27	7.667	3.20	10.67	1.07
1.750	1.34	4.750	4.27	7.750	3.20	10.75	1.07
1.833	1.34	4.833	4.27	7.833	3.20	10.83	1.07
1.917	1.34	4.917	4.27	7.917	3.20	10.92	1.07
2.000	1.34	5.000	4.27	8.000	3.20	11.00	1.07
2.083	1.60	5.083	6.41	8.083	1.87	11.08	1.07
2.167	1.60	5.167	6.41	8.167	1.87	11.17	1.07
2.250	1.60	5.250	6.41	8.250	1.87	11.25	1.07
2.333	1.60	5.333	6.41	8.333	1.87	11.33	1.07
2.417	1.60	5.417	6.41	8.417	1.87	11.42	1.07
2.500	1.60	5.500	6.41	8.500	1.87	11.50	1.07
2.583	1.60	5.583	25.64	8.583	1.87	11.58	1.07
2.667	1.60	5.667	25.64	8.667	1.87	11.67	1.07
2.750	1.60	5.750	25.64	8.750	1.87	11.75	1.07
2.833	1.60	5.833	70.50	8.833	1.87	11.83	1.07
2.917	1.60	5.917	70.50	8.917	1.87	11.92	1.07
3.000	1.60	6.000	70.50	9.000	1.87	12.00	1.07

```
     Max.Eff.Inten.(mm/hr)=      70.50        30.06
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       2.32 (ii)   21.08 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .30          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .17          .01          .178 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.25         6.00
     RUNOFF VOLUME    (mm)=      51.91         9.54        43.01
     TOTAL RAINFALL   (mm)=      53.41        53.41        53.41
     RUNOFF COEFFICIENT   =        .97          .18          .81

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.99         3.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     200.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        30.06
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       5.33 (ii)   24.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .21          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.23          .12         2.271 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.33         6.00
     RUNOFF VOLUME    (mm)=      51.91         9.54        43.01
     TOTAL RAINFALL   (mm)=      53.41        53.41        53.41
     RUNOFF COEFFICIENT   =        .97          .18          .81


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.20         5.05
     Dep. Storage     (mm)=       1.50         5.00
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     Average Slope      (%)=        .55          .55
     Length             (m)=     350.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        30.06
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       7.45 (ii)   26.21 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .17          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.56          .19         3.608 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.33          6.00
     RUNOFF VOLUME    (mm)=      51.91         9.54         43.01
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .18           .81


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0510)   |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.80         3.20
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .50          .20
     Length            (m)=     400.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        20.04
                over (min)       10.00        40.00
     Storage Coeff.  (min)=       8.31 (ii)   38.19 (ii)
     Unit Hyd. Tpeak (min)=      10.00        40.00
     Unit Hyd. peak  (cms)=        .13          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.06          .09         2.080 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.50          6.00
     RUNOFF VOLUME    (mm)=      51.91         9.54         43.01
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .18           .81


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0500)   |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
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                        Hadati Creek Watershed - Allowable
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      112.24        131.76
     Dep. Storage     (mm)=        1.50          5.00
     Average Slope     (%)=         .80           .80
     Length            (m)=     1275.00         40.00
     Mannings n          =        .013          .300

     Max.Eff.Inten.(mm/hr)=       70.50         78.43
                over (min)        15.00         30.00
     Storage Coeff.  (min)=       14.47 (ii)    25.89 (ii)
     Unit Hyd. Tpeak (min)=       15.00         30.00
     Unit Hyd. peak  (cms)=         .08           .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        8.08          9.34      14.467 (iii)
     TIME TO PEAK    (hrs)=        6.08          6.33        6.25
     RUNOFF VOLUME    (mm)=       51.91         14.36       24.12
     TOTAL RAINFALL   (mm)=       53.41         53.41       53.41
     RUNOFF COEFFICIENT   =         .97           .27         .45


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0540)   |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        3.70           .93
     Dep. Storage     (mm)=        1.50          5.00
     Average Slope     (%)=         .55           .55
     Length            (m)=      150.00         40.00
     Mannings n          =        .013          .300

     Max.Eff.Inten.(mm/hr)=       70.50         30.06
                over (min)         5.00         25.00
     Storage Coeff.  (min)=        4.48 (ii)    23.24 (ii)
     Unit Hyd. Tpeak (min)=        5.00         25.00
     Unit Hyd. peak  (cms)=         .23           .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=         .70           .04        .713 (iii)
     TIME TO PEAK    (hrs)=        6.00          6.25        6.00
     RUNOFF VOLUME    (mm)=       51.91          9.54       43.01
     TOTAL RAINFALL   (mm)=       53.41         53.41       53.41
     RUNOFF COEFFICIENT   =         .97           .18         .81

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0484)   |   Area    (ha)=  12.60
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.29         7.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.54 (ii)   16.07 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .44          .75         1.055 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.08
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0565)   |   Area    (ha)=  11.10
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.66         6.44
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.54 (ii)   16.07 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .39          .66          .929 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.08
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0481) |   Area    (ha)=   5.90
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.48         3.42
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.54 (ii)   16.07 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .21          .35          .494 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.08
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16        14.04
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     401.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.49 (ii)   14.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .20          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .95         1.66         2.307 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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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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--------------------
| CALIB            |
| STANDHYD  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.10         2.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.86         2.86
     Length            (m)=     185.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.10 (ii)   10.77 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .27          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .20          .39          .532 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98        11.02
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     365.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.19 (ii)   13.73 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .75         1.32         1.831 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41
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       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.70 (ii)   13.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .65         1.15         1.601 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01         8.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     287.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.49 (ii)   13.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .23          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .58         1.02         1.415 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
```

```
     RUNOFF VOLUME     (mm)=      51.91        14.24          22.15
     TOTAL RAINFALL    (mm)=      53.41        53.41          53.41
     RUNOFF COEFFICIENT   =        .97          .27            .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      21.55        29.77
     Dep. Storage      (mm)=       1.50         5.00
     Average Slope      (%)=       2.00         2.00
     Length             (m)=     550.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.64 (ii)   15.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .18          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.96         3.14        3.870 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.08
     RUNOFF VOLUME     (mm)=      51.91        14.24        22.15
     TOTAL RAINFALL    (mm)=      53.41        53.41        53.41
     RUNOFF COEFFICIENT   =        .97          .27          .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      49.35        68.15
     Dep. Storage      (mm)=       1.50         5.00
     Average Slope      (%)=       2.00         2.00
     Length             (m)=     885.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       8.83 (ii)   17.37 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
```

```
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.95         6.70         9.481 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.08
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.17         7.13
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.60         1.60
     Length            (m)=     286.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.79 (ii)   13.92 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .49          .85         1.183 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n          =       .013         .300
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```
     Max.Eff.Inten.(mm/hr)=      70.50        77.46
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.01 (ii)   16.75 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .63          .95         1.186 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        75.96
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.86 (ii)   14.65 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .20          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.06         1.94         2.582 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        13.31         20.64
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .25           .39

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0395) |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.12        46.08
```

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                        Hadati Creek Watershed - Allowable
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=       2.00          2.00
     Length             (m)=     900.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         58.39
                over (min)       10.00         20.00
     Storage Coeff.   (min)=      8.92 (ii)    18.68 (ii)
     Unit Hyd. Tpeak  (min)=     10.00         20.00
     Unit Hyd. peak   (cms)=       .12           .06
                                                              *TOTALS*
     PEAK FLOW        (cms)=       .41          2.36          2.601 (iii)
     TIME TO PEAK     (hrs)=      6.00          6.25           6.17
     RUNOFF VOLUME     (mm)=     51.91          9.64          11.75
     TOTAL RAINFALL    (mm)=     53.41         53.41          53.41
     RUNOFF COEFFICIENT   =        .97           .18            .22

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0455)   |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       5.33          7.37
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=       1.71          1.71
     Length             (m)=     300.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         81.70
                over (min)        5.00         15.00
     Storage Coeff.   (min)=      4.84 (ii)    13.78 (ii)
     Unit Hyd. Tpeak  (min)=      5.00         15.00
     Unit Hyd. peak   (cms)=       .22           .08
                                                              *TOTALS*
     PEAK FLOW        (cms)=       .51           .88          1.226 (iii)
     TIME TO PEAK     (hrs)=      6.00          6.08           6.00
     RUNOFF VOLUME     (mm)=     51.91         14.24          22.15
     TOTAL RAINFALL    (mm)=     53.41         53.41          53.41
     RUNOFF COEFFICIENT   =        .97           .27            .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460)   |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
---------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.12        20.88
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.03         2.03
     Length            (m)=     465.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.97 (ii)   14.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .19          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.40         2.42          3.376 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08           6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24          22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41          53.41
     RUNOFF COEFFICIENT   =        .97          .27            .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0480)   |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
---------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10        25.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.54 (ii)   16.07 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.52         2.56          3.608 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17           6.08
     RUNOFF VOLUME    (mm)=      51.91        14.24          22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41          53.41
     RUNOFF COEFFICIENT   =        .97          .27            .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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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--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00     14.47      6.25   24.12
     ==================================================
     MAJOR SYS.(ID= 2):  33.53      5.47      6.25   24.12
     MINOR SYS.(ID= 3): 210.47      9.00      6.00   24.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0566) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0484):    12.60   1.055     6.08    22.15
        + ID2= 2 (0565):    11.10    .929     6.08    22.15
          ==================================================
          ID = 3 (0566):    23.70   1.984     6.08    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0410):    24.20   2.307     6.00    22.15
        + ID2= 2 (0415):     4.99    .532     6.00    22.15
          ==================================================
          ID = 3 (0420):    29.19   2.839     6.00    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   1.0000      1.0000
                           .0100      .0100    |  20.0000      1.1000
                           .0120      .1000    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)      19.000      1.831        6.00       22.15
     OUTFLOW: ID= 1 (0111)      19.000       .238        6.58       22.14
```

Hadati Creek Watershed - Allowable

PEAK FLOW REDUCTION [Qout/Qin](%)= 12.98
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= .3060

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--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	16.32	1.601	6.00	22.15
+ ID2= 2 (0102):	14.32	1.415	6.00	22.15
ID = 3 (0103):	30.64	3.016	6.00	22.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5000	.4000
.0100	.0100	6.6000	.8000
.0260	.2300	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0105)	51.320	3.870	6.08	22.15
OUTFLOW: ID= 1 (0106)	51.320	2.731	6.33	22.14

PEAK FLOW REDUCTION [Qout/Qin](%)= 70.57
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .5507

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--------------------
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |
--------------------
```

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72

.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0355)	12.30	1.18	6.00	22.15	.16	1.10
OUTFLOW:	ID= 1 (0358)	12.30	.74	6.17	22.10	.13	.92

ROUTE CHN (0353)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0350)	16.30	1.19	6.00	22.15	.16	1.10
OUTFLOW:	ID= 1 (0353)	16.30	.95	6.25	22.11	.15	1.02

```
--------------------
| ROUTE CHN (0362) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	2.58	6.00	20.64	.23	1.41
OUTFLOW: ID= 1 (0362)	30.00	2.01	6.17	20.63	.21	1.31

```
--------------------
| ADD HYD   (0465) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0455):	12.70	1.226	6.00	22.15
+ ID2= 2 (0460):	36.00	3.376	6.00	22.15
ID = 3 (0465):	48.70	4.602	6.00	22.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |
```

AREA QPEAK TPEAK R.V.

```
                        Hadati Creek Watershed - Allowable
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0510):    16.00   2.080     6.00    43.01
        + ID2= 2 (0505):   210.47   9.000     6.00    24.12
          ==================================================
          ID = 3 (0515):   226.47  11.080     6.00    25.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00        101.50         .0500
                   1.00        100.70         .0500
                   1.50        100.55     .0500 / .0300  Main Channel
                   2.00         99.50         .0300      Main Channel
                   3.50         99.60         .0300      Main Channel
                   4.50        100.65     .0300 / .0500  Main Channel
                   6.00        101.45         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
        .10     99.60    .353E+02        .0           .19      43.69
        .19     99.69    .112E+03        .1           .37      22.76
        .29     99.79    .195E+03        .2           .49      17.03
        .38     99.88    .285E+03        .3           .59      14.23
        .48     99.98    .381E+03        .5           .67      12.51
        .57    100.07    .484E+03        .7           .74      11.32
        .67    100.17    .594E+03        .9           .80      10.43
        .76    100.26    .710E+03       1.2           .86       9.74
        .86    100.36    .832E+03       1.5           .91       9.18
        .95    100.45    .961E+03       1.8           .96       8.72
       1.05    100.55    .110E+04       2.2          1.00       8.32
       1.16    100.66    .127E+04       2.7          1.07       7.80
       1.28    100.78    .148E+04       3.4          1.14       7.31
       1.39    100.89    .170E+04       4.1          1.20       6.94
       1.50    101.00    .195E+04       4.9          1.25       6.65
       1.61    101.11    .221E+04       5.8          1.30       6.41
       1.72    101.22    .250E+04       6.7          1.34       6.22
       1.84    101.34    .280E+04       7.7          1.38       6.04
       1.95    101.45    .313E+04       8.8          1.41       5.90

                                     <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
     INFLOW : ID= 2 (0505)   33.53     5.47    6.25  24.12      1.58      1.28
     OUTFLOW: ID= 1 (0564)   33.53     4.91    6.33  24.12      1.50      1.25


--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0563) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   2.2) ------>
               Distance      Elevation       Manning
                    .00          1.00         .0350
                   2.00           .50         .0350
                   4.00           .00     .0350 / .0350  Main Channel
```

4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.573E+01	.0	.67	2.23
.11	.11	.135E+02	.1	.99	1.51
.16	.16	.232E+02	.3	1.23	1.22
.21	.21	.349E+02	.5	1.42	1.06
.26	.26	.486E+02	.9	1.58	.95
.32	.32	.643E+02	1.2	1.73	.87
.37	.37	.820E+02	1.7	1.86	.81
.42	.42	.102E+03	2.2	1.98	.76
.47	.47	.123E+03	2.9	2.10	.71
.53	.53	.147E+03	3.6	2.21	.68
.58	.58	.173E+03	4.4	2.31	.65
.63	.63	.200E+03	5.4	2.42	.62
.68	.68	.230E+03	6.4	2.51	.60
.74	.74	.262E+03	7.6	2.61	.58
.79	.79	.295E+03	8.9	2.70	.56
.84	.84	.331E+03	10.3	2.79	.54
.89	.89	.369E+03	11.8	2.88	.52
.95	.95	.408E+03	13.5	2.97	.51
1.00	1.00	.450E+03	15.2	3.05	.49

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0566)	23.70	1.98	6.08	22.15	.40	1.92
OUTFLOW: ID= 1 (0563)	23.70	1.97	6.08	22.15	.39	1.92

```
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	29.19	2.84	6.00	22.15
MAJOR SYS.(ID= 2):	2.28	.86	6.00	22.15
MINOR SYS.(ID= 3):	26.91	1.98	6.00	22.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.0000	.5000
.0100	.0100	10.0000	.6000
.0150	.1332	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0103)	30.640	3.016	6.00	22.15
OUTFLOW: ID= 1 (0104)	30.640	.801	6.42	22.14

```
PEAK   FLOW   REDUCTION [Qout/Qin](%)= 26.57
TIME SHIFT OF PEAK FLOW         (min)= 25.00
MAXIMUM  STORAGE   USED       (ha.m.)=   .4263
```

```
--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0358):    12.30     .744     6.17    22.10
        + ID2= 2 (0353):    16.30     .952     6.25    22.11
          ==================================================
          ID = 3 (0359):    28.60   1.680      6.25    22.11

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

```
--------------------
| ADD HYD   (0363) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0359):    28.60   1.680      6.25    22.11
        + ID2= 2 (0362):    30.00   2.013      6.17    20.63
          ==================================================
          ID = 3 (0363):    58.60   3.649      6.17    21.35

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

```
--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0465):    48.70   4.602      6.00    22.15
        + ID2= 2 (0425):     2.28    .859      6.00    22.15
          ==================================================
          ID = 3 (0470):    50.98   5.461      6.00    22.15

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

```
--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |       AREA     QPEAK     TPEAK     R.V.
--------------------       (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1): 226.47      11.08      6.00    25.46
     ==================================================
     MAJOR SYS.(ID= 2):  88.85       8.03      6.00    25.46
     MINOR SYS.(ID= 3): 137.62       3.05      5.75    25.46

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

```
--------------------
| ROUTE CHN (0561) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

Hadati Creek Watershed - Allowable

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

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.319E+01	.1	.87	.95
.11	.11	.748E+01	.2	1.26	.66
.16	.16	.129E+02	.4	1.54	.54
.21	.21	.194E+02	.7	1.75	.48
.26	.26	.270E+02	1.0	1.93	.43
.32	.32	.357E+02	1.5	2.08	.40
.37	.37	.456E+02	2.0	2.22	.38
.42	.42	.565E+02	2.6	2.34	.36
.47	.47	.686E+02	3.4	2.46	.34
.53	.53	.817E+02	4.2	2.57	.32
.58	.58	.960E+02	5.1	2.68	.31
.63	.63	.111E+03	6.2	2.78	.30
.68	.68	.128E+03	7.3	2.87	.29
.74	.74	.145E+03	8.6	2.97	.28
.79	.79	.164E+03	10.0	3.06	.27
.84	.84	.184E+03	11.6	3.14	.27
.89	.89	.205E+03	13.2	3.23	.26
.95	.95	.227E+03	15.0	3.31	.25
1.00	1.00	.250E+03	17.0	3.40	.25

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0563)	23.70	1.97	6.08	22.15	.36	2.20
OUTFLOW: ID= 1 (0561)	23.70	1.95	6.08	22.15	.36	2.20

ADD HYD (0114) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0111):	19.00	.238	6.58	22.14
+ ID2= 2 (0104):	30.64	.801	6.42	22.14
ID = 3 (0114):	49.64	1.029	6.50	22.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0380) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0365):	117.50	9.481	6.08	22.15
+ ID2= 2 (0363):	58.60	3.649	6.17	21.35
ID = 3 (0380):	176.10	12.674	6.17	21.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02
1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29
2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0470)	50.98	5.46	6.00	22.15	.49	1.23
OUTFLOW: ID= 1 (0475)	50.98	4.60	6.08	22.15	.45	1.19

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

```
--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0520):	88.85	8.030	6.00	25.46
+ ID2= 2 (0525):	.00	.001	.00	*******
ID = 3 (0526):	88.85	8.030	6.00	25.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

```
--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0561):    23.70   1.953     6.08    22.15
        + ID2= 2 (0481):     5.90    .494     6.08    22.15
          ==================================================
          ID = 3 (0492):    29.60   2.447     6.08    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0114):    49.64   1.029     6.50    22.14
        + ID2= 2 (0106):    51.32   2.731     6.33    22.14
          ==================================================
          ID = 3 (0115):   100.96   3.732     6.33    22.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0390) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   1.3100      1.6000
                           .7700      .2870    |   1.8600     23.2300
                          1.2600      .9680    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0380)    176.100     12.674        6.17       21.88
     OUTFLOW: ID= 1 (0390)    176.100      1.333        7.08       21.88

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.52
                    TIME SHIFT OF PEAK FLOW         (min)= 55.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  2.5065

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        313.20         .0500
                 140.00        312.40     .0500 / .0300  Main Channel
                 140.50        310.80         .0300      Main Channel
                 141.50        310.80         .0300      Main Channel
                 142.00        312.40     .0300 / .0500  Main Channel
                 160.00        313.20         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV       VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)      (cu.m.)       (cms)        (m/s)      (min)
        .12    310.92     .575E+02        .1           .40       18.86
        .25    311.05     .119E+03        .2           .57       13.13
```

.37	311.17	.185E+03	.3	.69	10.87
.49	311.29	.256E+03	.4	.78	9.61
.62	311.42	.330E+03	.6	.86	8.77
.74	311.54	.409E+03	.8	.92	8.17
.86	311.66	.492E+03	1.1	.97	7.70
.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0526)	88.85	8.03	6.00	25.46	2.05	.76
OUTFLOW: ID= 1 (0527)	88.85	6.50	6.42	25.46	1.97	.79

RESERVOIR (0482)	
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.2910	.3795
.2590	.0579	.2970	.4503
.2660	.1180	1.6320	.5232
.2720	.1802	4.1680	.5983
.2790	.2445	7.5660	.6756
.2850	.3109	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0492)	29.600	2.447	6.08	22.15
OUTFLOW: ID= 1 (0482)	29.600	.293	6.83	22.15

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.99
TIME SHIFT OF PEAK FLOW (min)= 45.00
MAXIMUM STORAGE USED (ha.m.)= .4082

ADD HYD (0400)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0390):	176.10	1.333	7.08	21.88
+ ID2= 2 (0395):	51.20	2.601	6.17	11.75
ID = 3 (0400):	227.30	3.883	6.17	19.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0403)

```
                          Hadati Creek Watershed - Allowable
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
                <------ DATA FOR SECTION (   1.1) ------>
                Distance       Elevation        Manning
                  100.00         338.30          .0500
                  110.00         336.80          .0500
                  135.00         336.00          .0300      Main Channel
                  142.00         335.30          .0500
                  148.00         335.30          .0500
                  156.00         336.00          .0500
                  165.00         338.30          .0000

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
        (m)       (m)      (cu.m.)      (cms)         (m/s)       (min)
        .16    335.46     .231E+04        .9           .71        44.52
        .32    335.62     .563E+04       3.2          1.09        29.11
        .47    335.77     .997E+04       7.3          1.39        22.72
        .63    335.93     .153E+05      13.4          1.66        19.04
        .79    336.09     .218E+05      22.7          1.97        16.04
        .95    336.25     .299E+05      35.3          2.25        14.10
       1.11    336.41     .396E+05      51.2          2.46        12.89
       1.26    336.56     .510E+05      70.7          2.63        12.02
       1.42    336.72     .641E+05      94.1          2.79        11.35
       1.58    336.88     .787E+05     122.4          2.96        10.71
       1.74    337.04     .939E+05     155.6          3.15        10.06
       1.89    337.19     .110E+06     192.8          3.34         9.48
       2.05    337.35     .126E+06     233.9          3.53         8.97
       2.21    337.51     .143E+06     278.9          3.71         8.53
       2.37    337.67     .160E+06     327.7          3.89         8.13
       2.53    337.83     .178E+06     380.3          4.07         7.79
       2.68    337.98     .196E+06     436.7          4.23         7.48
       2.84    338.14     .215E+06     496.9          4.40         7.20
       3.00    338.30     .234E+06     561.0          4.56         6.95

                                     <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
     INFLOW : ID= 2 (0400)  227.30     3.88    6.17  19.60      .34       1.13
     OUTFLOW: ID= 1 (0403)  227.30     2.23    6.42  19.60      .25        .89


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| ADD HYD   (0407) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0115):   100.96   3.732     6.33    22.14
        + ID2= 2 (0403):   227.30   2.232     6.42    19.60
          ==================================================
          ID = 3 (0407):   328.26   5.857     6.33    20.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)    (ha.m.)    |   (cms)    (ha.m.)
                           .0000      .0000    |   1.6000     6.4000
                          1.1000     2.9000    |   9.1000    10.0000
```

Hadati Creek Watershed - Allowable
1.3000 4.3000 | 12.0000 20.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0407)	328.260	5.857	6.33	20.38
OUTFLOW: ID= 1 (0113)	328.260	1.137	12.67	20.38

PEAK FLOW REDUCTION [Qout/Qin](%)= 19.42
TIME SHIFT OF PEAK FLOW (min)=380.00
MAXIMUM STORAGE USED (ha.m.)= 3.1599

ADD HYD (0430)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0425):	26.91	1.980	6.00	22.15
	+ ID2= 2 (0113):	328.26	1.137	12.67	20.38
	ID = 3 (0430):	355.17	2.137	6.17	20.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0440)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	325.40	.0600	
120.00	324.60	.0600	
126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

```
                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
     INFLOW : ID= 2 (0430)  355.17     2.14    6.17  20.51       .33      1.26
     OUTFLOW: ID= 1 (0440)  355.17     2.11    6.17  20.51       .32      1.26


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| ADD HYD   (0485) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0440):   355.17   2.113     6.17    20.51
        + ID2= 2 (0475):    50.98   4.600     6.08    22.15
          ==================================================
          ID = 3 (0485):   406.15   6.641     6.08    20.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0490) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0485):   406.15   6.641     6.08    20.72
        + ID2= 2 (0480):    43.10   3.608     6.08    22.15
          ==================================================
          ID = 3 (0490):   449.25  10.249     6.08    20.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0491) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0482):    29.60    .293     6.83    22.15
        + ID2= 2 (0490):   449.25  10.249     6.08    20.86
          ==================================================
          ID = 3 (0491):   478.85  10.519     6.08    20.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   7.0800      2.4860
                           .2760      .0600    |   8.1000      3.3240
                          1.2000      .3400    |   9.7980      4.6420
                          2.0400      .6182    |  10.4940      7.4397
                          2.6400     1.1630    |  11.6850     10.3000
                          3.1200     1.7070    |  12.3480     11.4000

                                AREA      QPEAK       TPEAK       R.V.
                                (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)    478.850    10.519       6.08       20.94
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OUTFLOW: ID= 1 (0483)    478.850      2.914        6.67       20.94

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 27.70
                TIME SHIFT OF PEAK FLOW         (min)= 35.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  1.4753

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--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0540):     4.63     .713     6.00    43.01
        + ID2= 2 (0483):   478.85    2.914     6.67    20.94
          ==================================================
          ID = 3 (0530):   483.48    3.009     6.50    21.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0527):    88.85    6.502     6.42    25.46
        + ID2= 2 (0530):   483.48    3.009     6.50    21.15
          ==================================================
          ID = 3 (0545):   572.33    9.488     6.50    21.82

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0542):    25.25    3.608     6.00    43.01
        + ID2= 2 (0545):   572.33    9.488     6.50    21.82
          ==================================================
          ID = 3 (0546):   597.58   10.369     6.00    22.71

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0543):    14.99    2.271     6.00    43.01
        + ID2= 2 (0546):   597.58   10.369     6.00    22.71
          ==================================================
          ID = 3 (0547):   612.57   12.640     6.00    23.21

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
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Hadati Creek Watershed - Allowable

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0544):	1.13	.178	6.00	43.01
+ ID2= 2 (0547):	612.57	12.640	6.00	23.21
ID = 3 (0548):	613.70	12.818	6.00	23.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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****************************
** SIMULATION NUMBER:   3 **
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READ STORM	Filename: Y:\SPrimmer\Miduss Modelling\105172\Cityview Ridge\25yrSCS12hr.stm
Ptotal= 73.56 mm	Comments: 25 year SCS Type II 12hr design storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	1.84	3.25	2.94	6.25	13.24	9.25	2.58
.50	1.84	3.50	2.94	6.50	13.24	9.50	2.58
.75	1.84	3.75	2.94	6.75	5.89	9.75	2.58
1.00	1.84	4.00	2.94	7.00	5.89	10.00	2.58
1.25	1.84	4.25	4.41	7.25	4.41	10.25	1.47
1.50	1.84	4.50	4.41	7.50	4.41	10.50	1.47
1.75	1.84	4.75	5.89	7.75	4.41	10.75	1.47
2.00	1.84	5.00	5.89	8.00	4.41	11.00	1.47
2.25	2.21	5.25	8.83	8.25	2.58	11.25	1.47
2.50	2.21	5.50	8.83	8.50	2.58	11.50	1.47
2.75	2.21	5.75	35.31	8.75	2.58	11.75	1.47
3.00	2.21	6.00	97.10	9.00	2.58	12.00	1.47

CALIB STANDHYD (0544) ID= 1 DT= 5.0 min	Area (ha)= 1.13 Total Imp(%)= 80.00 Dir. Conn.(%)= 79.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.90	.23
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	.55	.55
Length	(m)=	50.00	40.00
Mannings n	=	.013	.300

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
.083	1.84	3.083	2.94	6.083	13.24	9.08	2.58
.167	1.84	3.167	2.94	6.167	13.24	9.17	2.58
.250	1.84	3.250	2.94	6.250	13.24	9.25	2.58
.333	1.84	3.333	2.94	6.333	13.24	9.33	2.58
.417	1.84	3.417	2.94	6.417	13.24	9.42	2.58
.500	1.84	3.500	2.94	6.500	13.24	9.50	2.58
.583	1.84	3.583	2.94	6.583	5.89	9.58	2.58
.667	1.84	3.667	2.94	6.667	5.89	9.67	2.58
.750	1.84	3.750	2.94	6.750	5.89	9.75	2.58

.833	1.84	3.833	2.94	6.833	5.89	9.83	2.58
.917	1.84	3.917	2.94	6.917	5.89	9.92	2.58
1.000	1.84	4.000	2.94	7.000	5.88	10.00	2.58
1.083	1.84	4.083	4.41	7.083	4.41	10.08	1.47
1.167	1.84	4.167	4.41	7.167	4.41	10.17	1.47
1.250	1.84	4.250	4.41	7.250	4.41	10.25	1.47
1.333	1.84	4.333	4.41	7.333	4.41	10.33	1.47
1.417	1.84	4.417	4.41	7.417	4.41	10.42	1.47
1.500	1.84	4.500	4.41	7.500	4.41	10.50	1.47
1.583	1.84	4.583	5.88	7.583	4.41	10.58	1.47
1.667	1.84	4.667	5.89	7.667	4.41	10.67	1.47
1.750	1.84	4.750	5.89	7.750	4.41	10.75	1.47
1.833	1.84	4.833	5.89	7.833	4.41	10.83	1.47
1.917	1.84	4.917	5.89	7.917	4.41	10.92	1.47
2.000	1.84	5.000	5.89	8.000	4.41	11.00	1.47
2.083	2.21	5.083	8.83	8.083	2.58	11.08	1.47
2.167	2.21	5.167	8.83	8.167	2.58	11.17	1.47
2.250	2.21	5.250	8.83	8.250	2.58	11.25	1.47
2.333	2.21	5.333	8.83	8.333	2.58	11.33	1.47
2.417	2.21	5.417	8.83	8.417	2.58	11.42	1.47
2.500	2.21	5.500	8.83	8.500	2.58	11.50	1.47
2.583	2.21	5.583	35.31	8.583	2.58	11.58	1.47
2.667	2.21	5.667	35.31	8.667	2.58	11.67	1.47
2.750	2.21	5.750	35.31	8.750	2.58	11.75	1.47
2.833	2.21	5.833	97.10	8.833	2.58	11.83	1.47
2.917	2.21	5.917	97.10	8.917	2.58	11.92	1.47
3.000	2.21	6.000	97.10	9.000	2.58	12.00	1.47

```
     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.04 (ii)   14.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .31          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .24          .03          .266 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22         61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .29           .83

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.99         3.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     200.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
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                over (min)        5.00        20.00
     Storage Coeff.  (min)=       4.69 (ii)   16.94 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .22          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.11          .34        3.310 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22        61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .29          .83

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.20         5.05
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     350.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.56 (ii)   18.81 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .18          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       5.02          .53        5.333 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22        61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .29          .83


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0510) |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.80         3.20
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .50          .20
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                    Hadati Creek Watershed - Allowable
     Length            (m)=     400.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        65.53
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       7.31 (ii)   25.92 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .17          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.12          .25        3.209 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.33         6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22        61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .29          .83


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     112.24       131.76
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .80          .80
     Length            (m)=    1275.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       120.22
                over (min)       15.00        25.00
     Storage Coeff.  (min)=      12.73 (ii)   22.36 (ii)
     Unit Hyd. Tpeak (min)=      15.00        25.00
     Unit Hyd. peak  (cms)=        .08          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=      11.66        18.11       27.658 (iii)
     TIME TO PEAK    (hrs)=       6.08         6.25         6.17
     RUNOFF VOLUME    (mm)=      72.06        26.62        38.44
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .36          .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
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                        Hadati Creek Watershed - Allowable
     Surface Area     (ha)=       3.70          .93
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     150.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       3.94 (ii)   16.20 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .24          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .97          .11         1.036 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22         61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .29           .83

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0484)   |   Area    (ha)=  12.60
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.29         7.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.63 (ii)   13.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .18          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .66         1.43          1.918 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
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                          Hadati Creek Watershed - Allowable
| STANDHYD  (0565) |   Area    (ha)=  11.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.66         6.44
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.63 (ii)   13.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .18          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .59         1.26          1.689 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08           6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53          36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56          73.56
     RUNOFF COEFFICIENT   =        .98          .36            .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0481) |   Area    (ha)=   5.90
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.48         3.42
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.63 (ii)   13.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .18          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .31          .67           .898 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08           6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53          36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56          73.56
     RUNOFF COEFFICIENT   =        .98          .36            .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       10.16        14.04
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=        2.00         2.00
     Length            (m)=      401.00        40.00
     Mannings n          =        .013         .300

     Max.Eff.Inten.(mm/hr)=       97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=        4.83 (ii)   12.17 (ii)
     Unit Hyd. Tpeak (min)=        5.00        15.00
     Unit Hyd. peak  (cms)=         .22          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        1.33         2.92        3.938 (iii)
     TIME TO PEAK    (hrs)=        6.00         6.08         6.00
     RUNOFF VOLUME    (mm)=       72.06        26.53        36.09
     TOTAL RAINFALL   (mm)=       73.56        73.56        73.56
     RUNOFF COEFFICIENT   =         .98          .36          .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        2.10         2.89
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=        2.86         2.86
     Length            (m)=      185.00        40.00
     Mannings n          =        .013         .300

     Max.Eff.Inten.(mm/hr)=       97.10       119.40
                over (min)        5.00        10.00
     Storage Coeff.  (min)=        2.73 (ii)    9.32 (ii)
     Unit Hyd. Tpeak (min)=        5.00        10.00
     Unit Hyd. peak  (cms)=         .29          .12
                                                          *TOTALS*
     PEAK FLOW       (cms)=         .28          .73        1.007 (iii)
     TIME TO PEAK    (hrs)=        6.00         6.00         6.00
     RUNOFF VOLUME    (mm)=       72.06        26.53        36.09
     TOTAL RAINFALL   (mm)=       73.56        73.56        73.56
     RUNOFF COEFFICIENT   =         .98          .36          .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
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          Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98        11.02
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     365.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.57 (ii)   11.90 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .23          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.05         2.32         3.122 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.13 (ii)   11.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .24          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .91         2.02         2.725 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49
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***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01         8.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     287.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.95 (ii)   11.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .24          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .80         1.79          2.406 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08           6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53          36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56          73.56
     RUNOFF COEFFICIENT   =        .98          .36            .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.55        29.77
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     550.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.84 (ii)   13.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .20          .08
                                                          *TOTALS*
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PEAK FLOW        (cms)=       2.76          5.98           8.044 (iii)
TIME TO PEAK     (hrs)=       6.00          6.08            6.00
RUNOFF VOLUME     (mm)=      72.06         26.53           36.09
TOTAL RAINFALL    (mm)=      73.56         73.56           73.56
RUNOFF COEFFICIENT   =         .98           .36             .49


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=       49.35         68.15
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        2.00          2.00
Length             (m)=      885.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=       97.10        119.40
            over (min)       10.00         20.00
Storage Coeff.   (min)=       7.77 (ii)    15.10 (ii)
Unit Hyd. Tpeak  (min)=      10.00         20.00
Unit Hyd. peak   (cms)=        .13           .07
                                                        *TOTALS*
PEAK FLOW        (cms)=       5.65         11.98          16.238 (iii)
TIME TO PEAK     (hrs)=       6.00          6.17            6.08
RUNOFF VOLUME     (mm)=      72.06         26.53           36.09
TOTAL RAINFALL    (mm)=      73.56         73.56           73.56
RUNOFF COEFFICIENT   =         .98           .36             .49


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=        5.17          7.13
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        1.60          1.60
Length             (m)=      286.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=       97.10        119.40
            over (min)        5.00         15.00
Storage Coeff.   (min)=       4.22 (ii)    12.06 (ii)
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     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .24          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .68         1.49         2.015 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.29 (ii)   14.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .89         1.82         2.485 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n           =       .013         .300
```

```
     Max.Eff.Inten.(mm/hr)=      97.10       111.81
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.16 (ii)   12.69 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.48         3.58        4.647 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08         6.00
     RUNOFF VOLUME    (mm)=      72.06        25.57        34.40
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .35          .47

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0395) |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.12        46.08
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     900.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        88.55
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.85 (ii)   16.11 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .58         5.35        5.668 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.17
     RUNOFF VOLUME    (mm)=      72.06        21.36        23.89
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .29          .32

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
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--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.33          7.37
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       1.71          1.71
     Length            (m)=     300.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      97.10        119.40
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       4.25 (ii)    11.94 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .23           .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .71          1.55        2.088 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      72.06         26.53        36.09
     TOTAL RAINFALL   (mm)=      73.56         73.56        73.56
     RUNOFF COEFFICIENT   =        .98           .36          .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.12         20.88
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.03          2.03
     Length            (m)=     465.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      97.10        119.40
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       5.26 (ii)    12.56 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .21           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.96          4.29        5.772 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      72.06         26.53        36.09
     TOTAL RAINFALL   (mm)=      73.56         73.56        73.56
     RUNOFF COEFFICIENT   =        .98           .36          .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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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Hadati Creek Watershed - Allowable

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| CALIB            |
| STANDHYD  (0480) |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10        25.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.63 (ii)   13.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .18          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.27         4.88        6.559 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08         6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53        36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .36          .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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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--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00     27.66      6.17   38.44
     ==================================================
     MAJOR SYS.(ID= 2):  81.12     18.66      6.17   38.44
     MINOR SYS.(ID= 3): 162.88      9.00      5.92   38.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0566) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0484):    12.60   1.918     6.00    36.09
        + ID2= 2 (0565):    11.10   1.689     6.00    36.09
          ==================================================
          ID = 3 (0566):    23.70   3.607     6.00    36.09
```

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     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0410):    24.20   3.938     6.00    36.09
        + ID2= 2 (0415):     4.99   1.007     6.00    36.09
          ==================================================
          ID = 3 (0420):    29.19   4.945     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.0000      1.0000
                            .0100      .0100    |  20.0000      1.1000
                            .0120      .1000    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)      19.000      3.122        6.00       36.09
     OUTFLOW: ID= 1 (0111)      19.000       .447        6.58       36.08

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.31
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .4965

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--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0101):    16.32   2.725     6.00    36.09
        + ID2= 2 (0102):    14.32   2.406     6.00    36.09
          ==================================================
          ID = 3 (0103):    30.64   5.131     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |    .5000       .4000
                            .0100      .0100    |   6.6000       .8000
                            .0260      .2300    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0105)      51.320      8.044        6.00       36.09
     OUTFLOW: ID= 1 (0106)      51.320      5.545        6.17       36.09
```

Hadati Creek Watershed - Allowable
PEAK FLOW REDUCTION [Qout/Qin](%)= 68.94
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .7419

ROUTE CHN (0358)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	2.02	6.00	36.09	.21	1.25
OUTFLOW: ID= 1 (0358)	12.30	1.38	6.17	36.04	.17	1.15

ROUTE CHN (0353)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	2.49	6.00	36.09	.23	1.29
OUTFLOW: ID= 1 (0353)	16.30	1.83	6.17	36.06	.20	1.23

ROUTE CHN (0362)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63

.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	4.65	6.00	34.40	.31	1.61
OUTFLOW: ID= 1 (0362)	30.00	3.64	6.17	34.39	.27	1.53

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--------------------
| ADD HYD   (0465) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0455):	12.70	2.088	6.00	36.09
+ ID2= 2 (0460):	36.00	5.772	6.00	36.09
ID = 3 (0465):	48.70	7.859	6.00	36.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0510):	16.00	3.209	6.00	61.38
+ ID2= 2 (0505):	162.88	9.000	5.92	38.44
ID = 3 (0515):	178.88	12.209	6.00	40.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |
--------------------
```

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	101.50	.0500	
1.00	100.70	.0500	
1.50	100.55	.0500 / .0300	Main Channel
2.00	99.50	.0300	Main Channel
3.50	99.60	.0300	Main Channel
4.50	100.65	.0300 / .0500	Main Channel
6.00	101.45	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.10	99.60	.353E+02	.0	.19	43.69
.19	99.69	.112E+03	.1	.37	22.76
.29	99.79	.195E+03	.2	.49	17.03
.38	99.88	.285E+03	.3	.59	14.23
.48	99.98	.381E+03	.5	.67	12.51
.57	100.07	.484E+03	.7	.74	11.32

.67	100.17	.594E+03	.9	.80	10.43
.76	100.26	.710E+03	1.2	.86	9.74
.86	100.36	.832E+03	1.5	.91	9.18
.95	100.45	.961E+03	1.8	.96	8.72
1.05	100.55	.110E+04	2.2	1.00	8.32
1.16	100.66	.127E+04	2.7	1.07	7.80
1.28	100.78	.148E+04	3.4	1.14	7.31
1.39	100.89	.170E+04	4.1	1.20	6.94
1.50	101.00	.195E+04	4.9	1.25	6.65
1.61	101.11	.221E+04	5.8	1.30	6.41
1.72	101.22	.250E+04	6.7	1.34	6.22
1.84	101.34	.280E+04	7.7	1.38	6.04
1.95	101.45	.313E+04	8.8	1.41	5.90

**** WARNING: TRAVEL TIME TABLE EXCEEDED

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0505)	81.12	18.66	6.17	38.44	1.72	1.34
OUTFLOW: ID= 1 (0564)	81.12	28.30	6.50	38.44	1.95	1.41

**** WARNING: COMPUTATIONS FAILED TO CONVERGE.

ROUTE CHN (0563)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

<------ DATA FOR SECTION (2.2) ------>

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.573E+01	.0	.67	2.23
.11	.11	.135E+02	.1	.99	1.51
.16	.16	.232E+02	.3	1.23	1.22
.21	.21	.349E+02	.5	1.42	1.06
.26	.26	.486E+02	.9	1.58	.95
.32	.32	.643E+02	1.2	1.73	.87
.37	.37	.820E+02	1.7	1.86	.81
.42	.42	.102E+03	2.2	1.98	.76
.47	.47	.123E+03	2.9	2.10	.71
.53	.53	.147E+03	3.6	2.21	.68
.58	.58	.173E+03	4.4	2.31	.65
.63	.63	.200E+03	5.4	2.42	.62
.68	.68	.230E+03	6.4	2.51	.60
.74	.74	.262E+03	7.6	2.61	.58
.79	.79	.295E+03	8.9	2.70	.56
.84	.84	.331E+03	10.3	2.79	.54
.89	.89	.369E+03	11.8	2.88	.52
.95	.95	.408E+03	13.5	2.97	.51
1.00	1.00	.450E+03	15.2	3.05	.49

	<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL

Hadati Creek Watershed - Allowable

	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0566)	23.70	3.61	6.00	36.09	.53	2.21
OUTFLOW: ID= 1 (0563)	23.70	3.52	6.08	36.09	.52	2.20

DUHYD (0425)
Inlet Cap.=1.980
#of Inlets= 1
Total(cms)= 2.0

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	29.19	4.94	6.00	36.09
MAJOR SYS.(ID= 2):	7.51	2.96	6.00	36.09
MINOR SYS.(ID= 3):	21.68	1.98	5.83	36.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.0000	.5000
.0100	.0100	10.0000	.6000
.0150	.1332	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0103)	30.640	5.131	6.00	36.09
OUTFLOW: ID= 1 (0104)	30.640	4.550	6.17	36.08

PEAK FLOW REDUCTION [Qout/Qin](%)= 88.67
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .5514

ADD HYD (0359)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0358):	12.30	1.378	6.17	36.04
+ ID2= 2 (0353):	16.30	1.826	6.17	36.06
ID = 3 (0359):	28.60	3.204	6.17	36.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0363)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0359):	28.60	3.204	6.17	36.05
+ ID2= 2 (0362):	30.00	3.642	6.17	34.39
ID = 3 (0363):	58.60	6.846	6.17	35.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0465):    48.70   7.859     6.00    36.09
        + ID2= 2 (0425):     7.51   2.965     6.00    36.09
          ==================================================
          ID = 3 (0470):    56.21  10.824     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 178.88     12.21      6.00   40.49
     ========================================================
     MAJOR SYS.(ID= 2):  74.76      9.16      6.00   40.49
     MINOR SYS.(ID= 3): 104.13      3.05      5.67   40.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0561) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00          1.00         .0350
                   2.00           .50         .0350
                   4.00           .00     .0350 / .0350  Main Channel
                   4.50           .00         .0350      Main Channel
                   5.00           .00     .0350 / .0350  Main Channel
                   7.00           .50         .0350
                   9.00          1.00         .0350

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .05      .05    .319E+01        .1           .87        .95
        .11      .11    .748E+01        .2          1.26        .66
        .16      .16    .129E+02        .4          1.54        .54
        .21      .21    .194E+02        .7          1.75        .48
        .26      .26    .270E+02       1.0          1.93        .43
        .32      .32    .357E+02       1.5          2.08        .40
        .37      .37    .456E+02       2.0          2.22        .38
        .42      .42    .565E+02       2.6          2.34        .36
        .47      .47    .686E+02       3.4          2.46        .34
        .53      .53    .817E+02       4.2          2.57        .32
        .58      .58    .960E+02       5.1          2.68        .31
        .63      .63    .111E+03       6.2          2.78        .30
        .68      .68    .128E+03       7.3          2.87        .29
        .74      .74    .145E+03       8.6          2.97        .28
        .79      .79    .164E+03      10.0          3.06        .27
        .84      .84    .184E+03      11.6          3.14        .27
        .89      .89    .205E+03      13.2          3.23        .26
```

.95	.95	.227E+03	15.0	3.31	.25
1.00	1.00	.250E+03	17.0	3.40	.25

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->			<-pipe / channel->	
INFLOW : ID= 2 (0563)	23.70	3.52	6.08	36.09	.48	2.48
OUTFLOW: ID= 1 (0561)	23.70	3.57	6.08	36.09	.49	2.49

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--------------------
| ADD HYD   (0114) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0111):	19.00	.447	6.58	36.08
+ ID2= 2 (0104):	30.64	4.550	6.17	36.08
ID = 3 (0114):	49.64	4.877	6.17	36.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0365):	117.50	16.238	6.08	36.09
+ ID2= 2 (0363):	58.60	6.846	6.17	35.20
ID = 3 (0380):	176.10	22.579	6.08	35.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02

1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29
2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0470)	56.21	10.82	6.00	36.09	.67	1.43
OUTFLOW: ID= 1 (0475)	56.21	9.54	6.08	36.09	.64	1.39

```
--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0520):    74.76   9.159     6.00    40.49
        + ID2= 2 (0525):      .00    .001      .00  *******
          ==================================================
          ID = 3 (0526):    74.76   9.159     6.00    40.49

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

```
--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0561):    23.70   3.571     6.08    36.09
        + ID2= 2 (0481):     5.90    .898     6.00    36.09
          ==================================================
          ID = 3 (0492):    29.60   4.410     6.08    36.09

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

```
--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0114):    49.64   4.877     6.17    36.08
        + ID2= 2 (0106):    51.32   5.545     6.17    36.09
          ==================================================
          ID = 3 (0115):   100.96  10.422     6.17    36.08

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

```
--------------------
| RESERVOIR (0390) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
```

```
                         Hadati Creek Watershed - Allowable
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   1.3100      1.6000
                           .7700      .2870   |   1.8600     23.2300
                          1.2600      .9680   |    .0000       .0000

                                    AREA      QPEAK       TPEAK       R.V.
                                    (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0380)    176.100     22.579        6.08       35.79
     OUTFLOW: ID= 1 (0390)    176.100      1.387        7.17       35.79

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.14
                   TIME SHIFT OF PEAK FLOW         (min)= 65.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  4.6291

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        313.20         .0500
                 140.00        312.40     .0500 / .0300  Main Channel
                 140.50        310.80         .0300      Main Channel
                 141.50        310.80         .0300      Main Channel
                 142.00        312.40     .0300 / .0500  Main Channel
                 160.00        313.20         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)       (cms)        (m/s)      (min)
        .12    310.92    .575E+02        .1           .40       18.86
        .25    311.05    .119E+03        .2           .57       13.13
        .37    311.17    .185E+03        .3           .69       10.87
        .49    311.29    .256E+03        .4           .78        9.61
        .62    311.42    .330E+03        .6           .86        8.77
        .74    311.54    .409E+03        .8           .92        8.17
        .86    311.66    .492E+03       1.1           .97        7.70
        .98    311.78    .579E+03       1.3          1.02        7.32
       1.11    311.91    .671E+03       1.6          1.07        7.01
       1.23    312.03    .767E+03       1.9          1.11        6.74
       1.35    312.15    .867E+03       2.2          1.15        6.50
       1.48    312.28    .971E+03       2.6          1.19        6.29
       1.60    312.40    .108E+04       2.9          1.23        6.11
       1.73    312.53    .149E+04       3.6          1.10        6.85
       1.87    312.67    .248E+04       4.9           .88        8.52
       2.00    312.80    .405E+04       6.9           .77        9.74
       2.13    312.93    .620E+04      10.1           .73       10.21
       2.27    313.07    .893E+04      14.6           .74       10.17
       2.40    313.20    .122E+05      20.7           .76        9.85

                                   <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
     INFLOW : ID= 2 (0526)   74.76     9.16    6.00  40.49      2.09       .74
     OUTFLOW: ID= 1 (0527)   74.76     7.08    6.17  40.49      2.01       .77


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--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
```

Hadati Creek Watershed - Allowable

(cms)	(ha.m.)	(cms)	(ha.m.)
.0000	.0000	.2910	.3795
.2590	.0579	.2970	.4503
.2660	.1180	1.6320	.5232
.2720	.1802	4.1680	.5983
.2790	.2445	7.5660	.6756
.2850	.3109	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0492)	29.600	4.410	6.08	36.09
OUTFLOW: ID= 1 (0482)	29.600	2.218	6.33	36.09

PEAK FLOW REDUCTION [Qout/Qin](%)= 50.29
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .5440

ADD HYD (0400)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0390):	176.10	1.387	7.17	35.79
	+ ID2= 2 (0395):	51.20	5.668	6.17	23.89
	ID = 3 (0400):	227.30	6.995	6.17	33.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0403)
IN= 2---> OUT= 1 Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13

2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0400)	227.30	7.00	6.17	33.11	.46	1.36
OUTFLOW: ID= 1 (0403)	227.30	4.32	6.33	33.11	.36	1.16

```
--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0115):	100.96	10.422	6.17	36.08
+ ID2= 2 (0403):	227.30	4.324	6.33	33.11
ID = 3 (0407):	328.26	13.657	6.17	34.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.6000	6.4000
1.1000	2.9000	9.1000	10.0000
1.3000	4.3000	12.0000	20.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0407)	328.260	13.657	6.17	34.03
OUTFLOW: ID= 1 (0113)	328.260	1.367	15.17	34.02

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.01
TIME SHIFT OF PEAK FLOW (min)=540.00
MAXIMUM STORAGE USED (ha.m.)= 4.7719

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--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0425):	21.68	1.980	5.83	36.09
+ ID2= 2 (0113):	328.26	1.367	15.17	34.02
ID = 3 (0430):	349.94	2.494	6.25	34.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |
--------------------
```

Routing time step (min)'= 5.00

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

Hadati Creek Watershed - Allowable

Distance	Elevation	Manning	
100.00	325.40	.0600	
120.00	324.60	.0600	
126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0430)	349.94	2.49	6.25	34.15	.35	1.29
OUTFLOW: ID= 1 (0440)	349.94	2.40	6.33	34.15	.34	1.28

ADD HYD (0485)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0440):	349.94	2.403	6.33	34.15
	+ ID2= 2 (0475):	56.21	9.543	6.08	36.09
	ID = 3 (0485):	406.15	11.718	6.08	34.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0490)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0485):	406.15	11.718	6.08	34.42
	+ ID2= 2 (0480):	43.10	6.559	6.00	36.09

```
          ID = 3 (0490):   449.25  17.844     6.08    34.58

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0491) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0482):    29.60   2.218     6.33    36.09
        + ID2= 2 (0490):   449.25  17.844     6.08    34.58
          ====================================================
          ID = 3 (0491):   478.85  18.134     6.08    34.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)    |   (cms)     (ha.m.)
                            .0000      .0000     |   7.0800      2.4860
                            .2760      .0600     |   8.1000      3.3240
                           1.2000      .3400     |   9.7980      4.6420
                           2.0400      .6182     |  10.4940      7.4397
                           2.6400     1.1630     |  11.6850     10.3000
                           3.1200     1.7070     |  12.3480     11.4000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)    478.850     18.134        6.08       34.67
     OUTFLOW: ID= 1 (0483)    478.850      7.118        6.50       34.67

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 39.25
                    TIME SHIFT OF PEAK FLOW         (min)= 25.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  2.5265

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--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0540):     4.63   1.036     6.00    61.38
        + ID2= 2 (0483):   478.85   7.118     6.50    34.67
          ====================================================
          ID = 3 (0530):   483.48   7.293     6.50    34.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0527):    74.76   7.076     6.17    40.49
        + ID2= 2 (0530):   483.48   7.293     6.50    34.93
          ====================================================
          ID = 3 (0545):   558.24  14.150     6.50    35.67
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0542):    25.25   5.333     6.00    61.38
        + ID2= 2 (0545):   558.24  14.150     6.50    35.67
          ==================================================
          ID = 3 (0546):   583.49  15.241     6.42    36.79
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0543):    14.99   3.310     6.00    61.38
        + ID2= 2 (0546):   583.49  15.241     6.42    36.79
          ==================================================
          ID = 3 (0547):   598.48  18.314     6.00    37.40
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0544):     1.13    .266     6.00    61.38
        + ID2= 2 (0547):   598.48  18.314     6.00    37.40
          ==================================================
          ID = 3 (0548):   599.61  18.579     6.00    37.45
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************


--------------------
|    READ STORM    |    Filename: Y:\SPrimmer\Miduss Modelling\105172\Ci
|                  |              tyview Ridge\100yrSCS12hr.stm
| Ptotal= 90.18 mm |    Comments: 100 year SCS Type II 12hr design storm
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25    2.26 |  3.25    3.61 |  6.25   16.23 |  9.25    3.16
                 .50    2.26 |  3.50    3.61 |  6.50   16.23 |  9.50    3.16
                 .75    2.26 |  3.75    3.61 |  6.75    7.21 |  9.75    3.16
                1.00    2.26 |  4.00    3.61 |  7.00    7.21 | 10.00    3.16
                1.25    2.26 |  4.25    5.41 |  7.25    5.41 | 10.25    1.80
                1.50    2.26 |  4.50    5.41 |  7.50    5.41 | 10.50    1.80
                1.75    2.26 |  4.75    7.21 |  7.75    5.41 | 10.75    1.80
                2.00    2.26 |  5.00    7.21 |  8.00    5.41 | 11.00    1.80
                2.25    2.70 |  5.25   10.82 |  8.25    3.16 | 11.25    1.80
```

2.50	2.70	5.50	10.82	8.50	3.16	11.50	1.80
2.75	2.70	5.75	43.29	8.75	3.16	11.75	1.80
3.00	2.70	6.00	119.04	9.00	3.16	12.00	1.80

```
--------------------
| CALIB            |
| STANDHYD  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.90	.23
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	.55	.55
Length	(m)=	50.00	40.00
Mannings n	=	.013	.300

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
.083	2.26	3.083	3.61	6.083	16.23	9.08	3.16
.167	2.26	3.167	3.61	6.167	16.23	9.17	3.16
.250	2.26	3.250	3.61	6.250	16.23	9.25	3.16
.333	2.26	3.333	3.61	6.333	16.23	9.33	3.16
.417	2.26	3.417	3.61	6.417	16.23	9.42	3.16
.500	2.26	3.500	3.61	6.500	16.23	9.50	3.16
.583	2.26	3.583	3.61	6.583	7.21	9.58	3.16
.667	2.26	3.667	3.61	6.667	7.21	9.67	3.16
.750	2.26	3.750	3.61	6.750	7.21	9.75	3.16
.833	2.26	3.833	3.61	6.833	7.21	9.83	3.16
.917	2.26	3.917	3.61	6.917	7.21	9.92	3.16
1.000	2.26	4.000	3.61	7.000	7.21	10.00	3.16
1.083	2.26	4.083	5.41	7.083	5.41	10.08	1.80
1.167	2.26	4.167	5.41	7.167	5.41	10.17	1.80
1.250	2.26	4.250	5.41	7.250	5.41	10.25	1.80
1.333	2.26	4.333	5.41	7.333	5.41	10.33	1.80
1.417	2.26	4.417	5.41	7.417	5.41	10.42	1.80
1.500	2.26	4.500	5.41	7.500	5.41	10.50	1.80
1.583	2.26	4.583	7.21	7.583	5.41	10.58	1.80
1.667	2.26	4.667	7.21	7.667	5.41	10.67	1.80
1.750	2.26	4.750	7.21	7.750	5.41	10.75	1.80
1.833	2.26	4.833	7.21	7.833	5.41	10.83	1.80
1.917	2.26	4.917	7.21	7.917	5.41	10.92	1.80
2.000	2.26	5.000	7.21	8.000	5.41	11.00	1.80
2.083	2.70	5.083	10.82	8.083	3.16	11.08	1.80
2.167	2.70	5.167	10.82	8.167	3.16	11.17	1.80
2.250	2.70	5.250	10.82	8.250	3.16	11.25	1.80
2.333	2.70	5.333	10.82	8.333	3.16	11.33	1.80
2.417	2.70	5.417	10.82	8.417	3.16	11.42	1.80
2.500	2.70	5.500	10.82	8.500	3.16	11.50	1.80
2.583	2.70	5.583	43.29	8.583	3.16	11.58	1.80
2.667	2.70	5.667	43.29	8.667	3.16	11.67	1.80
2.750	2.70	5.750	43.29	8.750	3.16	11.75	1.80
2.833	2.70	5.833	119.04	8.833	3.16	11.83	1.80
2.917	2.70	5.917	119.04	8.917	3.16	11.92	1.80
3.000	2.70	6.000	119.04	9.000	3.16	12.00	1.80

Max.Eff.Inten.(mm/hr)=	119.04	111.85
over (min)	5.00	15.00

```
     Storage Coeff.  (min)=       1.88 (ii)   12.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .32          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .30          .04          .333 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        31.37         76.65
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .35           .85

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.99         3.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     200.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       111.85
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       4.32 (ii)   15.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .23          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.84          .48         4.164 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.00
     RUNOFF VOLUME    (mm)=      88.68        31.37         76.65
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .35           .85

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.20         5.05
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
```

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                        Hadati Creek Watershed - Allowable
     Length              (m)=     350.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       111.85
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.05 (ii)   17.13 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       6.23          .77         6.749 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.00
     RUNOFF VOLUME    (mm)=      88.68        31.37         76.65
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .35           .85


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0510) |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.80         3.20
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .50          .20
     Length            (m)=     400.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04        91.82
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       6.74 (ii)   22.99 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .18          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.88          .40         4.080 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.25          6.00
     RUNOFF VOLUME    (mm)=      88.68        31.37         76.65
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .35           .85


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
```

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                        Hadati Creek Watershed - Allowable
     Surface Area      (ha)=     112.24        131.76
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=        .80           .80
     Length             (m)=    1275.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        150.55
                over (min)       10.00         25.00
     Storage Coeff.  (min)=      11.73 (ii)    20.53 (ii)
     Unit Hyd. Tpeak (min)=      10.00         25.00
     Unit Hyd. peak  (cms)=        .10           .05
                                                              *TOTALS*
     PEAK FLOW       (cms)=      15.54         24.76          34.262 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.25            6.17
     RUNOFF VOLUME    (mm)=      88.68         36.25           49.88
     TOTAL RAINFALL   (mm)=      90.18         90.18           90.18
     RUNOFF COEFFICIENT   =        .98           .40             .55


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       3.70          .93
     Dep. Storage      (mm)=       1.50         5.00
     Average Slope      (%)=        .55          .55
     Length             (m)=     150.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        111.85
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       3.64 (ii)    14.73 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .25          .08
                                                              *TOTALS*
     PEAK FLOW       (cms)=       1.20          .16            1.339 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08            6.00
     RUNOFF VOLUME    (mm)=      88.68        31.37           76.65
     TOTAL RAINFALL   (mm)=      90.18        90.18           90.18
     RUNOFF COEFFICIENT   =        .98          .35             .85

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
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                          Hadati Creek Watershed - Allowable
| STANDHYD  (0484) |   Area    (ha)=  12.60
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.29         7.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.11 (ii)   12.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .19          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .83         1.92         2.550 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0565) |   Area    (ha)=  11.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.66         6.44
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.11 (ii)   12.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .19          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .73         1.69         2.246 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0481) |   Area    (ha)=   5.90
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.48          3.42
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     680.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       6.11 (ii)    12.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .19           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .39           .90        1.194 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         36.13        47.17
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .40          .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16         14.04
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     401.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       4.45 (ii)    11.16 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .23           .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.64          3.90        5.204 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         36.13        47.17
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .40          .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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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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| CALIB            |
| STANDHYD  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.10         2.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.86         2.86
     Length            (m)=     185.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.51 (ii)    8.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .29          .12
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .35          .96        1.304 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.00         6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13        47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18        90.18
     RUNOFF COEFFICIENT   =        .98          .40          .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98        11.02
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     365.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.21 (ii)   10.91 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .24          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.30         3.09        4.123 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13        47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18        90.18
     RUNOFF COEFFICIENT   =        .98          .40          .52
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***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.81 (ii)   10.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .25          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.12         2.69         3.593 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01         8.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     287.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.64 (ii)   10.35 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .25          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .98         2.37         3.171 (iii)
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     TIME TO PEAK     (hrs)=       6.00          6.08           6.00
     RUNOFF VOLUME     (mm)=      88.68         36.13          47.17
     TOTAL RAINFALL    (mm)=      90.18         90.18          90.18
     RUNOFF COEFFICIENT   =         .98           .40            .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      21.55        29.77
     Dep. Storage      (mm)=       1.50         5.00
     Average Slope      (%)=       2.00         2.00
     Length             (m)=     550.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.38 (ii)   12.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.42         8.01        10.668 (iii)
     TIME TO PEAK     (hrs)=      6.00         6.08          6.00
     RUNOFF VOLUME     (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL    (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      49.35        68.15
     Dep. Storage      (mm)=       1.50         5.00
     Average Slope      (%)=       2.00         2.00
     Length             (m)=     885.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       7.16 (ii)   13.86 (ii)
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     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .17          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       7.49        17.25        22.881 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.17         7.13
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.60         1.60
     Length            (m)=     286.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.89 (ii)   11.05 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .25          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .84         1.99         2.661 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n           =       .013         .300
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     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.88 (ii)   13.13 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.10         2.45        3.299 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13        47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18        90.18
     RUNOFF COEFFICIENT   =        .98          .40          .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       140.44
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.75 (ii)   11.63 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.83         4.81        6.183 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68        35.04        45.23
     TOTAL RAINFALL   (mm)=      90.18        90.18        90.18
     RUNOFF COEFFICIENT   =        .98          .39          .50

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0395) |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
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                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.12         46.08
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     900.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        112.64
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       7.23 (ii)    14.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .17           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .78          8.19        8.631 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.08
     RUNOFF VOLUME    (mm)=      88.68         31.49        34.35
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .35          .38

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.33          7.37
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       1.71          1.71
     Length            (m)=     300.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       3.92 (ii)    10.95 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .24           .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .87          2.06        2.756 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         36.13        47.17
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .40          .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.12        20.88
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.03         2.03
     Length            (m)=     465.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.84 (ii)   11.52 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.43         5.73         7.639 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0480) |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10        25.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.11 (ii)   12.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .19          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.82         6.56         8.721 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
```

```
          Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00     34.26      6.17   49.88
     ==================================================
     MAJOR SYS.(ID= 2): 102.03     25.26      6.17   49.88
     MINOR SYS.(ID= 3): 141.97      9.00      5.83   49.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0566) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0484):    12.60   2.550     6.00    47.17
        + ID2= 2 (0565):    11.10   2.246     6.00    47.17
          ==================================================
          ID = 3 (0566):    23.70   4.796     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0410):    24.20   5.204     6.00    47.17
        + ID2= 2 (0415):     4.99   1.304     6.00    47.17
          ==================================================
          ID = 3 (0420):    29.19   6.509     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |   1.0000      1.0000
                          .0100      .0100    |  20.0000      1.1000
                          .0120      .1000    |    .0000       .0000

                                AREA      QPEAK       TPEAK       R.V.
```

```
                        Hadati Creek Watershed - Allowable
                                  (ha)       (cms)        (hrs)        (mm)
     INFLOW : ID= 2 (0110)     19.000      4.123         6.00       47.17
     OUTFLOW: ID= 1 (0111)     19.000       .613         6.58       47.16

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.87
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .6478

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

--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0101):    16.32   3.593     6.00    47.17
        + ID2= 2 (0102):    14.32   3.171     6.00    47.17
          ==================================================
          ID = 3 (0103):    30.64   6.763     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .5000       .4000
                           .0100      .0100    |   6.6000       .8000
                           .0260      .2300    |    .0000       .0000
     **** WARNING : STORAGE-DISCHARGE TABLE WAS EXCEEDED.

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0105)     51.320     10.668        6.00       47.17
     OUTFLOW: ID= 1 (0106)     51.320      7.689        6.17       47.16

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 72.08
                   TIME SHIFT OF PEAK FLOW         (min)= 10.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .8782

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00          .26          .0300
                   5.50          .15      .0300 / .0150  Main Channel
                   5.51          .00          .0150      Main Channel
                  10.00          .09          .0150      Main Channel
                  14.49          .00          .0150      Main Channel
                  14.50          .15      .0150 / .0300  Main Channel
                  20.00          .26          .0300

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .01      .01    .102E+02       .0           .17      109.52
        .03      .03    .409E+02       .0           .27       68.99
        .04      .04    .920E+02       .0           .35       52.65
        .05      .05    .163E+03       .1           .42       43.46
```

.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	2.66	6.00	47.17	.23	1.31
OUTFLOW: ID= 1 (0358)	12.30	1.86	6.17	47.12	.20	1.23

```
| ROUTE CHN (0353) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

	<---- hydrograph ---->				<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL

Hadati Creek Watershed - Allowable

	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0350)	16.30	3.30	6.00	47.17	.26	1.34
OUTFLOW: ID= 1 (0353)	16.30	2.44	6.17	47.13	.22	1.29

ROUTE CHN (0362)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	6.18	6.00	45.23	.35	1.71
OUTFLOW: ID= 1 (0362)	30.00	4.88	6.17	45.22	.31	1.63

ADD HYD (0465)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0455):	12.70	2.756	6.00	47.17
+ ID2= 2 (0460):	36.00	7.639	6.00	47.17
ID = 3 (0465):	48.70	10.395	6.00	47.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0510):    16.00   4.080     6.00    76.65
        + ID2= 2 (0505):   141.97   9.000     5.83    49.88
          ==================================================
          ID = 3 (0515):   157.97  13.080     6.00    52.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00        101.50         .0500
                   1.00        100.70         .0500
                   1.50        100.55     .0500 / .0300  Main Channel
                   2.00         99.50         .0300      Main Channel
                   3.50         99.60         .0300      Main Channel
                   4.50        100.65     .0300 / .0500  Main Channel
                   6.00        101.45         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .10     99.60    .353E+02       .0           .19       43.69
        .19     99.69    .112E+03       .1           .37       22.76
        .29     99.79    .195E+03       .2           .49       17.03
        .38     99.88    .285E+03       .3           .59       14.23
        .48     99.98    .381E+03       .5           .67       12.51
        .57    100.07    .484E+03       .7           .74       11.32
        .67    100.17    .594E+03       .9           .80       10.43
        .76    100.26    .710E+03      1.2           .86        9.74
        .86    100.36    .832E+03      1.5           .91        9.18
        .95    100.45    .961E+03      1.8           .96        8.72
       1.05    100.55    .110E+04      2.2          1.00        8.32
       1.16    100.66    .127E+04      2.7          1.07        7.80
       1.28    100.78    .148E+04      3.4          1.14        7.31
       1.39    100.89    .170E+04      4.1          1.20        6.94
       1.50    101.00    .195E+04      4.9          1.25        6.65
       1.61    101.11    .221E+04      5.8          1.30        6.41
       1.72    101.22    .250E+04      6.7          1.34        6.22
       1.84    101.34    .280E+04      7.7          1.38        6.04
       1.95    101.45    .313E+04      8.8          1.41        5.90

     **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                   <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
     INFLOW : ID= 2 (0505)  102.03    25.26    6.17  49.88     1.80      1.37
     OUTFLOW: ID= 1 (0564)  102.03    39.67    6.58  49.88     1.95      1.41

     **** WARNING:  COMPUTATIONS FAILED TO CONVERGE.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0563) |
```

```
                          Hadati Creek Watershed - Allowable
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
                <------ DATA FOR SECTION (   2.2) ------>
                Distance      Elevation       Manning
                     .00          1.00         .0350
                    2.00           .50         .0350
                    4.00           .00     .0350 / .0350  Main Channel
                    4.50           .00         .0350      Main Channel
                    5.00           .00     .0350 / .0350  Main Channel
                    7.00           .50         .0350
                    9.00          1.00         .0350

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .05      .05    .573E+01        .0           .67       2.23
        .11      .11    .135E+02        .1           .99       1.51
        .16      .16    .232E+02        .3          1.23       1.22
        .21      .21    .349E+02        .5          1.42       1.06
        .26      .26    .486E+02        .9          1.58        .95
        .32      .32    .643E+02       1.2          1.73        .87
        .37      .37    .820E+02       1.7          1.86        .81
        .42      .42    .102E+03       2.2          1.98        .76
        .47      .47    .123E+03       2.9          2.10        .71
        .53      .53    .147E+03       3.6          2.21        .68
        .58      .58    .173E+03       4.4          2.31        .65
        .63      .63    .200E+03       5.4          2.42        .62
        .68      .68    .230E+03       6.4          2.51        .60
        .74      .74    .262E+03       7.6          2.61        .58
        .79      .79    .295E+03       8.9          2.70        .56
        .84      .84    .331E+03      10.3          2.79        .54
        .89      .89    .369E+03      11.8          2.88        .52
        .95      .95    .408E+03      13.5          2.97        .51
       1.00     1.00    .450E+03      15.2          3.05        .49

                                   <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
     INFLOW : ID= 2 (0566)   23.70     4.80    6.00  47.17     .60      2.35
     OUTFLOW: ID= 1 (0563)   23.70     4.63    6.08  47.17     .59      2.33


--------------------------------------------------------------------------------
--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |      AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):  29.19      6.51      6.00    47.17
     ==================================================
     MAJOR SYS.(ID= 2):  10.15      4.53      6.00    47.17
     MINOR SYS.(ID= 3):  19.04      1.98      5.83    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)    (ha.m.)    |   (cms)    (ha.m.)
                            .0000     .0000     |  1.0000      .5000
```

```
                        Hadati Creek Watershed - Allowable
                          .0100      .0100   |  10.0000       .6000
                          .0150      .1332   |    .0000       .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0103)     30.640      6.763        6.00       47.17
     OUTFLOW: ID= 1 (0104)     30.640      7.048        6.08       47.16

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=104.21
                  TIME SHIFT OF PEAK FLOW         (min)=  5.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=   .5855

     **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                      CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
-------------------------------------------------------------------------------

--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0358):    12.30   1.856     6.17    47.12
        + ID2= 2 (0353):    16.30   2.435     6.17    47.13
          ===================================================
          ID = 3 (0359):    28.60   4.291     6.17    47.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0363) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0359):    28.60   4.291     6.17    47.13
        + ID2= 2 (0362):    30.00   4.880     6.17    45.22
          ===================================================
          ID = 3 (0363):    58.60   9.171     6.17    46.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0465):    48.70  10.395     6.00    47.17
        + ID2= 2 (0425):    10.15   4.529     6.00    47.17
          ===================================================
          ID = 3 (0470):    58.85  14.924     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |       AREA     QPEAK     TPEAK     R.V.
--------------------       (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1): 157.97     13.08      6.00    52.60
     ===================================================
     MAJOR SYS.(ID= 2):  67.54     10.03      6.00    52.60
```

MINOR SYS.(ID= 3): 90.43 3.05 5.58 52.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN (0561) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.319E+01	.1	.87	.95
.11	.11	.748E+01	.2	1.26	.66
.16	.16	.129E+02	.4	1.54	.54
.21	.21	.194E+02	.7	1.75	.48
.26	.26	.270E+02	1.0	1.93	.43
.32	.32	.357E+02	1.5	2.08	.40
.37	.37	.456E+02	2.0	2.22	.38
.42	.42	.565E+02	2.6	2.34	.36
.47	.47	.686E+02	3.4	2.46	.34
.53	.53	.817E+02	4.2	2.57	.32
.58	.58	.960E+02	5.1	2.68	.31
.63	.63	.111E+03	6.2	2.78	.30
.68	.68	.128E+03	7.3	2.87	.29
.74	.74	.145E+03	8.6	2.97	.28
.79	.79	.164E+03	10.0	3.06	.27
.84	.84	.184E+03	11.6	3.14	.27
.89	.89	.205E+03	13.2	3.23	.26
.95	.95	.227E+03	15.0	3.31	.25
1.00	1.00	.250E+03	17.0	3.40	.25

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0563)	23.70	4.63	6.08	47.17	.55	2.62
OUTFLOW: ID= 1 (0561)	23.70	4.69	6.08	47.17	.55	2.63

```
| ADD HYD   (0114) |
|   1 +  2 =  3    |
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0111):	19.00	.613	6.58	47.16
+ ID2= 2 (0104):	30.64	7.048	6.08	47.16
ID = 3 (0114):	49.64	7.421	6.08	47.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0365):   117.50  22.881     6.00    47.17
        + ID2= 2 (0363):    58.60   9.171     6.17    46.15
          ==================================================
          ID = 3 (0380):   176.10  30.231     6.08    46.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        324.60         .0500
                 115.00        321.60         .0500
                 120.00        320.80     .0500 / .0300  Main Channel
                 122.00        320.80     .0300 / .0500  Main Channel
                 138.00        321.60         .0500
                 148.00        322.30         .0500
                 154.00        323.10         .0500
                 164.00        324.60         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
        .20    321.00    .398E+03        .8           .84       8.53
        .40    321.20    .125E+04       3.3          1.13       6.33
        .60    321.40    .255E+04       8.1          1.36       5.27
        .80    321.60    .430E+04      15.6          1.56       4.59
       1.00    321.80    .644E+04      26.8          1.79       4.01
       1.20    322.00    .892E+04      41.2          1.99       3.61
       1.40    322.20    .117E+05      59.3          2.17       3.30
       1.60    322.40    .148E+05      81.9          2.37       3.02
       1.80    322.60    .182E+05     109.1          2.58       2.78
       2.00    322.80    .218E+05     140.2          2.77       2.59
       2.20    323.00    .256E+05     175.3          2.95       2.43
       2.40    323.20    .296E+05     214.7          3.12       2.29
       2.60    323.40    .338E+05     258.6          3.29       2.18
       2.80    323.60    .382E+05     306.7          3.46       2.07
       3.00    323.80    .428E+05     359.1          3.61       1.98
       3.20    324.00    .476E+05     416.0          3.76       1.91
       3.40    324.20    .526E+05     477.5          3.91       1.83
       3.60    324.40    .578E+05     543.5          4.05       1.77
       3.80    324.60    .632E+05     614.3          4.18       1.71

                                   <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
     INFLOW : ID= 2 (0470)   58.85    14.92    6.00  47.17     .78      1.54
     OUTFLOW: ID= 1 (0475)   58.85    13.38    6.08  47.17     .74      1.49

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--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
```

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--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0520):     67.54  10.030     6.00    52.60
        + ID2= 2 (0525):       .00    .001      .00  *******
          ==================================================
          ID = 3 (0526):     67.54  10.030     6.00    52.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0561):     23.70   4.690     6.08    47.17
        + ID2= 2 (0481):      5.90   1.194     6.00    47.17
          ==================================================
          ID = 3 (0492):     29.60   5.789     6.08    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0114):     49.64   7.421     6.08    47.16
        + ID2= 2 (0106):     51.32   7.689     6.17    47.16
          ==================================================
          ID = 3 (0115):    100.96  14.393     6.08    47.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0390) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.3100      1.6000
                            .7700      .2870    |   1.8600     23.2300
                           1.2600      .9680    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0380)     176.100     30.231        6.08       46.83
     OUTFLOW: ID= 1 (0390)     176.100      1.430        7.25       46.83

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.73
                    TIME SHIFT OF PEAK FLOW         (min)= 70.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  6.3304

-------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        313.20         .0500
                 140.00        312.40     .0500 / .0300  Main Channel
                 140.50        310.80         .0300      Main Channel
```

141.50	310.80	.0300	Main Channel
142.00	312.40	.0300 / .0500	Main Channel
160.00	313.20	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.12	310.92	.575E+02	.1	.40	18.86
.25	311.05	.119E+03	.2	.57	13.13
.37	311.17	.185E+03	.3	.69	10.87
.49	311.29	.256E+03	.4	.78	9.61
.62	311.42	.330E+03	.6	.86	8.77
.74	311.54	.409E+03	.8	.92	8.17
.86	311.66	.492E+03	1.1	.97	7.70
.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0526)	67.54	10.03	6.00	52.60	2.13	.74
OUTFLOW:	ID= 1 (0527)	67.54	7.92	6.08	52.59	2.04	.76

RESERVOIR (0482)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.2910	.3795
	.2590	.0579	.2970	.4503
	.2660	.1180	1.6320	.5232
	.2720	.1802	4.1680	.5983
	.2790	.2445	7.5660	.6756
	.2850	.3109	.0000	.0000

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW :	ID= 2 (0492)	29.600	5.789	6.08	47.17
OUTFLOW:	ID= 1 (0482)	29.600	3.997	6.25	47.17

PEAK FLOW REDUCTION [Qout/Qin](%)= 69.05
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .5994

ADD HYD (0400)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0390):	176.10	1.430	7.25	46.83

```
    + ID2= 2 (0395):    51.20   8.631     6.08    34.35
      ==================================================
      ID = 3 (0400):   227.30   9.969     6.08    44.02

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0403) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                100.00        338.30         .0500
                110.00        336.80         .0500
                135.00        336.00         .0300      Main Channel
                142.00        335.30         .0500
                148.00        335.30         .0500
                156.00        336.00         .0500
                165.00        338.30         .0000

     <--------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       .16   335.46    .231E+04        .9           .71      44.52
       .32   335.62    .563E+04       3.2          1.09      29.11
       .47   335.77    .997E+04       7.3          1.39      22.72
       .63   335.93    .153E+05      13.4          1.66      19.04
       .79   336.09    .218E+05      22.7          1.97      16.04
       .95   336.25    .299E+05      35.3          2.25      14.10
      1.11   336.41    .396E+05      51.2          2.46      12.89
      1.26   336.56    .510E+05      70.7          2.63      12.02
      1.42   336.72    .641E+05      94.1          2.79      11.35
      1.58   336.88    .787E+05     122.4          2.96      10.71
      1.74   337.04    .939E+05     155.6          3.15      10.06
      1.89   337.19    .110E+06     192.8          3.34       9.48
      2.05   337.35    .126E+06     233.9          3.53       8.97
      2.21   337.51    .143E+06     278.9          3.71       8.53
      2.37   337.67    .160E+06     327.7          3.89       8.13
      2.53   337.83    .178E+06     380.3          4.07       7.79
      2.68   337.98    .196E+06     436.7          4.23       7.48
      2.84   338.14    .215E+06     496.9          4.40       7.20
      3.00   338.30    .234E+06     561.0          4.56       6.95

                                  <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
     INFLOW : ID= 2 (0400)  227.30     9.97    6.08  44.02       .54      1.50
     OUTFLOW: ID= 1 (0403)  227.30     6.22    6.25  44.02       .43      1.29


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--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0115):   100.96  14.393     6.08    47.16
        + ID2= 2 (0403):   227.30   6.216     6.25    44.02
          ==================================================
          ID = 3 (0407):   328.26  18.926     6.17    44.98

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

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--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.6000      6.4000
                           1.1000     2.9000    |   9.1000     10.0000
                           1.3000     4.3000    |  12.0000     20.0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0407)    328.260     18.926        6.17       44.98
     OUTFLOW: ID= 1 (0113)    328.260      1.552       12.50       44.98

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.20
                   TIME SHIFT OF PEAK FLOW         (min)=380.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  6.0640

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

--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0425):    19.04   1.980     5.83    47.17
        + ID2= 2 (0113):   328.26   1.552    12.50    44.98
          ==================================================
          ID = 3 (0430):   347.30   3.000     6.33    45.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        325.40         .0600
                 120.00        324.60         .0600
                 126.00        323.90         .0600
                 130.00        323.00         .0600
                 140.00        322.30     .0600 / .0300  Main Channel
                 142.00        322.30     .0300 / .0600  Main Channel
                 150.00        323.90         .0600
                 155.00        324.60         .0600
                 160.00        325.40         .0600

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)      (cu.m.)      (cms)        (m/s)      (min)
        .16    322.46    .233E+03       .6           .96        6.96
        .33    322.63    .672E+03      2.1          1.26        5.27
        .49    322.79    .132E+04      4.9          1.48        4.51
        .65    322.95    .216E+04      9.0          1.66        4.03
        .82    323.12    .319E+04     14.9          1.87        3.57
        .98    323.28    .433E+04     22.5          2.08        3.21
       1.14    323.44    .556E+04     31.6          2.27        2.93
       1.31    323.61    .689E+04     42.3          2.45        2.72
       1.47    323.77    .833E+04     54.6          2.62        2.54
       1.63    323.93    .987E+04     68.3          2.77        2.41
```

1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0430)	347.30	3.00	6.33	45.10	.38	1.33
OUTFLOW:	ID= 1 (0440)	347.30	2.86	6.42	45.10	.37	1.31

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--------------------
| ADD HYD   (0485) |
|   1 +  2 =  3    |
--------------------
```

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0440):	347.30	2.860	6.42	45.10
+	ID2= 2 (0475):	58.85	13.381	6.08	47.17
	ID = 3 (0485):	406.15	15.674	6.08	45.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0490) |
|   1 +  2 =  3    |
--------------------
```

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0485):	406.15	15.674	6.08	45.40
+	ID2= 2 (0480):	43.10	8.721	6.00	47.17
	ID = 3 (0490):	449.25	23.705	6.08	45.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0491) |
|   1 +  2 =  3    |
--------------------
```

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0482):	29.60	3.997	6.25	47.17
+	ID2= 2 (0490):	449.25	23.705	6.08	45.57
	ID = 3 (0491):	478.85	24.885	6.08	45.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	7.0800	2.4860

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.2760	.0600	8.1000	3.3240
1.2000	.3400	9.7980	4.6420
2.0400	.6182	10.4940	7.4397
2.6400	1.1630	11.6850	10.3000
3.1200	1.7070	12.3480	11.4000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0491)	478.850	24.885	6.08	45.67
OUTFLOW: ID= 1 (0483)	478.850	8.373	6.58	45.67

PEAK FLOW REDUCTION [Qout/Qin](%)= 33.65
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 3.5408

ADD HYD (0530)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0540):	4.63	1.339	6.00	76.65
	+ ID2= 2 (0483):	478.85	8.373	6.58	45.67
	ID = 3 (0530):	483.48	8.559	6.50	45.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0545)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0527):	67.54	7.924	6.08	52.59
	+ ID2= 2 (0530):	483.48	8.559	6.50	45.97
	ID = 3 (0545):	551.02	15.770	6.42	46.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0546)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0542):	25.25	6.749	6.00	76.65
	+ ID2= 2 (0545):	551.02	15.770	6.42	46.78
	ID = 3 (0546):	576.27	18.223	6.00	48.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0547)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0543):	14.99	4.164	6.00	76.65
	+ ID2= 2 (0546):	576.27	18.223	6.00	48.09

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ID = 3 (0547):	591.26	22.387	6.00	48.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0544):	1.13	.333	6.00	76.65
+ ID2= 2 (0547):	591.26	22.387	6.00	48.81
ID = 3 (0548):	592.39	22.720	6.00	48.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   5 **
  ****************************
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--------------------
|    READ STORM    |
|                  |
| Ptotal=211.07 mm |
--------------------
```

Filename: Y:\SPrimmer\Miduss Modelling\105172\Cityview Ridge\RegSCS12hr.stm
Comments: Regional SCS Type II 12hr design storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	6.35	3.25	12.70	6.25	23.11	9.25	52.83
.50	6.35	3.50	12.70	6.50	23.11	9.50	52.83
.75	6.35	3.75	12.70	6.75	23.11	9.75	52.83
1.00	6.35	4.00	12.70	7.00	23.11	10.00	52.83
1.25	4.32	4.25	16.76	7.25	12.70	10.25	37.85
1.50	4.32	4.50	16.76	7.50	12.70	10.50	37.85
1.75	4.32	4.75	16.76	7.75	12.70	10.75	37.85
2.00	4.32	5.00	16.76	8.00	12.70	11.00	37.85
2.25	6.35	5.25	12.70	8.25	12.70	11.25	12.70
2.50	6.35	5.50	12.70	8.50	12.70	11.50	12.70
2.75	6.35	5.75	12.70	8.75	12.70	11.75	12.70
3.00	6.35	6.00	12.70	9.00	12.70	12.00	12.70

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--------------------
| CALIB            |
| STANDHYD  (0544) |
|ID= 1 DT= 5.0 min |
--------------------
```

Area (ha)= 1.13
Total Imp(%)= 80.00 Dir. Conn.(%)= 79.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.90	.23
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	.55	.55
Length	(m)=	50.00	40.00
Mannings n	=	.013	.300

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

.083	6.35	3.083	12.70	6.083	23.11	9.08	52.83
.167	6.35	3.167	12.70	6.167	23.11	9.17	52.83
.250	6.35	3.250	12.70	6.250	23.11	9.25	52.83
.333	6.35	3.333	12.70	6.333	23.11	9.33	52.83
.417	6.35	3.417	12.70	6.417	23.11	9.42	52.83
.500	6.35	3.500	12.70	6.500	23.11	9.50	52.83
.583	6.35	3.583	12.70	6.583	23.11	9.58	52.83
.667	6.35	3.667	12.70	6.667	23.11	9.67	52.83
.750	6.35	3.750	12.70	6.750	23.11	9.75	52.83
.833	6.35	3.833	12.70	6.833	23.11	9.83	52.83
.917	6.35	3.917	12.70	6.917	23.11	9.92	52.83
1.000	6.35	4.000	12.70	7.000	23.11	10.00	52.83
1.083	4.32	4.083	16.76	7.083	12.70	10.08	37.85
1.167	4.32	4.167	16.76	7.167	12.70	10.17	37.85
1.250	4.32	4.250	16.76	7.250	12.70	10.25	37.85
1.333	4.32	4.333	16.76	7.333	12.70	10.33	37.85
1.417	4.32	4.417	16.76	7.417	12.70	10.42	37.85
1.500	4.32	4.500	16.76	7.500	12.70	10.50	37.85
1.583	4.32	4.583	16.76	7.583	12.70	10.58	37.85
1.667	4.32	4.667	16.76	7.667	12.70	10.67	37.85
1.750	4.32	4.750	16.76	7.750	12.70	10.75	37.85
1.833	4.32	4.833	16.76	7.833	12.70	10.83	37.85
1.917	4.32	4.917	16.76	7.917	12.70	10.92	37.85
2.000	4.32	5.000	16.76	8.000	12.70	11.00	37.85
2.083	6.35	5.083	12.70	8.083	12.70	11.08	12.70
2.167	6.35	5.167	12.70	8.167	12.70	11.17	12.70
2.250	6.35	5.250	12.70	8.250	12.70	11.25	12.70
2.333	6.35	5.333	12.70	8.333	12.70	11.33	12.70
2.417	6.35	5.417	12.70	8.417	12.70	11.42	12.70
2.500	6.35	5.500	12.70	8.500	12.70	11.50	12.70
2.583	6.35	5.583	12.70	8.583	12.70	11.58	12.70
2.667	6.35	5.667	12.70	8.667	12.70	11.67	12.70
2.750	6.35	5.750	12.70	8.750	12.70	11.75	12.70
2.833	6.35	5.833	12.70	8.833	12.70	11.83	12.70
2.917	6.35	5.917	12.70	8.917	12.70	11.92	12.70
3.000	6.35	6.000	12.70	9.000	12.70	12.00	12.70

```
Max.Eff.Inten.(mm/hr)=      52.83        42.97
           over (min)        5.00        20.00
Storage Coeff.  (min)=       2.60 (ii)   18.86 (ii)
Unit Hyd. Tpeak (min)=       5.00        20.00
Unit Hyd. peak  (cms)=        .29          .06
                                                        *TOTALS*
PEAK FLOW       (cms)=        .13          .03            .156 (iii)
TIME TO PEAK    (hrs)=       9.67        10.00          10.00
RUNOFF VOLUME    (mm)=     209.57        81.35         182.64
TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .39            .87

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

      (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (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  (0543)   |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
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--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.99         3.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     200.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        42.97
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       5.98 (ii)   22.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .19          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.74          .32         2.054 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.08         10.00
     RUNOFF VOLUME    (mm)=     209.57        81.35        182.64
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .39           .87


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0542)  |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.20         5.05
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     350.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        42.97
                over (min)       10.00        25.00
     Storage Coeff.  (min)=       8.37 (ii)   24.63 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .12          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.92          .53         3.443 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.17         10.00
     RUNOFF VOLUME    (mm)=     209.57        81.35        182.64
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .39           .87


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0510)   |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.80         3.20
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .50          .20
     Length            (m)=     400.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        42.97
                over (min)      10.00        35.00
     Storage Coeff.  (min)=       9.33 (ii)   31.35 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .12          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.85          .31        2.134 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.33        10.00
     RUNOFF VOLUME    (mm)=     209.57        81.35       182.64
     TOTAL RAINFALL   (mm)=     211.07       211.07       211.07
     RUNOFF COEFFICIENT   =        .99          .39          .87


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0500)   |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     112.24       131.76
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .80          .80
     Length            (m)=    1275.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.90
                over (min)      15.00        30.00
     Storage Coeff.  (min)=      16.24 (ii)   28.96 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
     Unit Hyd. peak  (cms)=        .07          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       9.05        18.51       27.108 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.25        10.08
     RUNOFF VOLUME    (mm)=     209.57       107.75       134.22
     TOTAL RAINFALL   (mm)=     211.07       211.07       211.07
     RUNOFF COEFFICIENT   =        .99          .51          .64


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70          .93
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     150.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        42.97
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       5.03 (ii)   21.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .21          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .54          .10          .636 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.08         10.00
     RUNOFF VOLUME    (mm)=     209.57        81.35        182.64
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .39           .87


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0484) |   Area    (ha)=  12.60
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.29         7.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       8.46 (ii)   18.15 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .39         1.14         1.527 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00         10.00
     RUNOFF VOLUME    (mm)=     209.57       107.20        128.70
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .51           .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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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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--------------------
| CALIB            |
| STANDHYD  (0565) |   Area    (ha)=  11.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.66         6.44
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       8.46 (ii)   18.15 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .34         1.00         1.345 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00         10.00
     RUNOFF VOLUME    (mm)=     209.57       107.20        128.70
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .51           .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0481) |   Area    (ha)=   5.90
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.48         3.42
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       8.46 (ii)   18.15 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .18          .53           .715 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00         10.00
     RUNOFF VOLUME    (mm)=     209.57       107.20        128.70
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .51           .61
```

```
      (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16        14.04
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     401.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.16 (ii)   15.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .75         2.23          2.975 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00          10.00
     RUNOFF VOLUME    (mm)=     209.57       107.20         128.70
     TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
     RUNOFF COEFFICIENT   =        .99          .51            .61


      (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (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  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.10         2.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.86         2.86
     Length            (m)=     185.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.48 (ii)   12.19 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .26          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .15          .47           .626 (iii)
     TIME TO PEAK    (hrs)=       9.92        10.00          10.00
     RUNOFF VOLUME    (mm)=     209.57       107.20         128.70
     TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
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     RUNOFF COEFFICIENT   =        .99          .51            .61

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98         11.02
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     365.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       5.82 (ii)    15.52 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .20           .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .59          1.75          2.340 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00          10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20         128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07         211.07
     RUNOFF COEFFICIENT   =        .99           .51            .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85          9.47
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     309.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       5.27 (ii)    14.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .21           .08
                                                          *TOTALS*
```

```
PEAK FLOW        (cms)=        .50         1.52          2.027 (iii)
TIME TO PEAK     (hrs)=      10.00        10.00          10.00
RUNOFF VOLUME     (mm)=     209.57       107.20         128.70
TOTAL RAINFALL    (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .51            .61


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=          6.01          8.31
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          2.00          2.00
Length            (m)=        287.00         40.00
Mannings n           =          .013          .300

Max.Eff.Inten.(mm/hr)=         52.83         59.46
           over (min)           5.00         15.00
Storage Coeff.  (min)=          5.04 (ii)    14.74 (ii)
Unit Hyd. Tpeak (min)=          5.00         15.00
Unit Hyd. peak  (cms)=           .21           .08
                                                        *TOTALS*
PEAK FLOW        (cms)=          .44          1.34        1.780 (iii)
TIME TO PEAK     (hrs)=        10.00         10.00        10.00
RUNOFF VOLUME     (mm)=       209.57        107.20       128.70
TOTAL RAINFALL    (mm)=       211.07        211.07       211.07
RUNOFF COEFFICIENT   =          .99           .51          .61


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=         21.55         29.77
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          2.00          2.00
Length            (m)=        550.00         40.00
Mannings n           =          .013          .300

Max.Eff.Inten.(mm/hr)=         52.83         59.46
           over (min)           5.00         20.00
Storage Coeff.  (min)=          7.45 (ii)    17.14 (ii)
```

```
Unit Hyd. Tpeak (min)=       5.00        20.00
Unit Hyd. peak  (cms)=        .17          .06
                                                        *TOTALS*
PEAK FLOW       (cms)=       1.58         4.68          6.260 (iii)
TIME TO PEAK    (hrs)=      10.00        10.00          10.00
RUNOFF VOLUME    (mm)=     209.57       107.20         128.70
TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .51            .61

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=        49.35         68.15
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=         2.00          2.00
Length            (m)=       885.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         59.46
            over (min)        10.00         20.00
Storage Coeff.  (min)=         9.91 (ii)    19.60 (ii)
Unit Hyd. Tpeak (min)=        10.00         20.00
Unit Hyd. peak  (cms)=          .11           .06
                                                        *TOTALS*
PEAK FLOW       (cms)=         3.61         10.49         14.089 (iii)
TIME TO PEAK    (hrs)=        10.00         10.08          10.00
RUNOFF VOLUME    (mm)=       209.57        107.20         128.70
TOTAL RAINFALL   (mm)=       211.07        211.07         211.07
RUNOFF COEFFICIENT   =          .99           .51            .61

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=         5.17          7.13
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=         1.60          1.60
Length            (m)=       286.00         40.00
Mannings n           =         .013          .300
```

```
Max.Eff.Inten.(mm/hr)=      52.83        59.46
           over (min)        5.00        20.00
Storage Coeff.  (min)=       5.38 (ii)   15.74 (ii)
Unit Hyd. Tpeak (min)=       5.00        20.00
Unit Hyd. peak  (cms)=        .21          .07
                                                        *TOTALS*
PEAK FLOW       (cms)=        .38         1.13          1.513 (iii)
TIME TO PEAK    (hrs)=      10.00        10.00          10.00
RUNOFF VOLUME    (mm)=     209.57       107.20         128.70
TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .51            .61

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=          6.85          9.45
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          1.00          1.00
Length            (m)=        330.00         40.00
Mannings n           =          .013          .300

Max.Eff.Inten.(mm/hr)=      52.83        59.46
           over (min)        5.00        20.00
Storage Coeff.  (min)=       6.75 (ii)   18.68 (ii)
Unit Hyd. Tpeak (min)=       5.00        20.00
Unit Hyd. peak  (cms)=        .18          .06
                                                        *TOTALS*
PEAK FLOW       (cms)=        .50         1.47          1.968 (iii)
TIME TO PEAK    (hrs)=      10.00        10.00          10.00
RUNOFF VOLUME    (mm)=     209.57       107.20         128.70
TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .51            .61

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=         11.10         18.90
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          2.00          2.00
```

```
                        Hadati Creek Watershed - Allowable
     Length              (m)=     447.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        55.42
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.58 (ii)   16.55 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .18          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .84         2.78         3.618 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00         10.00
     RUNOFF VOLUME    (mm)=     209.57       101.80        122.28
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .48           .58

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0395) |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.12        46.08
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     900.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        43.26
                over (min)       10.00        25.00
     Storage Coeff.  (min)=      10.01 (ii)   21.02 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .11          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .37         5.03         5.388 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.08         10.08
     RUNOFF VOLUME    (mm)=     209.57        81.91         88.29
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .39           .42

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
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| STANDHYD  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.33          7.37
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       1.71          1.71
     Length            (m)=     300.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       5.43 (ii)    15.59 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .20           .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .39          1.17          1.564 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00          10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20         128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07         211.07
     RUNOFF COEFFICIENT   =        .99           .51            .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.12         20.88
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.03          2.03
     Length            (m)=     465.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       6.71 (ii)    16.36 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .18           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.11          3.30          4.413 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00          10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20         128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07         211.07
     RUNOFF COEFFICIENT   =        .99           .51            .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0480) |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10        25.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)      10.00        20.00
     Storage Coeff.  (min)=       8.46 (ii)   18.15 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.33         3.90         5.222 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00         10.00
     RUNOFF VOLUME    (mm)=     209.57       107.20        128.70
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .51           .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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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--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |       AREA     QPEAK     TPEAK     R.V.
--------------------       (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1): 244.00     27.11     10.08  134.22
     ==================================================
     MAJOR SYS.(ID= 2):  78.53     18.11     10.08  134.22
     MINOR SYS.(ID= 3): 165.47      9.00      6.75  134.22

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0566) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0484):    12.60   1.527    10.00   128.70
        + ID2= 2 (0565):    11.10   1.345    10.00   128.70
          ==================================================
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          ID = 3 (0566):    23.70   2.872    10.00   128.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0410):    24.20   2.975    10.00   128.70
        + ID2= 2 (0415):     4.99    .626    10.00   128.70
          ===================================================
          ID = 3 (0420):    29.19   3.602    10.00   128.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   1.0000      1.0000
                           .0100      .0100    |  20.0000      1.1000
                           .0120      .1000    |    .0000       .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)     19.000      2.340       10.00      128.70
     OUTFLOW: ID= 1 (0111)     19.000      2.069       10.50      128.68

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 88.39
                   TIME SHIFT OF PEAK FLOW         (min)= 30.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  1.0100

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--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0101):    16.32   2.027    10.00   128.70
        + ID2= 2 (0102):    14.32   1.780    10.00   128.70
          ===================================================
          ID = 3 (0103):    30.64   3.807    10.00   128.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .5000       .4000
                           .0100      .0100    |   6.6000       .8000
                           .0260      .2300    |    .0000       .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0105)     51.320      6.260       10.00      128.70
     OUTFLOW: ID= 1 (0106)     51.320      5.997       10.08      128.69
```

```
PEAK   FLOW   REDUCTION [Qout/Qin](%)= 95.79
TIME SHIFT OF PEAK FLOW         (min)=  5.00
MAXIMUM  STORAGE   USED       (ha.m.)=   .7608
```

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--------------------
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00           .26         .0300
                   5.50           .15     .0300 / .0150  Main Channel
                   5.51           .00         .0150      Main Channel
                  10.00           .09         .0150      Main Channel
                  14.49           .00         .0150      Main Channel
                  14.50           .15     .0150 / .0300  Main Channel
                  20.00           .26         .0300
```

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	1.51	10.00	128.70	.18	1.18
OUTFLOW: ID= 1 (0358)	12.30	1.44	10.08	128.64	.18	1.17

```
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0353) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00           .26         .0300
                   5.50           .15     .0300 / .0150  Main Channel
                   5.51           .00         .0150      Main Channel
                  10.00           .09         .0150      Main Channel
                  14.49           .00         .0150      Main Channel
                  14.50           .15     .0150 / .0300  Main Channel
```

20.00	.26	.0300

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	1.97	10.00	128.70	.20	1.25
OUTFLOW: ID= 1 (0353)	16.30	1.87	10.08	128.66	.20	1.24

ROUTE CHN (0362)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05

.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	3.62	10.00	122.28	.27	1.53
OUTFLOW: ID= 1 (0362)	30.00	3.50	10.08	122.26	.27	1.52

```
--------------------
| ADD HYD   (0465) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0455):	12.70	1.564	10.00	128.70
+ ID2= 2 (0460):	36.00	4.413	10.00	128.70
ID = 3 (0465):	48.70	5.977	10.00	128.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0510):	16.00	2.134	10.00	182.64
+ ID2= 2 (0505):	165.47	9.000	6.75	134.22
ID = 3 (0515):	181.47	11.134	10.00	138.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
.00	101.50	.0500	
1.00	100.70	.0500	
1.50	100.55	.0500 / .0300	Main Channel
2.00	99.50	.0300	Main Channel
3.50	99.60	.0300	Main Channel
4.50	100.65	.0300 / .0500	Main Channel
6.00	101.45	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.10	99.60	.353E+02	.0	.19	43.69
.19	99.69	.112E+03	.1	.37	22.76
.29	99.79	.195E+03	.2	.49	17.03
.38	99.88	.285E+03	.3	.59	14.23
.48	99.98	.381E+03	.5	.67	12.51

.57	100.07	.484E+03	.7	.74	11.32
.67	100.17	.594E+03	.9	.80	10.43
.76	100.26	.710E+03	1.2	.86	9.74
.86	100.36	.832E+03	1.5	.91	9.18
.95	100.45	.961E+03	1.8	.96	8.72
1.05	100.55	.110E+04	2.2	1.00	8.32
1.16	100.66	.127E+04	2.7	1.07	7.80
1.28	100.78	.148E+04	3.4	1.14	7.31
1.39	100.89	.170E+04	4.1	1.20	6.94
1.50	101.00	.195E+04	4.9	1.25	6.65
1.61	101.11	.221E+04	5.8	1.30	6.41
1.72	101.22	.250E+04	6.7	1.34	6.22
1.84	101.34	.280E+04	7.7	1.38	6.04
1.95	101.45	.313E+04	8.8	1.41	5.90

**** WARNING: TRAVEL TIME TABLE EXCEEDED

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0505)	78.53	18.11	10.08	134.22	1.92	1.40
OUTFLOW: ID= 1 (0564)	78.53	17.83	10.25	134.22	1.95	1.41

ROUTE CHN (0563)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

<------ DATA FOR SECTION (2.2) ------>

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.573E+01	.0	.67	2.23
.11	.11	.135E+02	.1	.99	1.51
.16	.16	.232E+02	.3	1.23	1.22
.21	.21	.349E+02	.5	1.42	1.06
.26	.26	.486E+02	.9	1.58	.95
.32	.32	.643E+02	1.2	1.73	.87
.37	.37	.820E+02	1.7	1.86	.81
.42	.42	.102E+03	2.2	1.98	.76
.47	.47	.123E+03	2.9	2.10	.71
.53	.53	.147E+03	3.6	2.21	.68
.58	.58	.173E+03	4.4	2.31	.65
.63	.63	.200E+03	5.4	2.42	.62
.68	.68	.230E+03	6.4	2.51	.60
.74	.74	.262E+03	7.6	2.61	.58
.79	.79	.295E+03	8.9	2.70	.56
.84	.84	.331E+03	10.3	2.79	.54
.89	.89	.369E+03	11.8	2.88	.52
.95	.95	.408E+03	13.5	2.97	.51
1.00	1.00	.450E+03	15.2	3.05	.49

	<---- hydrograph ---->				<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL

Hadati Creek Watershed - Allowable

	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0566)	23.70	2.87	10.00	128.70	.47	2.10
OUTFLOW: ID= 1 (0563)	23.70	2.87	10.00	128.70	.47	2.10

```
--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	29.19	3.60	10.00	128.70
MAJOR SYS.(ID= 2):	4.95	1.62	10.00	128.70
MINOR SYS.(ID= 3):	24.24	1.98	9.33	128.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.0000	.5000
.0100	.0100	10.0000	.6000
.0150	.1332	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0103)	30.640	3.807	10.00	128.70
OUTFLOW: ID= 1 (0104)	30.640	3.797	10.00	128.69

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.73
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)= .5312

```
--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0358):	12.30	1.436	10.08	128.64
+ ID2= 2 (0353):	16.30	1.875	10.08	128.66
ID = 3 (0359):	28.60	3.311	10.08	128.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0363) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0359):	28.60	3.311	10.08	128.65
+ ID2= 2 (0362):	30.00	3.504	10.08	122.26
ID = 3 (0363):	58.60	6.814	10.08	125.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0465):    48.70   5.977    10.00   128.70
        + ID2= 2 (0425):     4.95   1.622    10.00   128.70
          ==================================================
          ID = 3 (0470):    53.65   7.598    10.00   128.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 181.47     11.13     10.00  138.49
     ====================================================
     MAJOR SYS.(ID= 2):  98.04      8.08     10.00  138.49
     MINOR SYS.(ID= 3):  83.43      3.05      4.25  138.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0561) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00          1.00         .0350
                   2.00           .50         .0350
                   4.00           .00     .0350 / .0350  Main Channel
                   4.50           .00         .0350      Main Channel
                   5.00           .00     .0350 / .0350  Main Channel
                   7.00           .50         .0350
                   9.00          1.00         .0350

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .05      .05    .319E+01        .1           .87        .95
        .11      .11    .748E+01        .2          1.26        .66
        .16      .16    .129E+02        .4          1.54        .54
        .21      .21    .194E+02        .7          1.75        .48
        .26      .26    .270E+02       1.0          1.93        .43
        .32      .32    .357E+02       1.5          2.08        .40
        .37      .37    .456E+02       2.0          2.22        .38
        .42      .42    .565E+02       2.6          2.34        .36
        .47      .47    .686E+02       3.4          2.46        .34
        .53      .53    .817E+02       4.2          2.57        .32
        .58      .58    .960E+02       5.1          2.68        .31
        .63      .63    .111E+03       6.2          2.78        .30
        .68      .68    .128E+03       7.3          2.87        .29
        .74      .74    .145E+03       8.6          2.97        .28
        .79      .79    .164E+03      10.0          3.06        .27
        .84      .84    .184E+03      11.6          3.14        .27
        .89      .89    .205E+03      13.2          3.23        .26
```

.95	.95	.227E+03	15.0	3.31	.25
1.00	1.00	.250E+03	17.0	3.40	.25

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->			<-pipe / channel->	
INFLOW : ID= 2 (0563)	23.70	2.87	10.00	128.70	.44	2.38
OUTFLOW: ID= 1 (0561)	23.70	2.87	10.00	128.70	.44	2.38

```
--------------------
| ADD HYD   (0114) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0111):	19.00	2.069	10.50	128.68
+ ID2= 2 (0104):	30.64	3.797	10.00	128.69
ID = 3 (0114):	49.64	4.896	10.50	128.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0365):	117.50	14.089	10.00	128.70
+ ID2= 2 (0363):	58.60	6.814	10.08	125.38
ID = 3 (0380):	176.10	20.834	10.00	127.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02

1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29
2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0470)	53.65	7.60	10.00	128.70	.58	1.33
OUTFLOW: ID= 1 (0475)	53.65	7.51	10.00	128.70	.58	1.33

```
--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0520):    98.04    8.084    10.00   138.49
        + ID2= 2 (0525):      .00     .001      .00  *******
          ==================================================
          ID = 3 (0526):    98.04    8.084    10.00   138.49

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

```
--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0561):    23.70    2.867    10.00   128.70
        + ID2= 2 (0481):     5.90     .715    10.00   128.70
          ==================================================
          ID = 3 (0492):    29.60    3.582    10.00   128.70

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

```
--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0114):    49.64    4.896    10.50   128.69
        + ID2= 2 (0106):    51.32    5.997    10.08   128.69
          ==================================================
          ID = 3 (0115):   100.96   10.540    10.08   128.69

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

```
--------------------
| RESERVOIR (0390) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW     STORAGE    |  OUTFLOW     STORAGE
```

```
                          Hadati Creek Watershed - Allowable
--------------------       (cms)      (ha.m.)    |   (cms)      (ha.m.)
                           .0000       .0000     |   1.3100      1.6000
                           .7700       .2870     |   1.8600     23.2300
                          1.2600       .9680     |    .0000       .0000

                                    AREA      QPEAK       TPEAK       R.V.
                                    (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0380)     176.100     20.834       10.00      127.59
     OUTFLOW: ID= 1 (0390)     176.100      1.714       12.33      127.59

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.23
                    TIME SHIFT OF PEAK FLOW         (min)=140.00
                    MAXIMUM  STORAGE   USED       (ha.m.)= 17.4981

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        313.20         .0500
                 140.00        312.40     .0500 / .0300  Main Channel
                 140.50        310.80         .0300      Main Channel
                 141.50        310.80         .0300      Main Channel
                 142.00        312.40     .0300 / .0500  Main Channel
                 160.00        313.20         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)       (cms)        (m/s)      (min)
        .12    310.92    .575E+02        .1           .40       18.86
        .25    311.05    .119E+03        .2           .57       13.13
        .37    311.17    .185E+03        .3           .69       10.87
        .49    311.29    .256E+03        .4           .78        9.61
        .62    311.42    .330E+03        .6           .86        8.77
        .74    311.54    .409E+03        .8           .92        8.17
        .86    311.66    .492E+03       1.1           .97        7.70
        .98    311.78    .579E+03       1.3          1.02        7.32
       1.11    311.91    .671E+03       1.6          1.07        7.01
       1.23    312.03    .767E+03       1.9          1.11        6.74
       1.35    312.15    .867E+03       2.2          1.15        6.50
       1.48    312.28    .971E+03       2.6          1.19        6.29
       1.60    312.40    .108E+04       2.9          1.23        6.11
       1.73    312.53    .149E+04       3.6          1.10        6.85
       1.87    312.67    .248E+04       4.9           .88        8.52
       2.00    312.80    .405E+04       6.9           .77        9.74
       2.13    312.93    .620E+04      10.1           .73       10.21
       2.27    313.07    .893E+04      14.6           .74       10.17
       2.40    313.20    .122E+05      20.7           .76        9.85

                                   <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
     INFLOW : ID= 2 (0526)   98.04    8.08   10.00 138.49     2.05       .76
     OUTFLOW: ID= 1 (0527)   98.04    7.97   10.08 138.49     2.04       .76

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
```

Hadati Creek Watershed - Allowable

(cms)	(ha.m.)	(cms)	(ha.m.)
.0000	.0000	.2910	.3795
.2590	.0579	.2970	.4503
.2660	.1180	1.6320	.5232
.2720	.1802	4.1680	.5983
.2790	.2445	7.5660	.6756
.2850	.3109	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0492)	29.600	3.582	10.00	128.70
OUTFLOW: ID= 1 (0482)	29.600	3.550	10.08	128.69

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.13
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= .5800

ADD HYD (0400)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0390):	176.10	1.714	12.33	127.59
+ ID2= 2 (0395):	51.20	5.388	10.08	88.29
ID = 3 (0400):	227.30	6.909	10.08	118.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0403)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13

2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0400)	227.30	6.91	10.08	118.74	.46	1.36
OUTFLOW: ID= 1 (0403)	227.30	6.38	10.33	118.74	.44	1.30

```
--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0115):	100.96	10.540	10.08	128.69
+ ID2= 2 (0403):	227.30	6.377	10.33	118.74
ID = 3 (0407):	328.26	16.526	10.17	121.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.6000	6.4000
1.1000	2.9000	9.1000	10.0000
1.3000	4.3000	12.0000	20.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0407)	328.260	16.526	10.17	121.80
OUTFLOW: ID= 1 (0113)	328.260	9.456	11.50	121.80

PEAK FLOW REDUCTION [Qout/Qin](%)= 57.22
TIME SHIFT OF PEAK FLOW (min)= 80.00
MAXIMUM STORAGE USED (ha.m.)= 11.2348

```
--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0425):	24.24	1.980	9.33	128.70
+ ID2= 2 (0113):	328.26	9.456	11.50	121.80
ID = 3 (0430):	352.50	11.349	11.08	122.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |
--------------------
```

Routing time step (min)'= 5.00

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

Hadati Creek Watershed - Allowable

Distance	Elevation	Manning	
100.00	325.40	.0600	
120.00	324.60	.0600	
126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0430)	352.50	11.35	11.08	122.27	.72	1.73
OUTFLOW:	ID= 1 (0440)	352.50	11.32	11.08	122.27	.71	1.73

ADD HYD (0485)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0440):	352.50	11.321	11.08	122.27
	+ ID2= 2 (0475):	53.65	7.511	10.00	128.70
	ID = 3 (0485):	406.15	16.120	10.75	123.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0490)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0485):	406.15	16.120	10.75	123.12
	+ ID2= 2 (0480):	43.10	5.222	10.00	128.70

```
          ID = 3 (0490):   449.25  19.973    10.67   123.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0491) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0482):    29.60   3.550    10.08   128.69
        + ID2= 2 (0490):   449.25  19.973    10.67   123.66
          ==================================================
          ID = 3 (0491):   478.85  23.211    10.17   123.97

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   7.0800      2.4860
                            .2760      .0600    |   8.1000      3.3240
                           1.2000      .3400    |   9.7980      4.6420
                           2.0400      .6182    |  10.4940      7.4397
                           2.6400     1.1630    |  11.6850     10.3000
                           3.1200     1.7070    |  12.3480     11.4000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)    478.850     23.211       10.17      123.97
     OUTFLOW: ID= 1 (0483)    478.850     11.874       12.08      123.97

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 51.15
                    TIME SHIFT OF PEAK FLOW         (min)=115.00
                    MAXIMUM  STORAGE   USED       (ha.m.)= 10.6135

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

--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0540):     4.63     .636    10.00   182.64
        + ID2= 2 (0483):   478.85  11.874    12.08   123.97
          ==================================================
          ID = 3 (0530):   483.48  12.008    12.00   124.53

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0527):    98.04   7.968    10.08   138.49
        + ID2= 2 (0530):   483.48  12.008    12.00   124.53
          ==================================================
          ID = 3 (0545):   581.52  19.161    11.00   126.88
```

Hadati Creek Watershed - Allowable

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

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--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0542):    25.25    3.443    10.00   182.64
        + ID2= 2 (0545):   581.52   19.161    11.00   126.88
          ====================================================
          ID = 3 (0546):   606.77   21.671    10.08   129.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0543):    14.99    2.054    10.00   182.64
        + ID2= 2 (0546):   606.77   21.671    10.08   129.20
          ====================================================
          ID = 3 (0547):   621.76   23.685    10.00   130.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0544):     1.13     .156    10.00   182.64
        + ID2= 2 (0547):   621.76   23.685    10.00   130.49
          ====================================================
          ID = 3 (0548):   622.89   23.841    10.00   130.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH
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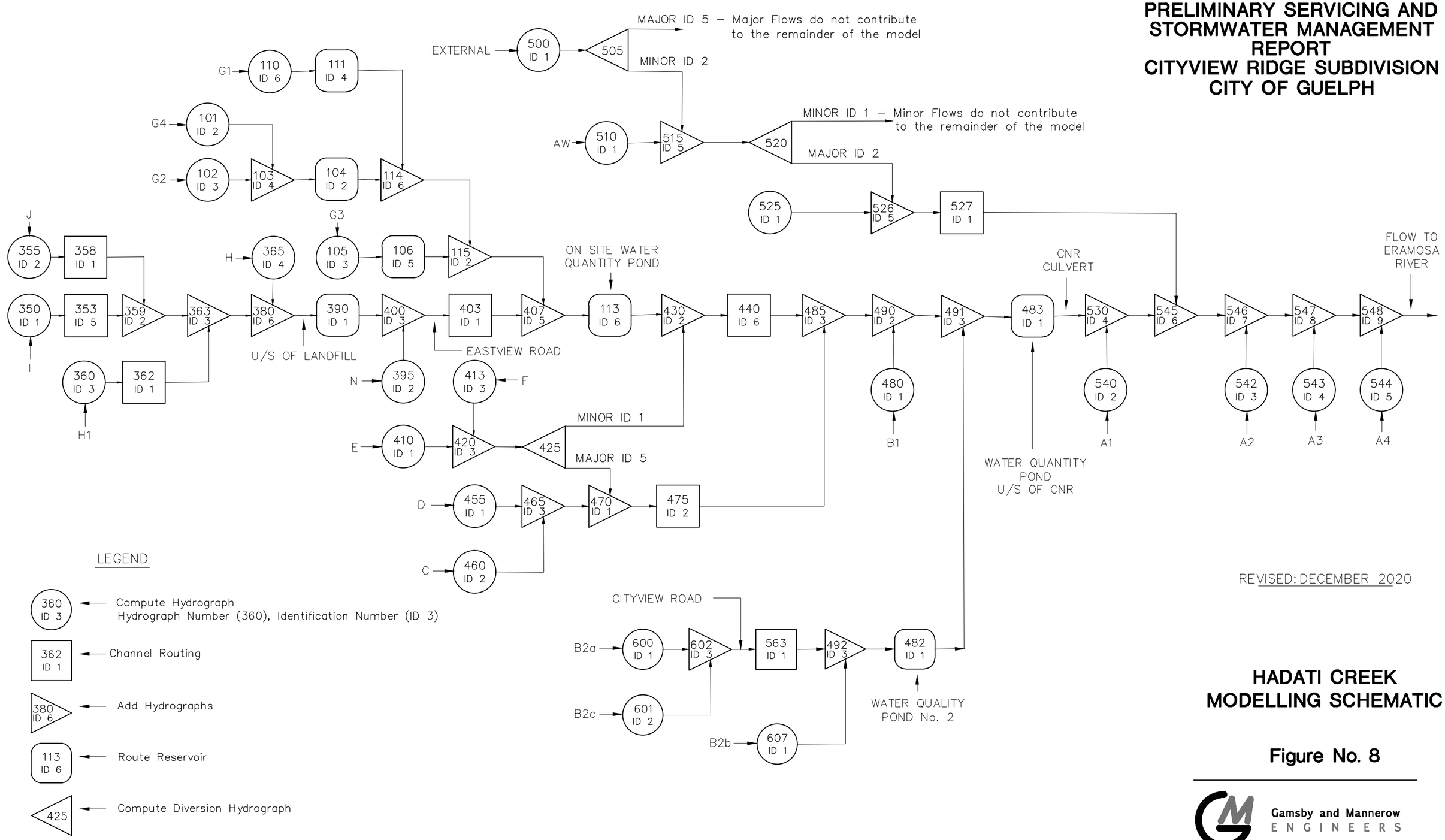
PRELIMINARY SERVICING AND STORMWATER MANAGEMENT REPORT
CITYVIEW RIDGE SUBDIVISION
CITY OF GUELPH



REVISED: DECEMBER 2020

HADATI CREEK MODELLING SCHEMATIC

Figure No. 8

Gamsby and Mannerow ENGINEERS

Gamsby and Mannerow Limited OCT 23 2003 03027002.DWG

Plotted On: December 10, 2020 105172-FIG8.dwg

Hadati Creek Watershed - Post Development with Cityview Ridge

```
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  LLLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O

 OOO     T      T    H   H    Y    M   M   OOO
```


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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.2\voin.dat

Output filename: Y:\SPrimmer\OTTHYMO\Cityview Ridge\Hadati Creek Watershed - Post Development with Cityview Ridge.out
Summary filename: Y:\SPrimmer\OTTHYMO\Cityview Ridge\Hadati Creek Watershed - Post Development with Cityview Ridge.sum

DATE: 3/30/2015 TIME: 3:05:13 PM

USER:

COMMENTS: _____

```
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************
```

```
--------------------
|    READ STORM    |    Filename: Y:\SPrimmer\OTTHYMO\Ci
|                  |              tyview Ridge\25mm4hr.stm
| Ptotal= 25.00 mm |    Comments: 25 mm - 4 hour - 10 Minute Time Step
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	.53	1.17	17.57	2.17	2.95	3.17	.76
.33	.71	1.33	61.55	2.33	2.19	3.33	.65
.50	.99	1.50	24.02	2.50	1.69	3.50	.57
.67	1.51	1.67	11.16	2.67	1.34	3.67	.49
.83	2.57	1.83	6.44	2.83	1.09	3.83	.44
1.00	5.31	2.00	4.20	3.00	.90	4.00	.38

Hadati Creek Watershed - Post Development with Cityview Ridge

```
--------------------
| CALIB            |
| STANDHYD  (0480) |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10        25.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n           =       .013         .300

         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
                .083     .53 | 1.083   17.57 | 2.083    2.95 | 3.08     .76
                .167     .53 | 1.167   17.57 | 2.167    2.95 | 3.17     .76
                .250     .71 | 1.250   61.55 | 2.250    2.19 | 3.25     .65
                .333     .71 | 1.333   61.55 | 2.333    2.19 | 3.33     .65
                .417     .99 | 1.417   24.02 | 2.417    1.69 | 3.42     .57
                .500     .99 | 1.500   24.02 | 2.500    1.69 | 3.50     .57
                .583    1.51 | 1.583   11.16 | 2.583    1.34 | 3.58     .49
                .667    1.51 | 1.667   11.16 | 2.667    1.34 | 3.67     .49
                .750    2.57 | 1.750    6.44 | 2.750    1.09 | 3.75     .44
                .833    2.57 | 1.833    6.44 | 2.833    1.09 | 3.83     .44
                .917    5.31 | 1.917    4.20 | 2.917     .90 | 3.92     .38
               1.000    5.31 | 2.000    4.20 | 3.000     .90 | 4.00     .38

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)       10.00        35.00
     Storage Coeff.  (min)=      7.96 (ii)    30.70 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .13          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.09          .23        1.142 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.83         1.42
     RUNOFF VOLUME    (mm)=      23.50         2.16         6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .09          .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.10         2.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.86         2.86
     Length            (m)=     185.00        40.00
```

```
     Mannings n           =       .013          .300

     Max.Eff.Inten.(mm/hr)=      61.55          8.82
                over (min)        5.00         25.00
     Storage Coeff.  (min)=       3.27 (ii)    21.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00         25.00
     Unit Hyd. peak  (cms)=        .27           .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .17           .04          .179 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.67          1.33
     RUNOFF VOLUME    (mm)=      23.50          2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00         25.00         25.00
     RUNOFF COEFFICIENT   =        .94           .09           .27

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16         14.04
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     401.00         40.00
     Mannings n           =       .013          .300

     Max.Eff.Inten.(mm/hr)=      61.55          7.05
                over (min)        5.00         30.00
     Storage Coeff.  (min)=       5.80 (ii)    28.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00         30.00
     Unit Hyd. peak  (cms)=        .20           .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .75           .14          .770 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50          2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00         25.00         25.00
     RUNOFF COEFFICIENT   =        .94           .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
```

Hadati Creek Watershed - Post Development with Cityview Ridge

Surface Area	(ha)=	15.12	20.88	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	2.03	2.03	
Length	(m)=	465.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.	(mm/hr)=	61.55	7.05	
over	(min)	5.00	30.00	
Storage Coeff.	(min)=	6.31 (ii)	28.95 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	30.00	
Unit Hyd. peak	(cms)=	.19	.04	
				TOTALS
PEAK FLOW	(cms)=	1.09	.21	1.117 (iii)
TIME TO PEAK	(hrs)=	1.33	1.75	1.33
RUNOFF VOLUME	(mm)=	23.50	2.16	6.64
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.94	.09	.27

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB              |
| STANDHYD  (0455)   |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
```

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	5.33	7.37	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	1.71	1.71	
Length	(m)=	300.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.	(mm/hr)=	61.55	7.05	
over	(min)	5.00	30.00	
Storage Coeff.	(min)=	5.11 (ii)	28.94 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	30.00	
Unit Hyd. peak	(cms)=	.21	.04	
				TOTALS
PEAK FLOW	(cms)=	.41	.07	.417 (iii)
TIME TO PEAK	(hrs)=	1.33	1.75	1.33
RUNOFF VOLUME	(mm)=	23.50	2.16	6.64
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.94	.09	.27

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB              |
| STANDHYD  (0395)   |   Area    (ha)=  51.20
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          Hadati Creek Watershed - Post Development with Cityview Ridge
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.12        46.08
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     900.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55          .00
                over (min)       10.00       230.00
     Storage Coeff.  (min)=       9.42 (ii)  225.31 (ii)
     Unit Hyd. Tpeak (min)=      10.00       230.00
     Unit Hyd. peak  (cms)=        .12          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .29          .00          .292 (iii)
     TIME TO PEAK    (hrs)=       1.42          .00         1.42
     RUNOFF VOLUME    (mm)=      23.50          .00         1.17
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .00          .05

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         2.81
                over (min)        5.00        40.00
     Storage Coeff.  (min)=       6.19 (ii)   39.07 (ii)
     Unit Hyd. Tpeak (min)=       5.00        40.00
     Unit Hyd. peak  (cms)=        .19          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .83          .08          .834 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.92         1.33
     RUNOFF VOLUME    (mm)=      23.50         1.27         5.50
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .05          .22

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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          Hadati Creek Watershed - Post Development with Cityview Ridge
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         5.04
                over (min)        5.00        40.00
     Storage Coeff.  (min)=       6.35 (ii)   38.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        40.00
     Unit Hyd. peak  (cms)=        .19          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .49          .07          .499 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.92          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.17         7.13
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.60         1.60
     Length            (m)=     286.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       5.06 (ii)   29.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .21          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .40          .07          .405 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27
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          Hadati Creek Watershed - Post Development with Cityview Ridge
       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      49.35        68.15
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     885.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)       10.00        35.00
     Storage Coeff.  (min)=       9.32 (ii)   32.06 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .12          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.82          .62         2.960 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.83          1.42
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.55        29.77
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     550.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       7.01 (ii)   29.75 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .17          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.50          .30         1.538 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
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RUNOFF COEFFICIENT   =        .94          .09            .27


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01         8.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     287.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       4.74 (ii)   27.48 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .22          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .47          .09          .479 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27

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

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       4.96 (ii)   27.70 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .22          .04
                                                          *TOTALS*
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```
     PEAK FLOW       (cms)=        .53          .10          .540 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98        11.02
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     365.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       5.48 (ii)   28.22 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .20          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .60          .11          .614 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0600) |   Area    (ha)=  11.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.78         6.60
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)       10.00        35.00
```

```
Storage Coeff.  (min)=       7.96 (ii)   30.70 (ii)
Unit Hyd. Tpeak (min)=      10.00        35.00
Unit Hyd. peak  (cms)=        .13          .04
                                                      *TOTALS*
PEAK FLOW       (cms)=        .29          .06          .301 (iii)
TIME TO PEAK    (hrs)=       1.42         1.83          1.42
RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
RUNOFF COEFFICIENT   =        .94          .09           .27


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0601) |   Area    (ha)=   7.62
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  21.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       3.51          4.11
Dep. Storage     (mm)=       1.50          5.00
Average Slope     (%)=       2.00          2.00
Length            (m)=     680.00         40.00
Mannings n           =       .013          .300

Max.Eff.Inten.(mm/hr)=      61.55         13.97
           over (min)       10.00         30.00
Storage Coeff.  (min)=       7.96 (ii)   25.26 (ii)
Unit Hyd. Tpeak (min)=      10.00         30.00
Unit Hyd. peak  (cms)=        .13          .04
                                                      *TOTALS*
PEAK FLOW       (cms)=        .19          .07          .212 (iii)
TIME TO PEAK    (hrs)=       1.42         1.75          1.42
RUNOFF VOLUME    (mm)=      23.50         3.18          7.45
TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
RUNOFF COEFFICIENT   =        .94          .13           .30


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0607) |   Area    (ha)=   5.97
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=   2.50
--------------------
                             IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       2.51          3.46
Dep. Storage     (mm)=       1.50          5.00
Average Slope     (%)=       2.00          2.00
Length            (m)=     680.00         40.00
Mannings n           =       .013          .300
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```
     Max.Eff.Inten.(mm/hr)=      61.55        33.18
                over (min)       10.00        25.00
     Storage Coeff.  (min)=       7.96 (ii)   20.20 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .13          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .02          .13          .141 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.67         1.67
     RUNOFF VOLUME    (mm)=      23.50         4.97         5.44
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .20          .22

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70          .93
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     150.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55          .00
                over (min)        5.00       325.00
     Storage Coeff.  (min)=       4.73 (ii)  322.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00       325.00
     Unit Hyd. peak  (cms)=        .22          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .57          .00          .569 (iii)
     TIME TO PEAK    (hrs)=       1.33          .00         1.33
     RUNOFF VOLUME    (mm)=      23.50          .00        18.56
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .00          .74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
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--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      112.24       131.76
     Dep. Storage      (mm)=        1.50         5.00
     Average Slope      (%)=         .80          .80
     Length             (m)=     1275.00        40.00
     Mannings n            =        .013         .300

     Max.Eff.Inten.(mm/hr)=       42.79         5.28
                over (min)        20.00        55.00
     Storage Coeff.  (min)=       17.67 (ii)   51.28 (ii)
     Unit Hyd. Tpeak (min)=       20.00        55.00
     Unit Hyd. peak  (cms)=         .06          .02
                                                          *TOTALS*
     PEAK FLOW       (cms)=        5.07          .82        5.342 (iii)
     TIME TO PEAK    (hrs)=        1.58         2.17         1.58
     RUNOFF VOLUME    (mm)=       23.50         2.25         7.77
     TOTAL RAINFALL   (mm)=       25.00        25.00        25.00
     RUNOFF COEFFICIENT   =         .94          .09          .31


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0510) |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       12.80         3.20
     Dep. Storage      (mm)=        1.50         5.00
     Average Slope      (%)=         .50          .20
     Length             (m)=      400.00        40.00
     Mannings n            =        .013         .300

     Max.Eff.Inten.(mm/hr)=       61.55          .00
                over (min)        10.00       440.00
     Storage Coeff.  (min)=        8.77 (ii)  439.54 (ii)
     Unit Hyd. Tpeak (min)=       10.00       440.00
     Unit Hyd. peak  (cms)=         .12          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        1.48          .00        1.475 (iii)
     TIME TO PEAK    (hrs)=        1.42          .00         1.42
     RUNOFF VOLUME    (mm)=       23.50          .00        18.56
     TOTAL RAINFALL   (mm)=       25.00        25.00        25.00
     RUNOFF COEFFICIENT   =         .94          .00          .74

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       20.20         5.05
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=         .55          .55
     Length            (m)=      350.00        40.00
     Mannings n          =        .013         .300

     Max.Eff.Inten.(mm/hr)=       61.55          .00
                over (min)       10.00       330.00
     Storage Coeff.  (min)=        7.87 (ii)  325.88 (ii)
     Unit Hyd. Tpeak (min)=       10.00       330.00
     Unit Hyd. peak  (cms)=         .13          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        2.41          .00        2.408 (iii)
     TIME TO PEAK    (hrs)=        1.42          .00         1.42
     RUNOFF VOLUME    (mm)=       23.50          .00        18.56
     TOTAL RAINFALL   (mm)=       25.00        25.00        25.00
     RUNOFF COEFFICIENT   =         .94          .00          .74

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       11.99         3.00
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=         .55          .55
     Length            (m)=      200.00        40.00
     Mannings n          =        .013         .300

     Max.Eff.Inten.(mm/hr)=       61.55          .00
                over (min)        5.00       325.00
     Storage Coeff.  (min)=        5.63 (ii)  323.64 (ii)
     Unit Hyd. Tpeak (min)=        5.00       325.00
     Unit Hyd. peak  (cms)=         .20          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        1.77          .00        1.767 (iii)
     TIME TO PEAK    (hrs)=        1.33          .00         1.33
     RUNOFF VOLUME    (mm)=       23.50          .00        18.56
     TOTAL RAINFALL   (mm)=       25.00        25.00        25.00
     RUNOFF COEFFICIENT   =         .94          .00          .74

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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          Hadati Creek Watershed - Post Development with Cityview Ridge
      (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  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .90          .23
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=      50.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55          .00
                over (min)        5.00       325.00
     Storage Coeff.  (min)=       2.45 (ii)  320.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00       325.00
     Unit Hyd. peak  (cms)=        .30          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .15          .00          .151 (iii)
     TIME TO PEAK    (hrs)=       1.33          .00          1.33
     RUNOFF VOLUME    (mm)=      23.50          .00         18.56
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .00           .74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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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--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0415):      4.99     .179     1.33     6.64
        + ID2= 2 (0410):     24.20     .770     1.33     6.64
          ==================================================
          ID = 3 (0420):     29.19     .948     1.33     6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0465) |
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Hadati Creek Watershed - Post Development with Cityview Ridge

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0460):	36.00	1.117	1.33	6.64
+ ID2= 2 (0455):	12.70	.417	1.33	6.64
ID = 3 (0465):	48.70	1.534	1.33	6.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0362)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	.83	1.33	5.50	.14	.96
OUTFLOW: ID= 1 (0362)	30.00	.41	1.50	5.48	.11	.71

ROUTE CHN (0353)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel

5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	.50	1.33	6.64	.12	.78
OUTFLOW: ID= 1 (0353)	16.30	.22	1.58	6.60	.09	.57

ROUTE CHN (0358)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72

.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	.40	1.33	6.64	.11	.72
OUTFLOW: ID= 1 (0358)	12.30	.15	1.58	6.59	.08	.52

RESERVOIR (0106)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.5000	.4000
	.0100	.0100	6.6000	.8000
	.0260	.2300	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0105)	51.320	1.538	1.33	6.64
OUTFLOW: ID= 1 (0106)	51.320	.155	2.42	6.63

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.08
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= .2763

ADD HYD (0103)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	14.32	.479	1.33	6.64
+ ID2= 2 (0101):	16.32	.540	1.33	6.64
ID = 3 (0103):	30.64	1.019	1.33	6.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0111)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	1.0000	1.0000
	.0100	.0100	20.0000	1.1000
	.0120	.1000	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0110)	19.000	.614	1.33	6.64

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OUTFLOW: ID= 1 (0111)     19.000       .024        2.92        6.63

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.93
                TIME SHIFT OF PEAK FLOW         (min)= 95.00
                MAXIMUM  STORAGE   USED       (ha.m.)=   .1111

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| ADD HYD   (0602) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0600):    11.38     .301     1.42     6.64
        + ID2= 2 (0601):     7.62     .212     1.42     7.45
          ====================================================
          ID = 3 (0602):    19.00     .514     1.42     6.96

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00      5.34      1.58    7.77
     ====================================================
     MAJOR SYS.(ID= 2):    .00       .00       .00     .00
     MINOR SYS.(ID= 3): 244.00      5.34      1.58    7.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0515) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0505):   244.00   5.342     1.58     7.77
        + ID2= 2 (0510):    16.00   1.475     1.42    18.56
          ====================================================
          ID = 3 (0515):   260.00   6.307     1.58     8.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  29.19       .95      1.33    6.64
     ====================================================
     MAJOR SYS.(ID= 2):    .00       .00       .00     .00
     MINOR SYS.(ID= 3):  29.19       .95      1.33    6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH 0425 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH 0470 = HYDROGRAPH 0465
*** W A R N I N G :  HYDROGRAPH 0470 = HYDROGRAPH 0465
          ID1= 1 (0425):      .00    .000      .00      .00
        + ID2= 2 (0465):    48.70   1.534     1.33     6.64
          ====================================================
          ID = 3 (0470):    48.70   1.534     1.33     6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0359) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0353):    16.30    .216     1.58     6.60
        + ID2= 2 (0358):    12.30    .153     1.58     6.59
          ====================================================
          ID = 3 (0359):    28.60    .369     1.58     6.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |   1.0000      .5000
                          .0100      .0100    |  10.0000      .6000
                          .0150      .1332    |    .0000      .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0103)     30.640      1.019        1.33        6.64
     OUTFLOW: ID= 1 (0104)     30.640       .097        2.33        6.63

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.52
                    TIME SHIFT OF PEAK FLOW         (min)= 60.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .1639

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| ADD HYD   (0114) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0104):    30.64    .097     2.33     6.63
        + ID2= 2 (0111):    19.00    .024     2.92     6.63
          ====================================================
          ID = 3 (0114):    49.64    .118     2.42     6.63

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0563) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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<------ DATA FOR SECTION (2.2) ------>

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.745E+01	.0	.64	3.06
.11	.11	.175E+02	.1	.96	2.03
.16	.16	.301E+02	.3	1.21	1.61
.21	.21	.454E+02	.6	1.42	1.37
.26	.26	.632E+02	.9	1.61	1.21
.32	.32	.836E+02	1.3	1.77	1.10
.37	.37	.107E+03	1.8	1.93	1.01
.42	.42	.132E+03	2.3	2.08	.94
.47	.47	.160E+03	3.0	2.22	.88
.53	.53	.191E+03	3.8	2.35	.83
.58	.58	.225E+03	4.8	2.48	.79
.63	.63	.261E+03	5.8	2.60	.75
.68	.68	.299E+03	7.0	2.72	.72
.74	.74	.340E+03	8.2	2.84	.69
.79	.79	.384E+03	9.7	2.95	.66
.84	.84	.430E+03	11.3	3.06	.64
.89	.89	.479E+03	13.0	3.17	.62
.95	.95	.531E+03	14.8	3.27	.60
1.00	1.00	.585E+03	16.9	3.38	.58

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0602)	19.00	.51	1.42	6.96	.20	1.38
OUTFLOW: ID= 1 (0563)	19.00	.53	1.42	6.96	.21	1.40

```
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	101.50	.0500	
1.00	100.70	.0500	
1.50	100.55	.0500 / .0300	Main Channel
2.00	99.50	.0300	Main Channel
3.50	99.60	.0300	Main Channel
4.50	100.65	.0300 / .0500	Main Channel
6.00	101.45	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.10	99.60	.353E+02	.0	.19	43.69
.19	99.69	.112E+03	.1	.37	22.76
.29	99.79	.195E+03	.2	.49	17.03
.38	99.88	.285E+03	.3	.59	14.23
.48	99.98	.381E+03	.5	.67	12.51

.57	100.07	.484E+03	.7	.74	11.32
.67	100.17	.594E+03	.9	.80	10.43
.76	100.26	.710E+03	1.2	.86	9.74
.86	100.36	.832E+03	1.5	.91	9.18
.95	100.45	.961E+03	1.8	.96	8.72
1.05	100.55	.110E+04	2.2	1.00	8.32
1.16	100.66	.127E+04	2.7	1.07	7.80
1.28	100.78	.148E+04	3.4	1.14	7.31
1.39	100.89	.170E+04	4.1	1.20	6.94
1.50	101.00	.195E+04	4.9	1.25	6.65
1.61	101.11	.221E+04	5.8	1.30	6.41
1.72	101.22	.250E+04	6.7	1.34	6.22
1.84	101.34	.280E+04	7.7	1.38	6.04
1.95	101.45	.313E+04	8.8	1.41	5.90

**** WARNING: INFLOW HYDROGRAPH IS DRY!!

```
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	260.00	6.31	1.58	8.44
MAJOR SYS.(ID= 2):	59.59	3.26	1.58	8.44
MINOR SYS.(ID= 3):	200.41	3.05	1.33	8.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |
```

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02
1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29

2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0470)	48.70	1.53	1.33	6.64	.26	.91
OUTFLOW: ID= 1 (0475)	48.70	1.10	1.42	6.64	.23	.87

```
--------------------
| ADD HYD   (0363) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0362):	30.00	.406	1.50	5.48
+ ID2= 2 (0359):	28.60	.369	1.58	6.60
ID = 3 (0363):	58.60	.769	1.50	6.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0106):	51.32	.155	2.42	6.63
+ ID2= 2 (0114):	49.64	.118	2.42	6.63
ID = 3 (0115):	100.96	.273	2.42	6.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0563):	19.00	.533	1.42	6.96
+ ID2= 2 (0607):	5.97	.141	1.67	5.44
ID = 3 (0492):	24.97	.596	1.42	6.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0525):	.00	.001	.00	*******
+ ID2= 2 (0520):	59.59	3.257	1.58	8.44

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```
ID = 3 (0526):    59.59   3.257     1.58     8.44

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0363):    58.60     .769     1.50     6.03
        + ID2= 2 (0365):   117.50    2.960     1.42     6.64
          ==================================================
          ID = 3 (0380):   176.10    3.653     1.42     6.44

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |    .2910       .3795
                            .2590      .0579    |    .2970       .4503
                            .2660      .1180    |   1.6320       .5232
                            .2720      .1802    |   4.1680       .5983
                            .2790      .2445    |   7.5660       .6756
                            .2850      .3109    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0492)      24.970       .596        1.42        6.60
     OUTFLOW: ID= 1 (0482)      24.970       .260        2.00        6.60

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 43.68
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .0700

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        313.20         .0500
                 140.00        312.40     .0500 / .0300  Main Channel
                 140.50        310.80         .0300      Main Channel
                 141.50        310.80         .0300      Main Channel
                 142.00        312.40     .0300 / .0500  Main Channel
                 160.00        313.20         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .12    310.92    .575E+02        .1           .40       18.86
        .25    311.05    .119E+03        .2           .57       13.13
        .37    311.17    .185E+03        .3           .69       10.87
        .49    311.29    .256E+03        .4           .78        9.61
        .62    311.42    .330E+03        .6           .86        8.77
        .74    311.54    .409E+03        .8           .92        8.17
        .86    311.66    .492E+03       1.1           .97        7.70
```

.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0526)	59.59	3.26	1.58	8.44	1.66	1.16
OUTFLOW: ID= 1 (0527)	59.59	2.80	1.67	8.44	1.54	1.21

```
--------------------
| RESERVOIR (0390) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	3.653	1.42	6.44
OUTFLOW: ID= 1 (0390)	176.100	.982	2.25	6.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 26.88
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= .5820

```
--------------------
| ADD HYD   (0400) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0395):	51.20	.292	1.42	1.17
+ ID2= 2 (0390):	176.10	.982	2.25	6.43
ID = 3 (0400):	227.30	1.022	1.58	5.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0403) |
| IN= 2---> OUT= 1 |
--------------------
```

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	

148.00	335.30	.0500
156.00	336.00	.0500
165.00	338.30	.0000

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0400)	227.30	1.02	1.58	5.25	.17	.73
OUTFLOW: ID= 1 (0403)	227.30	.88	3.17	5.25	.16	.71

ADD HYD (0407)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0403):	227.30	.881	3.17	5.25
	+ ID2= 2 (0115):	100.96	.273	2.42	6.63
	ID = 3 (0407):	328.26	1.112	2.83	5.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0113)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.6000	6.4000
1.1000	2.9000	9.1000	10.0000
1.3000	4.3000	12.0000	20.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0407)	328.260	1.112	2.83	5.67
OUTFLOW: ID= 1 (0113)	328.260	.354	5.83	5.67

PEAK FLOW REDUCTION [Qout/Qin](%)= 31.88

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TIME SHIFT OF PEAK FLOW (min)=180.00
MAXIMUM STORAGE USED (ha.m.)= .9343

```
--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0113):   328.26     .354     5.83     5.67
        + ID2= 2 (0425):    29.19     .948     1.33     6.64
          ==================================================
          ID = 3 (0430):   357.45     .951     1.33     5.75
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	325.40	.0600	
120.00	324.60	.0600	
126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0430)	357.45	.95	1.33	5.75	.20	1.02
OUTFLOW: ID= 1 (0440)	357.45	.72	1.42	5.75	.18	.98

```
--------------------
| ADD HYD   (0485) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0475):    48.70   1.101     1.42     6.64
        + ID2= 2 (0440):   357.45    .720     1.42     5.75
          ==================================================
          ID = 3 (0485):   406.15   1.820     1.42     5.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0490) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0480):    43.10   1.142     1.42     6.64
        + ID2= 2 (0485):   406.15   1.820     1.42     5.86
          ==================================================
          ID = 3 (0490):   449.25   2.962     1.42     5.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0491) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0490):   449.25   2.962     1.42     5.93
        + ID2= 2 (0482):    24.97    .260     2.00     6.60
          ==================================================
          ID = 3 (0491):   474.22   3.086     1.42     5.97

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   7.0800      2.4860
                           .2760      .0600    |   8.1000      3.3240
                          1.2000      .3400    |   9.7980      4.6420
                          2.0400      .6182    |  10.4940      7.4397
                          2.6400     1.1630    |  11.6850     10.3000
                          3.1200     1.7070    |  12.3480     11.4000

                                AREA      QPEAK       TPEAK       R.V.
                                (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)    474.220    3.086        1.42        5.97
     OUTFLOW: ID= 1 (0483)    474.220    1.344        2.00        5.97

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 43.57
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .3886
```

```
--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0483):   474.22   1.344     2.00     5.97
        + ID2= 2 (0540):     4.63    .569     1.33    18.56
          ==================================================
          ID = 3 (0530):   478.85   1.391     2.00     6.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0530):   478.85   1.391     2.00     6.09
        + ID2= 2 (0527):    59.59   2.796     1.67     8.44
          ==================================================
          ID = 3 (0545):   538.44   4.086     1.67     6.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0545):   538.44   4.086     1.67     6.35
        + ID2= 2 (0542):    25.25   2.408     1.42    18.56
          ==================================================
          ID = 3 (0546):   563.69   5.474     1.58     6.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0546):   563.69   5.474     1.58     6.90
        + ID2= 2 (0543):    14.99   1.767     1.33    18.56
          ==================================================
          ID = 3 (0547):   578.68   6.159     1.50     7.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0547):   578.68   6.159     1.50     7.20
        + ID2= 2 (0544):     1.13    .151     1.33    18.56
          ==================================================
          ID = 3 (0548):   579.81   6.220     1.50     7.22

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

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****************************
** SIMULATION NUMBER:   2 **
****************************
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READ STORM	Filename: Y:\SPrimmer\OTTHYMO\Cityview Ridge\5yrSCS12hr.stm
Ptotal= 53.41 mm	Comments: 5 year SCS Type II 12hour design storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	1.34	3.25	2.14	6.25	9.61	9.25	1.87
.50	1.34	3.50	2.14	6.50	9.61	9.50	1.87
.75	1.34	3.75	2.14	6.75	4.27	9.75	1.87
1.00	1.34	4.00	2.14	7.00	4.27	10.00	1.87
1.25	1.34	4.25	3.20	7.25	3.20	10.25	1.07
1.50	1.34	4.50	3.20	7.50	3.20	10.50	1.07
1.75	1.34	4.75	4.27	7.75	3.20	10.75	1.07
2.00	1.34	5.00	4.27	8.00	3.20	11.00	1.07
2.25	1.60	5.25	6.41	8.25	1.87	11.25	1.07
2.50	1.60	5.50	6.41	8.50	1.87	11.50	1.07
2.75	1.60	5.75	25.64	8.75	1.87	11.75	1.07
3.00	1.60	6.00	70.50	9.00	1.87	12.00	1.07

CALIB STANDHYD (0480) ID= 1 DT= 5.0 min	Area (ha)= 43.10 Total Imp(%)= 42.00 Dir. Conn.(%)= 21.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	18.10	25.00
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	680.00	40.00
Mannings n	=	.013	.300

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
.083	1.34	3.083	2.14	6.083	9.61	9.08	1.87
.167	1.34	3.167	2.14	6.167	9.61	9.17	1.87
.250	1.34	3.250	2.14	6.250	9.61	9.25	1.87
.333	1.34	3.333	2.14	6.333	9.61	9.33	1.87
.417	1.34	3.417	2.14	6.417	9.61	9.42	1.87
.500	1.34	3.500	2.14	6.500	9.61	9.50	1.87
.583	1.34	3.583	2.14	6.583	4.27	9.58	1.87
.667	1.34	3.667	2.14	6.667	4.27	9.67	1.87
.750	1.34	3.750	2.14	6.750	4.27	9.75	1.87
.833	1.34	3.833	2.14	6.833	4.27	9.83	1.87
.917	1.34	3.917	2.14	6.917	4.27	9.92	1.87
1.000	1.34	4.000	2.14	7.000	4.27	10.00	1.87
1.083	1.34	4.083	3.20	7.083	3.20	10.08	1.07
1.167	1.34	4.167	3.20	7.167	3.20	10.17	1.07
1.250	1.34	4.250	3.20	7.250	3.20	10.25	1.07
1.333	1.34	4.333	3.20	7.333	3.20	10.33	1.07
1.417	1.34	4.417	3.20	7.417	3.20	10.42	1.07

1.500	1.34	4.500	3.20	7.500	3.20	10.50	1.07
1.583	1.34	4.583	4.27	7.583	3.20	10.58	1.07
1.667	1.34	4.667	4.27	7.667	3.20	10.67	1.07
1.750	1.34	4.750	4.27	7.750	3.20	10.75	1.07
1.833	1.34	4.833	4.27	7.833	3.20	10.83	1.07
1.917	1.34	4.917	4.27	7.917	3.20	10.92	1.07
2.000	1.34	5.000	4.27	8.000	3.20	11.00	1.07
2.083	1.60	5.083	6.41	8.083	1.87	11.08	1.07
2.167	1.60	5.167	6.41	8.167	1.87	11.17	1.07
2.250	1.60	5.250	6.41	8.250	1.87	11.25	1.07
2.333	1.60	5.333	6.41	8.333	1.87	11.33	1.07
2.417	1.60	5.417	6.41	8.417	1.87	11.42	1.07
2.500	1.60	5.500	6.41	8.500	1.87	11.50	1.07
2.583	1.60	5.583	25.64	8.583	1.87	11.58	1.07
2.667	1.60	5.667	25.64	8.667	1.87	11.67	1.07
2.750	1.60	5.750	25.64	8.750	1.87	11.75	1.07
2.833	1.60	5.833	70.50	8.833	1.87	11.83	1.07
2.917	1.60	5.917	70.50	8.917	1.87	11.92	1.07
3.000	1.60	6.000	70.50	9.000	1.87	12.00	1.07

```
Max.Eff.Inten.(mm/hr)=      70.50        81.70
           over (min)       10.00        20.00
Storage Coeff.  (min)=       7.54 (ii)   16.07 (ii)
Unit Hyd. Tpeak (min)=      10.00        20.00
Unit Hyd. peak  (cms)=        .13          .06
                                                        *TOTALS*
PEAK FLOW       (cms)=       1.52         2.56          3.608 (iii)
TIME TO PEAK    (hrs)=       6.00         6.17           6.08
RUNOFF VOLUME    (mm)=      51.91        14.24          22.15
TOTAL RAINFALL   (mm)=      53.41        53.41          53.41
RUNOFF COEFFICIENT   =        .97          .27            .41


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=        2.10          2.89
Dep. Storage     (mm)=        1.50          5.00
Average Slope     (%)=        2.86          2.86
Length            (m)=      185.00         40.00
Mannings n           =        .013          .300

Max.Eff.Inten.(mm/hr)=      70.50        81.70
           over (min)        5.00        15.00
Storage Coeff.  (min)=       3.10 (ii)   10.77 (ii)
Unit Hyd. Tpeak (min)=       5.00        15.00
Unit Hyd. peak  (cms)=        .27          .09
                                                        *TOTALS*
PEAK FLOW       (cms)=        .20          .39            .532 (iii)
TIME TO PEAK    (hrs)=       6.00         6.08           6.00
RUNOFF VOLUME    (mm)=      51.91        14.24          22.15
TOTAL RAINFALL   (mm)=      53.41        53.41          53.41
```

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     RUNOFF COEFFICIENT   =        .97          .27            .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16        14.04
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     401.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.49 (ii)   14.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .20          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .95         1.66         2.307 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27            .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.12        20.88
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.03         2.03
     Length            (m)=     465.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.97 (ii)   14.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .19          .08
                                                          *TOTALS*
```

```
PEAK FLOW        (cms)=       1.40          2.42          3.376 (iii)
TIME TO PEAK     (hrs)=       6.00          6.08           6.00
RUNOFF VOLUME     (mm)=      51.91         14.24          22.15
TOTAL RAINFALL    (mm)=      53.41         53.41          53.41
RUNOFF COEFFICIENT   =        .97           .27            .41


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=        5.33          7.37
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        1.71          1.71
Length             (m)=      300.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=       70.50         81.70
            over (min)        5.00         15.00
Storage Coeff.  (min)=        4.84 (ii)    13.78 (ii)
Unit Hyd. Tpeak (min)=        5.00         15.00
Unit Hyd. peak  (cms)=         .22           .08
                                                        *TOTALS*
PEAK FLOW        (cms)=        .51           .88          1.226 (iii)
TIME TO PEAK     (hrs)=       6.00          6.08           6.00
RUNOFF VOLUME     (mm)=      51.91         14.24          22.15
TOTAL RAINFALL    (mm)=      53.41         53.41          53.41
RUNOFF COEFFICIENT   =        .97           .27            .41

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

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0395) |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=        5.12         46.08
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        2.00          2.00
Length             (m)=      900.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=       70.50         58.39
            over (min)       10.00         20.00
```

```
     Storage Coeff.  (min)=       8.92 (ii)   18.68 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .41         2.36         2.601 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.25          6.17
     RUNOFF VOLUME    (mm)=      51.91         9.64         11.75
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .18           .22

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        75.96
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.86 (ii)   14.65 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .20          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.06         1.94         2.582 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        13.31         20.64
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .25           .39

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
```

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        Hadati Creek Watershed - Post Development with Cityview Ridge
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=       1.00          1.00
     Length             (m)=     330.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         77.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       6.01 (ii)    16.75 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .19           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .63           .95        1.186 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.17         6.00
     RUNOFF VOLUME    (mm)=      51.91         14.24        22.15
     TOTAL RAINFALL   (mm)=      53.41         53.41        53.41
     RUNOFF COEFFICIENT   =        .97           .27          .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.17          7.13
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       1.60          1.60
     Length            (m)=     286.00         40.00
     Mannings n           =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         81.70
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       4.79 (ii)    13.92 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .22           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .49           .85        1.183 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      51.91         14.24        22.15
     TOTAL RAINFALL   (mm)=      53.41         53.41        53.41
     RUNOFF COEFFICIENT   =        .97           .27          .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0365) |   Area    (ha)= 117.50
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          Hadati Creek Watershed - Post Development with Cityview Ridge
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      49.35        68.15
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     885.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)      10.00        20.00
     Storage Coeff.  (min)=       8.83 (ii)   17.37 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.95         6.70         9.481 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.08
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.55        29.77
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     550.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)       5.00        20.00
     Storage Coeff.  (min)=       6.64 (ii)   15.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .18          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.96         3.14         3.870 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.08
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01         8.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     287.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.49 (ii)   13.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .23          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .58         1.02         1.415 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.70 (ii)   13.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .65         1.15         1.601 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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          Hadati Creek Watershed - Post Development with Cityview Ridge
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98         11.02
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     365.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         81.70
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       5.19 (ii)    13.73 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .21           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .75          1.32        1.831 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      51.91         14.24        22.15
     TOTAL RAINFALL   (mm)=      53.41         53.41        53.41
     RUNOFF COEFFICIENT   =        .97           .27          .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0600) |   Area    (ha)=  11.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.78          6.60
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     680.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         81.70
                over (min)       10.00         20.00
     Storage Coeff.  (min)=       7.54 (ii)    16.07 (ii)
     Unit Hyd. Tpeak (min)=      10.00         20.00
     Unit Hyd. peak  (cms)=        .13           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .40           .68         .953 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.17         6.08
     RUNOFF VOLUME    (mm)=      51.91         14.24        22.15
     TOTAL RAINFALL   (mm)=      53.41         53.41        53.41
     RUNOFF COEFFICIENT   =        .97           .27          .41
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          Hadati Creek Watershed - Post Development with Cityview Ridge
       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0601) |   Area    (ha)=   7.62
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.51         4.11
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        89.23
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.54 (ii)   15.78 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .27          .49          .679 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.08
     RUNOFF VOLUME    (mm)=      51.91        15.62        23.24
     TOTAL RAINFALL   (mm)=      53.41        53.41        53.41
     RUNOFF COEFFICIENT   =        .97          .29          .44


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0607) |   Area    (ha)=   5.97
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=   2.50
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.51         3.46
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50       105.29
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.54 (ii)   15.25 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .03          .52          .534 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.17
     RUNOFF VOLUME    (mm)=      51.91        17.87        18.72
     TOTAL RAINFALL   (mm)=      53.41        53.41        53.41
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     RUNOFF COEFFICIENT   =        .97          .33            .35

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70          .93
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     150.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        30.06
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       4.48 (ii)   23.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .23          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .70          .04          .713 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.25          6.00
     RUNOFF VOLUME    (mm)=      51.91         9.54         43.01
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .18           .81

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     112.24       131.76
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .80          .80
     Length            (m)=    1275.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        78.43
                over (min)       15.00        30.00
     Storage Coeff.  (min)=      14.47 (ii)   25.89 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
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Unit Hyd. peak  (cms)=        .08          .04
                                                        *TOTALS*
PEAK FLOW       (cms)=       8.08         9.34          14.467 (iii)
TIME TO PEAK    (hrs)=       6.08         6.33            6.25
RUNOFF VOLUME    (mm)=      51.91        14.36           24.12
TOTAL RAINFALL   (mm)=      53.41        53.41           53.41
RUNOFF COEFFICIENT   =        .97          .27             .45


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0510) |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       12.80         3.20
Dep. Storage     (mm)=        1.50         5.00
Average Slope     (%)=         .50          .20
Length            (m)=      400.00        40.00
Mannings n           =        .013         .300

Max.Eff.Inten.(mm/hr)=       70.50        20.04
            over (min)       10.00        40.00
Storage Coeff.  (min)=        8.31 (ii)   38.19 (ii)
Unit Hyd. Tpeak (min)=       10.00        40.00
Unit Hyd. peak  (cms)=         .13          .03
                                                        *TOTALS*
PEAK FLOW       (cms)=        2.06          .09           2.080 (iii)
TIME TO PEAK    (hrs)=        6.00         6.50            6.00
RUNOFF VOLUME    (mm)=       51.91         9.54           43.01
TOTAL RAINFALL   (mm)=       53.41        53.41           53.41
RUNOFF COEFFICIENT   =         .97          .18             .81


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       20.20         5.05
Dep. Storage     (mm)=        1.50         5.00
Average Slope     (%)=         .55          .55
Length            (m)=      350.00        40.00
Mannings n           =        .013         .300

Max.Eff.Inten.(mm/hr)=       70.50        30.06
```

```
            over (min)        5.00        30.00
     Storage Coeff.  (min)=   7.45 (ii)   26.21 (ii)
     Unit Hyd. Tpeak (min)=   5.00        30.00
     Unit Hyd. peak  (cms)=    .17          .04
                                                        *TOTALS*
     PEAK FLOW       (cms)=   3.56          .19          3.608 (iii)
     TIME TO PEAK    (hrs)=   6.00         6.33           6.00
     RUNOFF VOLUME    (mm)=  51.91         9.54          43.01
     TOTAL RAINFALL   (mm)=  53.41        53.41          53.41
     RUNOFF COEFFICIENT   =    .97          .18            .81

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.99          3.00
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=        .55           .55
     Length            (m)=     200.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         30.06
            over (min)         5.00         25.00
     Storage Coeff.  (min)=     5.33 (ii)    24.09 (ii)
     Unit Hyd. Tpeak (min)=     5.00         25.00
     Unit Hyd. peak  (cms)=      .21           .05
                                                        *TOTALS*
     PEAK FLOW       (cms)=     2.23           .12          2.271 (iii)
     TIME TO PEAK    (hrs)=     6.00         6.33           6.00
     RUNOFF VOLUME    (mm)=    51.91         9.54          43.01
     TOTAL RAINFALL   (mm)=    53.41        53.41          53.41
     RUNOFF COEFFICIENT   =      .97          .18            .81

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .90           .23
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=        .55           .55
     Length            (m)=      50.00         40.00
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          Hadati Creek Watershed - Post Development with Cityview Ridge
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         30.06
                over (min)        5.00         25.00
     Storage Coeff.  (min)=       2.32 (ii)    21.08 (ii)
     Unit Hyd. Tpeak (min)=       5.00         25.00
     Unit Hyd. peak  (cms)=        .30           .05
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .17           .01            .178 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.25            6.00
     RUNOFF VOLUME    (mm)=      51.91          9.54           43.01
     TOTAL RAINFALL   (mm)=      53.41         53.41           53.41
     RUNOFF COEFFICIENT   =        .97           .18             .81

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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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--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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

--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0415):     4.99     .532     6.00    22.15
        + ID2= 2 (0410):    24.20    2.307     6.00    22.15
          ===================================================
          ID = 3 (0420):    29.19    2.839     6.00    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0465) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0460):    36.00    3.376     6.00    22.15
        + ID2= 2 (0455):    12.70    1.226     6.00    22.15
          ===================================================
          ID = 3 (0465):    48.70    4.602     6.00    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0362) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
```

.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	2.58	6.00	20.64	.23	1.41
OUTFLOW: ID= 1 (0362)	30.00	2.01	6.17	20.63	.21	1.31

ROUTE CHN (0353)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24

.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	1.19	6.00	22.15	.16	1.10
OUTFLOW: ID= 1 (0353)	16.30	.95	6.25	22.11	.15	1.02

```
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	1.18	6.00	22.15	.16	1.10
OUTFLOW: ID= 1 (0358)	12.30	.74	6.17	22.10	.13	.92

```
--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)    |   (cms)     (ha.m.)
                            .0000      .0000     |    .5000       .4000
                            .0100      .0100     |   6.6000       .8000
                            .0260      .2300     |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0105)      51.320      3.870        6.08       22.15
     OUTFLOW: ID= 1 (0106)      51.320      2.731        6.33       22.14

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 70.57
                    TIME SHIFT OF PEAK FLOW         (min)= 15.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .5507

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--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0102):    14.32   1.415     6.00    22.15
        + ID2= 2 (0101):    16.32   1.601     6.00    22.15
          ==================================================
          ID = 3 (0103):    30.64   3.016     6.00    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)    |   (cms)     (ha.m.)
                            .0000      .0000     |   1.0000      1.0000
                            .0100      .0100     |  20.0000      1.1000
                            .0120      .1000     |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)      19.000      1.831        6.00       22.15
     OUTFLOW: ID= 1 (0111)      19.000       .238        6.58       22.14

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.98
                    TIME SHIFT OF PEAK FLOW         (min)= 35.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .3060

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--------------------
| ADD HYD   (0602) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0600):    11.38    .953     6.08    22.15
        + ID2= 2 (0601):     7.62    .679     6.08    23.24
          ==================================================
          ID = 3 (0602):    19.00   1.632     6.08    22.59
```

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

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--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00     14.47      6.25   24.12
     ==================================================
     MAJOR SYS.(ID= 2):  33.53      5.47      6.25   24.12
     MINOR SYS.(ID= 3): 210.47      9.00      6.00   24.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0505):   210.47   9.000     6.00    24.12
        + ID2= 2 (0510):    16.00   2.080     6.00    43.01
          ==================================================
          ID = 3 (0515):   226.47  11.080     6.00    25.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  29.19      2.84      6.00   22.15
     ==================================================
     MAJOR SYS.(ID= 2):   2.28       .86      6.00   22.15
     MINOR SYS.(ID= 3):  26.91      1.98      6.00   22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0425):     2.28     .859     6.00    22.15
        + ID2= 2 (0465):    48.70   4.602     6.00    22.15
          ==================================================
          ID = 3 (0470):    50.98   5.461     6.00    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```

```
          ID1= 1 (0353):    16.30    .952     6.25    22.11
        + ID2= 2 (0358):    12.30    .744     6.17    22.10
          ==================================================
          ID = 3 (0359):    28.60   1.680     6.25    22.11

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.0000      .5000
                            .0100      .0100    |  10.0000      .6000
                            .0150      .1332    |    .0000      .0000

                                   AREA      QPEAK       TPEAK       R.V.
                                   (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0103)      30.640      3.016        6.00       22.15
     OUTFLOW: ID= 1 (0104)      30.640       .801        6.42       22.14

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 26.57
                   TIME SHIFT OF PEAK FLOW         (min)= 25.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .4263

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--------------------
| ADD HYD   (0114) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0104):    30.64    .801     6.42    22.14
        + ID2= 2 (0111):    19.00    .238     6.58    22.14
          ==================================================
          ID = 3 (0114):    49.64   1.029     6.50    22.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0563) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   2.2) ------>
               Distance      Elevation       Manning
                    .00          1.00         .0350
                   2.00           .50         .0350
                   4.00           .00     .0350 / .0350  Main Channel
                   4.50           .00         .0350      Main Channel
                   5.00           .00     .0350 / .0350  Main Channel
                   7.00           .50         .0350
                   9.00          1.00         .0350

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .05      .05    .745E+01        .0           .64       3.06
        .11      .11    .175E+02        .1           .96       2.03
        .16      .16    .301E+02        .3          1.21       1.61
        .21      .21    .454E+02        .6          1.42       1.37
        .26      .26    .632E+02        .9          1.61       1.21
        .32      .32    .836E+02       1.3          1.77       1.10
```

.37	.37	.107E+03	1.8	1.93	1.01
.42	.42	.132E+03	2.3	2.08	.94
.47	.47	.160E+03	3.0	2.22	.88
.53	.53	.191E+03	3.8	2.35	.83
.58	.58	.225E+03	4.8	2.48	.79
.63	.63	.261E+03	5.8	2.60	.75
.68	.68	.299E+03	7.0	2.72	.72
.74	.74	.340E+03	8.2	2.84	.69
.79	.79	.384E+03	9.7	2.95	.66
.84	.84	.430E+03	11.3	3.06	.64
.89	.89	.479E+03	13.0	3.17	.62
.95	.95	.531E+03	14.8	3.27	.60
1.00	1.00	.585E+03	16.9	3.38	.58

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0602)	19.00	1.63	6.08	22.59	.35	1.89
OUTFLOW: ID= 1 (0563)	19.00	1.61	6.08	22.59	.35	1.88

```
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	101.50	.0500	
1.00	100.70	.0500	
1.50	100.55	.0500 / .0300	Main Channel
2.00	99.50	.0300	Main Channel
3.50	99.60	.0300	Main Channel
4.50	100.65	.0300 / .0500	Main Channel
6.00	101.45	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.10	99.60	.353E+02	.0	.19	43.69
.19	99.69	.112E+03	.1	.37	22.76
.29	99.79	.195E+03	.2	.49	17.03
.38	99.88	.285E+03	.3	.59	14.23
.48	99.98	.381E+03	.5	.67	12.51
.57	100.07	.484E+03	.7	.74	11.32
.67	100.17	.594E+03	.9	.80	10.43
.76	100.26	.710E+03	1.2	.86	9.74
.86	100.36	.832E+03	1.5	.91	9.18
.95	100.45	.961E+03	1.8	.96	8.72
1.05	100.55	.110E+04	2.2	1.00	8.32
1.16	100.66	.127E+04	2.7	1.07	7.80
1.28	100.78	.148E+04	3.4	1.14	7.31
1.39	100.89	.170E+04	4.1	1.20	6.94
1.50	101.00	.195E+04	4.9	1.25	6.65
1.61	101.11	.221E+04	5.8	1.30	6.41
1.72	101.22	.250E+04	6.7	1.34	6.22
1.84	101.34	.280E+04	7.7	1.38	6.04
1.95	101.45	.313E+04	8.8	1.41	5.90

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0505)	33.53	5.47	6.25	24.12	1.58	1.28

```
OUTFLOW: ID= 1 (0564)   33.53     4.91    6.33  24.12      1.50      1.25

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 226.47     11.08      6.00   25.46
     ==========================================================
     MAJOR SYS.(ID= 2):  88.85      8.03      6.00   25.46
     MINOR SYS.(ID= 3): 137.62      3.05      5.75   25.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        324.60         .0500
                 115.00        321.60         .0500
                 120.00        320.80     .0500 / .0300  Main Channel
                 122.00        320.80     .0300 / .0500  Main Channel
                 138.00        321.60         .0500
                 148.00        322.30         .0500
                 154.00        323.10         .0500
                 164.00        324.60         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .20   321.00    .398E+03        .8           .84        8.53
        .40   321.20    .125E+04       3.3          1.13        6.33
        .60   321.40    .255E+04       8.1          1.36        5.27
        .80   321.60    .430E+04      15.6          1.56        4.59
       1.00   321.80    .644E+04      26.8          1.79        4.01
       1.20   322.00    .892E+04      41.2          1.99        3.61
       1.40   322.20    .117E+05      59.3          2.17        3.30
       1.60   322.40    .148E+05      81.9          2.37        3.02
       1.80   322.60    .182E+05     109.1          2.58        2.78
       2.00   322.80    .218E+05     140.2          2.77        2.59
       2.20   323.00    .256E+05     175.3          2.95        2.43
       2.40   323.20    .296E+05     214.7          3.12        2.29
       2.60   323.40    .338E+05     258.6          3.29        2.18
       2.80   323.60    .382E+05     306.7          3.46        2.07
       3.00   323.80    .428E+05     359.1          3.61        1.98
       3.20   324.00    .476E+05     416.0          3.76        1.91
       3.40   324.20    .526E+05     477.5          3.91        1.83
       3.60   324.40    .578E+05     543.5          4.05        1.77
       3.80   324.60    .632E+05     614.3          4.18        1.71

                                  <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)    (hrs)    (mm)     (m)      (m/s)
     INFLOW : ID= 2 (0470)   50.98    5.46     6.00   22.15     .49      1.23
     OUTFLOW: ID= 1 (0475)   50.98    4.60     6.08   22.15     .45      1.19
```

```
--------------------
| ADD HYD   (0363) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0362):    30.00   2.013     6.17    20.63
        + ID2= 2 (0359):    28.60   1.680     6.25    22.11
          ===================================================
          ID = 3 (0363):    58.60   3.649     6.17    21.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0106):    51.32   2.731     6.33    22.14
        + ID2= 2 (0114):    49.64   1.029     6.50    22.14
          ===================================================
          ID = 3 (0115):   100.96   3.732     6.33    22.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0563):    19.00   1.610     6.08    22.59
        + ID2= 2 (0607):     5.97    .534     6.17    18.72
          ===================================================
          ID = 3 (0492):    24.97   2.115     6.08    21.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0525):      .00    .001      .00  *******
        + ID2= 2 (0520):    88.85   8.030     6.00    25.46
          ===================================================
          ID = 3 (0526):    88.85   8.030     6.00    25.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0363):    58.60   3.649     6.17    21.35
        + ID2= 2 (0365):   117.50   9.481     6.08    22.15
          ===================================================
          ID = 3 (0380):   176.10  12.674     6.17    21.88
```

Hadati Creek Watershed - Post Development with Cityview Ridge
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)    |   (cms)     (ha.m.)
                            .0000      .0000     |    .2910       .3795
                            .2590      .0579     |    .2970       .4503
                            .2660      .1180     |   1.6320       .5232
                            .2720      .1802     |   4.1680       .5983
                            .2790      .2445     |   7.5660       .6756
                            .2850      .3109     |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0492)      24.970      2.115        6.08       21.66
     OUTFLOW: ID= 1 (0482)      24.970       .288        6.83       21.66

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 13.60
                TIME SHIFT OF PEAK FLOW         (min)= 45.00
                MAXIMUM  STORAGE   USED       (ha.m.)=   .3412

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        313.20         .0500
                 140.00        312.40     .0500 / .0300  Main Channel
                 140.50        310.80         .0300      Main Channel
                 141.50        310.80         .0300      Main Channel
                 142.00        312.40     .0300 / .0500  Main Channel
                 160.00        313.20         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
        .12    310.92    .575E+02        .1           .40      18.86
        .25    311.05    .119E+03        .2           .57      13.13
        .37    311.17    .185E+03        .3           .69      10.87
        .49    311.29    .256E+03        .4           .78       9.61
        .62    311.42    .330E+03        .6           .86       8.77
        .74    311.54    .409E+03        .8           .92       8.17
        .86    311.66    .492E+03       1.1           .97       7.70
        .98    311.78    .579E+03       1.3          1.02       7.32
       1.11    311.91    .671E+03       1.6          1.07       7.01
       1.23    312.03    .767E+03       1.9          1.11       6.74
       1.35    312.15    .867E+03       2.2          1.15       6.50
       1.48    312.28    .971E+03       2.6          1.19       6.29
       1.60    312.40    .108E+04       2.9          1.23       6.11
       1.73    312.53    .149E+04       3.6          1.10       6.85
       1.87    312.67    .248E+04       4.9           .88       8.52
       2.00    312.80    .405E+04       6.9           .77       9.74
       2.13    312.93    .620E+04      10.1           .73      10.21
       2.27    313.07    .893E+04      14.6           .74      10.17
       2.40    313.20    .122E+05      20.7           .76       9.85

                                   <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
```

Hadati Creek Watershed - Post Development with Cityview Ridge

	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0526)	88.85	8.03	6.00	25.46	2.05	.76
OUTFLOW: ID= 1 (0527)	88.85	6.50	6.42	25.46	1.97	.79

```
| RESERVOIR (0390) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	12.674	6.17	21.88
OUTFLOW: ID= 1 (0390)	176.100	1.333	7.08	21.88

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.52
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 2.5065

```
| ADD HYD   (0400) |
|   1 +  2 =  3    |
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0395):	51.20	2.601	6.17	11.75
+ ID2= 2 (0390):	176.10	1.333	7.08	21.88
ID = 3 (0400):	227.30	3.883	6.17	19.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN (0403) |
| IN= 2---> OUT= 1 |
```

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02

1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0400)	227.30	3.88	6.17	19.60	.34	1.13
OUTFLOW: ID= 1 (0403)	227.30	2.23	6.42	19.60	.25	.89

```
--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0403):	227.30	2.232	6.42	19.60
+ ID2= 2 (0115):	100.96	3.732	6.33	22.14
ID = 3 (0407):	328.26	5.857	6.33	20.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.6000	6.4000
1.1000	2.9000	9.1000	10.0000
1.3000	4.3000	12.0000	20.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0407)	328.260	5.857	6.33	20.38
OUTFLOW: ID= 1 (0113)	328.260	1.137	12.67	20.38

PEAK FLOW REDUCTION [Qout/Qin](%)= 19.42
TIME SHIFT OF PEAK FLOW (min)=380.00
MAXIMUM STORAGE USED (ha.m.)= 3.1599

```
--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0113):	328.26	1.137	12.67	20.38
+ ID2= 2 (0425):	26.91	1.980	6.00	22.15
ID = 3 (0430):	355.17	2.137	6.17	20.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	325.40	.0600	
120.00	324.60	.0600	
126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0430)	355.17	2.14	6.17	20.51	.33	1.26
OUTFLOW: ID= 1 (0440)	355.17	2.11	6.17	20.51	.32	1.26

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

```
--------------------
| ADD HYD   (0485) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0475):	50.98	4.600	6.08	22.15
+ ID2= 2 (0440):	355.17	2.113	6.17	20.51
ID = 3 (0485):	406.15	6.641	6.08	20.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

```
--------------------
| ADD HYD   (0490) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0480):    43.10   3.608     6.08    22.15
        + ID2= 2 (0485):   406.15   6.641     6.08    20.72
          ==================================================
          ID = 3 (0490):   449.25  10.249     6.08    20.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0491) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0490):   449.25  10.249     6.08    20.86
        + ID2= 2 (0482):    24.97    .288     6.83    21.66
          ==================================================
          ID = 3 (0491):   474.22  10.516     6.08    20.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   7.0800      2.4860
                            .2760      .0600    |   8.1000      3.3240
                           1.2000      .3400    |   9.7980      4.6420
                           2.0400      .6182    |  10.4940      7.4397
                           2.6400     1.1630    |  11.6850     10.3000
                           3.1200     1.7070    |  12.3480     11.4000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)    474.220     10.516        6.08       20.90
     OUTFLOW: ID= 1 (0483)    474.220      2.907        6.67       20.90

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 27.65
                    TIME SHIFT OF PEAK FLOW         (min)= 35.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  1.4680

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

--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0483):   474.22   2.907     6.67    20.90
        + ID2= 2 (0540):     4.63    .713     6.00    43.01
          ==================================================
          ID = 3 (0530):   478.85   3.002     6.50    21.11

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
```

Hadati Creek Watershed - Post Development with Cityview Ridge

```
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0530):   478.85   3.002     6.50    21.11
        + ID2= 2 (0527):    88.85   6.502     6.42    25.46
          ===================================================
          ID = 3 (0545):   567.70   9.482     6.50    21.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0545):   567.70   9.482     6.50    21.79
        + ID2= 2 (0542):    25.25   3.608     6.00    43.01
          ===================================================
          ID = 3 (0546):   592.95  10.345     6.00    22.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0546):   592.95  10.345     6.00    22.70
        + ID2= 2 (0543):    14.99   2.271     6.00    43.01
          ===================================================
          ID = 3 (0547):   607.94  12.615     6.00    23.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0547):   607.94  12.615     6.00    23.20
        + ID2= 2 (0544):     1.13    .178     6.00    43.01
          ===================================================
          ID = 3 (0548):   609.07  12.793     6.00    23.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************


--------------------
|    READ STORM    |     Filename: Y:\SPrimmer\OTTHYMO\Ci
|                  |               tyview Ridge\25yrSCS12hr.stm
| Ptotal= 73.56 mm |     Comments: 25 year SCS Type II 12hr design storm
--------------------
                 TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .25    1.84 |  3.25    2.94 |  6.25   13.24 |  9.25    2.58
                  .50    1.84 |  3.50    2.94 |  6.50   13.24 |  9.50    2.58
```

.75	1.84	3.75	2.94	6.75	5.89	9.75	2.58
1.00	1.84	4.00	2.94	7.00	5.89	10.00	2.58
1.25	1.84	4.25	4.41	7.25	4.41	10.25	1.47
1.50	1.84	4.50	4.41	7.50	4.41	10.50	1.47
1.75	1.84	4.75	5.89	7.75	4.41	10.75	1.47
2.00	1.84	5.00	5.89	8.00	4.41	11.00	1.47
2.25	2.21	5.25	8.83	8.25	2.58	11.25	1.47
2.50	2.21	5.50	8.83	8.50	2.58	11.50	1.47
2.75	2.21	5.75	35.31	8.75	2.58	11.75	1.47
3.00	2.21	6.00	97.10	9.00	2.58	12.00	1.47

```
--------------------
| CALIB            |
| STANDHYD  (0480) |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10         25.00
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     680.00         40.00
     Mannings n          =        .013          .300

         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
.083	1.84	3.083	2.94	6.083	13.24	9.08	2.58
.167	1.84	3.167	2.94	6.167	13.24	9.17	2.58
.250	1.84	3.250	2.94	6.250	13.24	9.25	2.58
.333	1.84	3.333	2.94	6.333	13.24	9.33	2.58
.417	1.84	3.417	2.94	6.417	13.24	9.42	2.58
.500	1.84	3.500	2.94	6.500	13.24	9.50	2.58
.583	1.84	3.583	2.94	6.583	5.89	9.58	2.58
.667	1.84	3.667	2.94	6.667	5.89	9.67	2.58
.750	1.84	3.750	2.94	6.750	5.89	9.75	2.58
.833	1.84	3.833	2.94	6.833	5.89	9.83	2.58
.917	1.84	3.917	2.94	6.917	5.89	9.92	2.58
1.000	1.84	4.000	2.94	7.000	5.88	10.00	2.58
1.083	1.84	4.083	4.41	7.083	4.41	10.08	1.47
1.167	1.84	4.167	4.41	7.167	4.41	10.17	1.47
1.250	1.84	4.250	4.41	7.250	4.41	10.25	1.47
1.333	1.84	4.333	4.41	7.333	4.41	10.33	1.47
1.417	1.84	4.417	4.41	7.417	4.41	10.42	1.47
1.500	1.84	4.500	4.41	7.500	4.41	10.50	1.47
1.583	1.84	4.583	5.88	7.583	4.41	10.58	1.47
1.667	1.84	4.667	5.89	7.667	4.41	10.67	1.47
1.750	1.84	4.750	5.89	7.750	4.41	10.75	1.47
1.833	1.84	4.833	5.89	7.833	4.41	10.83	1.47
1.917	1.84	4.917	5.89	7.917	4.41	10.92	1.47
2.000	1.84	5.000	5.89	8.000	4.41	11.00	1.47
2.083	2.21	5.083	8.83	8.083	2.58	11.08	1.47
2.167	2.21	5.167	8.83	8.167	2.58	11.17	1.47
2.250	2.21	5.250	8.83	8.250	2.58	11.25	1.47
2.333	2.21	5.333	8.83	8.333	2.58	11.33	1.47
2.417	2.21	5.417	8.83	8.417	2.58	11.42	1.47
2.500	2.21	5.500	8.83	8.500	2.58	11.50	1.47
2.583	2.21	5.583	35.31	8.583	2.58	11.58	1.47
2.667	2.21	5.667	35.31	8.667	2.58	11.67	1.47

```
          2.750    2.21 | 5.750   35.31 | 8.750    2.58 | 11.75    1.47
          2.833    2.21 | 5.833   97.10 | 8.833    2.58 | 11.83    1.47
          2.917    2.21 | 5.917   97.10 | 8.917    2.58 | 11.92    1.47
          3.000    2.21 | 6.000   97.10 | 9.000    2.58 | 12.00    1.47

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.63 (ii)   13.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .18          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.27         4.88         6.559 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0415)   |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.10         2.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.86         2.86
     Length            (m)=     185.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.73 (ii)    9.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .29          .12
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .28          .73         1.007 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.00          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0410)   |   Area    (ha)=  24.20
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          Hadati Creek Watershed - Post Development with Cityview Ridge
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16        14.04
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     401.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.83 (ii)   12.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.33         2.92         3.938 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.12        20.88
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.03         2.03
     Length            (m)=     465.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.26 (ii)   12.56 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.96         4.29         5.772 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.33         7.37
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.71         1.71
     Length            (m)=     300.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.25 (ii)   11.94 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .23          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .71         1.55        2.088 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08         6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53        36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .36          .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0395) |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.12        46.08
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     900.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        88.55
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.85 (ii)   16.11 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .58         5.35        5.668 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.17
     RUNOFF VOLUME    (mm)=      72.06        21.36        23.89
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .29          .32

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
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          Hadati Creek Watershed - Post Development with Cityview Ridge
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0360)   |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       111.81
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.16 (ii)   12.69 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.48         3.58         4.647 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        25.57         34.40
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .35           .47

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350)   |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.29 (ii)   14.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .89         1.82         2.485 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
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TOTAL RAINFALL   (mm)=      73.56        73.56          73.56
RUNOFF COEFFICIENT   =        .98          .36            .49


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=          5.17          7.13
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          1.60          1.60
Length            (m)=        286.00         40.00
Mannings n           =          .013          .300

Max.Eff.Inten.(mm/hr)=         97.10        119.40
           over (min)           5.00         15.00
Storage Coeff.  (min)=          4.22 (ii)    12.06 (ii)
Unit Hyd. Tpeak (min)=          5.00         15.00
Unit Hyd. peak  (cms)=           .24           .09
                                                        *TOTALS*
PEAK FLOW       (cms)=           .68          1.49        2.015 (iii)
TIME TO PEAK    (hrs)=          6.00          6.08         6.00
RUNOFF VOLUME    (mm)=         72.06         26.53        36.09
TOTAL RAINFALL   (mm)=         73.56         73.56        73.56
RUNOFF COEFFICIENT   =           .98           .36          .49

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

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=         49.35         68.15
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          2.00          2.00
Length            (m)=        885.00         40.00
Mannings n           =          .013          .300

Max.Eff.Inten.(mm/hr)=         97.10        119.40
           over (min)          10.00         20.00
Storage Coeff.  (min)=          7.77 (ii)    15.10 (ii)
Unit Hyd. Tpeak (min)=         10.00         20.00
Unit Hyd. peak  (cms)=           .13           .07
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                                                          *TOTALS*
PEAK FLOW        (cms)=       5.65        11.98          16.238 (iii)
TIME TO PEAK     (hrs)=       6.00         6.17            6.08
RUNOFF VOLUME     (mm)=      72.06        26.53           36.09
TOTAL RAINFALL    (mm)=      73.56        73.56           73.56
RUNOFF COEFFICIENT   =         .98          .36             .49

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=       21.55         29.77
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        2.00          2.00
Length             (m)=      550.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=       97.10        119.40
            over (min)        5.00         15.00
Storage Coeff.  (min)=        5.84 (ii)    13.17 (ii)
Unit Hyd. Tpeak (min)=        5.00         15.00
Unit Hyd. peak  (cms)=         .20           .08
                                                          *TOTALS*
PEAK FLOW        (cms)=       2.76          5.98           8.044 (iii)
TIME TO PEAK     (hrs)=       6.00          6.08            6.00
RUNOFF VOLUME     (mm)=      72.06         26.53           36.09
TOTAL RAINFALL    (mm)=      73.56         73.56           73.56
RUNOFF COEFFICIENT   =         .98           .36             .49

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=        6.01          8.31
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        2.00          2.00
Length             (m)=      287.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=       97.10        119.40
            over (min)        5.00         15.00
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     Storage Coeff.  (min)=       3.95 (ii)   11.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .24          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .80         1.79         2.406 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.13 (ii)   11.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .24          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .91         2.02         2.725 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98        11.02
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
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          Hadati Creek Watershed - Post Development with Cityview Ridge
     Length              (m)=     365.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.57 (ii)   11.90 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .23          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.05         2.32         3.122 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0600) |   Area    (ha)=  11.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.78         6.60
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.63 (ii)   13.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .18          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .60         1.29         1.732 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0601) |   Area    (ha)=   7.62
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  21.00
--------------------
```

Hadati Creek Watershed - Post Development with Cityview Ridge

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	3.51	4.11	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	680.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.(mm/hr)=		97.10	129.34	
over (min)		5.00	15.00	
Storage Coeff. (min)=		6.63 (ii)	13.74 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.18	.08	
				TOTALS
PEAK FLOW	(cms)=	.40	.89	1.186 (iii)
TIME TO PEAK	(hrs)=	6.00	6.08	6.00
RUNOFF VOLUME	(mm)=	72.06	27.57	36.92
TOTAL RAINFALL	(mm)=	73.56	73.56	73.56
RUNOFF COEFFICIENT	=	.98	.37	.50

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB              |
| STANDHYD  (0607)   |   Area    (ha)=   5.97
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=   2.50
```

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	2.51	3.46	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	680.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.(mm/hr)=		97.10	150.66	
over (min)		5.00	15.00	
Storage Coeff. (min)=		6.63 (ii)	13.32 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.18	.08	
				TOTALS
PEAK FLOW	(cms)=	.04	.90	.921 (iii)
TIME TO PEAK	(hrs)=	6.00	6.08	6.08
RUNOFF VOLUME	(mm)=	72.06	29.58	30.64
TOTAL RAINFALL	(mm)=	73.56	73.56	73.56
RUNOFF COEFFICIENT	=	.98	.40	.42

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Hadati Creek Watershed - Post Development with Cityview Ridge

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--------------------
| CALIB            |
| STANDHYD  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70          .93
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     150.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       3.94 (ii)   16.20 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .24          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .97          .11        1.036 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22        61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .29          .83

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     112.24       131.76
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .80          .80
     Length            (m)=    1275.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       120.22
                over (min)       15.00        25.00
     Storage Coeff.  (min)=      12.73 (ii)   22.36 (ii)
     Unit Hyd. Tpeak (min)=      15.00        25.00
     Unit Hyd. peak  (cms)=        .08          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=      11.66        18.11       27.658 (iii)
     TIME TO PEAK    (hrs)=       6.08         6.25         6.17
     RUNOFF VOLUME    (mm)=      72.06        26.62        38.44
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .36          .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
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          THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (0510) |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.80         3.20
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .50          .20
     Length            (m)=     400.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        65.53
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       7.31 (ii)   25.92 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .17          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.12          .25         3.209 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.33          6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22         61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .29           .83


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.20         5.05
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     350.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.56 (ii)   18.81 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .18          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       5.02          .53         5.333 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22         61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .29           .83


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
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          Hadati Creek Watershed - Post Development with Cityview Ridge
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.99         3.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     200.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       4.69 (ii)   16.94 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .22          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.11          .34         3.310 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22         61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .29           .83

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .90          .23
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=      50.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.04 (ii)   14.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .31          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .24          .03          .266 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22         61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
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          Hadati Creek Watershed - Post Development with Cityview Ridge
     RUNOFF COEFFICIENT   =        .98          .29            .83

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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

--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0415):     4.99   1.007     6.00    36.09
        + ID2= 2 (0410):    24.20   3.938     6.00    36.09
          ==================================================
          ID = 3 (0420):    29.19   4.945     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0465) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0460):    36.00   5.772     6.00    36.09
        + ID2= 2 (0455):    12.70   2.088     6.00    36.09
          ==================================================
          ID = 3 (0465):    48.70   7.859     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0362) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00           .40         .0300
                   5.50           .15     .0300 / .0150  Main Channel
                   5.51           .00         .0150      Main Channel
                  10.00           .09         .0150      Main Channel
                  14.49           .00         .0150      Main Channel
                  14.50           .15     .0150 / .0300  Main Channel
                  20.00           .40         .0300

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .02      .02    .176E+02        .0           .21      80.52
```

.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	4.65	6.00	34.40	.31	1.61
OUTFLOW: ID= 1 (0362)	30.00	3.64	6.17	34.39	.27	1.53

ROUTE CHN (0353)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	2.49	6.00	36.09	.23	1.29
OUTFLOW: ID= 1 (0353)	16.30	1.83	6.17	36.06	.20	1.23

```
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	2.02	6.00	36.09	.21	1.25
OUTFLOW: ID= 1 (0358)	12.30	1.38	6.17	36.04	.17	1.15

```
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5000	.4000
.0100	.0100	6.6000	.8000
.0260	.2300	.0000	.0000

```
                                AREA      QPEAK       TPEAK       R.V.
                                (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0105)     51.320     8.044        6.00       36.09
     OUTFLOW: ID= 1 (0106)     51.320     5.545        6.17       36.09

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 68.94
                   TIME SHIFT OF PEAK FLOW         (min)= 10.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .7419

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

--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0102):    14.32   2.406     6.00    36.09
        + ID2= 2 (0101):    16.32   2.725     6.00    36.09
          ====================================================
          ID = 3 (0103):    30.64   5.131     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.0000      1.0000
                            .0100      .0100    |  20.0000      1.1000
                            .0120      .1000    |    .0000       .0000

                                AREA      QPEAK       TPEAK       R.V.
                                (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)     19.000     3.122        6.00       36.09
     OUTFLOW: ID= 1 (0111)     19.000      .447        6.58       36.08

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.31
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .4965

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

--------------------
| ADD HYD   (0602) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0600):    11.38   1.732     6.00    36.09
        + ID2= 2 (0601):     7.62   1.186     6.00    36.92
          ====================================================
          ID = 3 (0602):    19.00   2.918     6.00    36.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00     27.66      6.17   38.44
     ======================================================
```

```
     MAJOR SYS.(ID= 2):  81.12      18.66      6.17   38.44
     MINOR SYS.(ID= 3): 162.88       9.00      5.92   38.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0505):    162.88    9.000     5.92    38.44
        + ID2= 2 (0510):     16.00    3.209     6.00    61.38
          ====================================================
          ID = 3 (0515):    178.88   12.209     6.00    40.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |       AREA     QPEAK     TPEAK     R.V.
--------------------       (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):   29.19      4.94      6.00    36.09
     ====================================================
     MAJOR SYS.(ID= 2):    7.51      2.96      6.00    36.09
     MINOR SYS.(ID= 3):   21.68      1.98      5.83    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0425):      7.51    2.965     6.00    36.09
        + ID2= 2 (0465):     48.70    7.859     6.00    36.09
          ====================================================
          ID = 3 (0470):     56.21   10.824     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0353):     16.30    1.826     6.17    36.06
        + ID2= 2 (0358):     12.30    1.378     6.17    36.04
          ====================================================
          ID = 3 (0359):     28.60    3.204     6.17    36.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW     STORAGE    |  OUTFLOW     STORAGE
```

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(cms)	(ha.m.)	(cms)	(ha.m.)
.0000	.0000	1.0000	.5000
.0100	.0100	10.0000	.6000
.0150	.1332	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0103)	30.640	5.131	6.00	36.09
OUTFLOW: ID= 1 (0104)	30.640	4.550	6.17	36.08

PEAK FLOW REDUCTION [Qout/Qin](%)= 88.67
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .5514

ADD HYD (0114)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0104):	30.64	4.550	6.17	36.08
+ ID2= 2 (0111):	19.00	.447	6.58	36.08
ID = 3 (0114):	49.64	4.877	6.17	36.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0563)
IN= 2---> OUT= 1 Routing time step (min)'= 5.00

<------ DATA FOR SECTION (2.2) ------>

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.745E+01	.0	.64	3.06
.11	.11	.175E+02	.1	.96	2.03
.16	.16	.301E+02	.3	1.21	1.61
.21	.21	.454E+02	.6	1.42	1.37
.26	.26	.632E+02	.9	1.61	1.21
.32	.32	.836E+02	1.3	1.77	1.10
.37	.37	.107E+03	1.8	1.93	1.01
.42	.42	.132E+03	2.3	2.08	.94
.47	.47	.160E+03	3.0	2.22	.88
.53	.53	.191E+03	3.8	2.35	.83
.58	.58	.225E+03	4.8	2.48	.79
.63	.63	.261E+03	5.8	2.60	.75
.68	.68	.299E+03	7.0	2.72	.72
.74	.74	.340E+03	8.2	2.84	.69
.79	.79	.384E+03	9.7	2.95	.66
.84	.84	.430E+03	11.3	3.06	.64
.89	.89	.479E+03	13.0	3.17	.62
.95	.95	.531E+03	14.8	3.27	.60

```
  1.00     1.00    .585E+03      16.9          3.38        .58

                                <---- hydrograph ---->   <-pipe / channel->
                          AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                          (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
INFLOW : ID= 2 (0602)   19.00     2.92    6.00  36.42       .46      2.19
OUTFLOW: ID= 1 (0563)   19.00     2.87    6.08  36.42       .46      2.18


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--------------------
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00        101.50         .0500
                   1.00        100.70         .0500
                   1.50        100.55     .0500 / .0300  Main Channel
                   2.00         99.50         .0300      Main Channel
                   3.50         99.60         .0300      Main Channel
                   4.50        100.65     .0300 / .0500  Main Channel
                   6.00        101.45         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
        .10     99.60    .353E+02        .0           .19      43.69
        .19     99.69    .112E+03        .1           .37      22.76
        .29     99.79    .195E+03        .2           .49      17.03
        .38     99.88    .285E+03        .3           .59      14.23
        .48     99.98    .381E+03        .5           .67      12.51
        .57    100.07    .484E+03        .7           .74      11.32
        .67    100.17    .594E+03        .9           .80      10.43
        .76    100.26    .710E+03       1.2           .86       9.74
        .86    100.36    .832E+03       1.5           .91       9.18
        .95    100.45    .961E+03       1.8           .96       8.72
       1.05    100.55    .110E+04       2.2          1.00       8.32
       1.16    100.66    .127E+04       2.7          1.07       7.80
       1.28    100.78    .148E+04       3.4          1.14       7.31
       1.39    100.89    .170E+04       4.1          1.20       6.94
       1.50    101.00    .195E+04       4.9          1.25       6.65
       1.61    101.11    .221E+04       5.8          1.30       6.41
       1.72    101.22    .250E+04       6.7          1.34       6.22
       1.84    101.34    .280E+04       7.7          1.38       6.04
       1.95    101.45    .313E+04       8.8          1.41       5.90

     **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                <---- hydrograph ---->   <-pipe / channel->
                          AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                          (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
INFLOW : ID= 2 (0505)   81.12    18.66    6.17  38.44      1.72      1.34
OUTFLOW: ID= 1 (0564)   81.12    28.30    6.50  38.44      1.95      1.41

     **** WARNING:  COMPUTATIONS FAILED TO CONVERGE.

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--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |      AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
```

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TOTAL HYD.(ID= 1):	178.88	12.21	6.00	40.49
MAJOR SYS.(ID= 2):	74.76	9.16	6.00	40.49
MINOR SYS.(ID= 3):	104.13	3.05	5.67	40.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0475)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02
1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29
2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0470)	56.21	10.82	6.00	36.09	.67	1.43
OUTFLOW: ID= 1 (0475)	56.21	9.54	6.08	36.09	.64	1.39

ADD HYD (0363)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0362):	30.00	3.642	6.17	34.39
+ ID2= 2 (0359):	28.60	3.204	6.17	36.05
ID = 3 (0363):	58.60	6.846	6.17	35.20

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     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0106):    51.32   5.545     6.17    36.09
        + ID2= 2 (0114):    49.64   4.877     6.17    36.08
          ==================================================
          ID = 3 (0115):   100.96  10.422     6.17    36.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0563):    19.00   2.866     6.08    36.42
        + ID2= 2 (0607):     5.97    .921     6.08    30.64
          ==================================================
          ID = 3 (0492):    24.97   3.787     6.08    35.04

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0525):      .00     .001      .00  *******
        + ID2= 2 (0520):    74.76   9.159     6.00    40.49
          ==================================================
          ID = 3 (0526):    74.76   9.159     6.00    40.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0363):    58.60   6.846     6.17    35.20
        + ID2= 2 (0365):   117.50  16.238     6.08    36.09
          ==================================================
          ID = 3 (0380):   176.10  22.579     6.08    35.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .2910       .3795
                          .2590      .0579    |    .2970       .4503
```

.2660	.1180	1.6320	.5232
.2720	.1802	4.1680	.5983
.2790	.2445	7.5660	.6756
.2850	.3109	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0492)	24.970	3.787	6.08	35.04
OUTFLOW: ID= 1 (0482)	24.970	1.351	6.42	35.04

PEAK FLOW REDUCTION [Qout/Qin](%)= 35.67
TIME SHIFT OF PEAK FLOW (min)= 20.00
MAXIMUM STORAGE USED (ha.m.)= .5079

ROUTE CHN (0527)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	313.20	.0500	
140.00	312.40	.0500 / .0300	Main Channel
140.50	310.80	.0300	Main Channel
141.50	310.80	.0300	Main Channel
142.00	312.40	.0300 / .0500	Main Channel
160.00	313.20	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.12	310.92	.575E+02	.1	.40	18.86
.25	311.05	.119E+03	.2	.57	13.13
.37	311.17	.185E+03	.3	.69	10.87
.49	311.29	.256E+03	.4	.78	9.61
.62	311.42	.330E+03	.6	.86	8.77
.74	311.54	.409E+03	.8	.92	8.17
.86	311.66	.492E+03	1.1	.97	7.70
.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0526)	74.76	9.16	6.00	40.49	2.09	.74
OUTFLOW: ID= 1 (0527)	74.76	7.08	6.17	40.49	2.01	.77

RESERVOIR (0390)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW STORAGE | OUTFLOW STORAGE

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(cms)	(ha.m.)	(cms)	(ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	22.579	6.08	35.79
OUTFLOW: ID= 1 (0390)	176.100	1.387	7.17	35.79

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.14
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 4.6291

ADD HYD (0400)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0395):	51.20	5.668	6.17	23.89
	+ ID2= 2 (0390):	176.10	1.387	7.17	35.79
	ID = 3 (0400):	227.30	6.995	6.17	33.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0403)
IN= 2---> OUT= 1 Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20

```
 3.00   338.30    .234E+06     561.0          4.56       6.95

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
INFLOW : ID= 2 (0400)  227.30     7.00    6.17  33.11       .46      1.36
OUTFLOW: ID= 1 (0403)  227.30     4.32    6.33  33.11       .36      1.16


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--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0403):   227.30   4.324     6.33    33.11
        + ID2= 2 (0115):   100.96  10.422     6.17    36.08
          ====================================================
          ID = 3 (0407):   328.26  13.657     6.17    34.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.6000      6.4000
                           1.1000     2.9000    |   9.1000     10.0000
                           1.3000     4.3000    |  12.0000     20.0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
INFLOW : ID= 2 (0407)    328.260     13.657        6.17       34.03
OUTFLOW: ID= 1 (0113)    328.260      1.367       15.17       34.02

                 PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.01
                 TIME SHIFT OF PEAK FLOW         (min)=540.00
                 MAXIMUM  STORAGE   USED       (ha.m.)=  4.7719

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--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0113):   328.26   1.367    15.17    34.02
        + ID2= 2 (0425):    21.68   1.980     5.83    36.09
          ====================================================
          ID = 3 (0430):   349.94   2.494     6.25    34.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        325.40         .0600
                 120.00        324.60         .0600
```

126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0430)	349.94	2.49	6.25	34.15	.35	1.29
OUTFLOW:	ID= 1 (0440)	349.94	2.40	6.33	34.15	.34	1.28

ADD HYD (0485)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0475):	56.21	9.543	6.08	36.09
	+ ID2= 2 (0440):	349.94	2.403	6.33	34.15
	ID = 3 (0485):	406.15	11.718	6.08	34.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0490)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0480):	43.10	6.559	6.00	36.09
	+ ID2= 2 (0485):	406.15	11.718	6.08	34.42
	ID = 3 (0490):	449.25	17.844	6.08	34.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0491) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0490):    449.25  17.844     6.08    34.58
        + ID2= 2 (0482):     24.97   1.351     6.42    35.04
          ===================================================
          ID = 3 (0491):    474.22  18.128     6.08    34.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   7.0800      2.4860
                            .2760      .0600    |   8.1000      3.3240
                           1.2000      .3400    |   9.7980      4.6420
                           2.0400      .6182    |  10.4940      7.4397
                           2.6400     1.1630    |  11.6850     10.3000
                           3.1200     1.7070    |  12.3480     11.4000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)     474.220    18.128        6.08       34.60
     OUTFLOW: ID= 1 (0483)     474.220     6.839        6.50       34.60

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 37.72
                    TIME SHIFT OF PEAK FLOW         (min)= 25.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  2.4478

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--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0483):    474.22   6.839     6.50    34.60
        + ID2= 2 (0540):      4.63   1.036     6.00    61.38
          ===================================================
          ID = 3 (0530):    478.85   7.014     6.50    34.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0530):    478.85   7.014     6.50    34.86
        + ID2= 2 (0527):     74.76   7.076     6.17    40.49
          ===================================================
          ID = 3 (0545):    553.61  13.871     6.50    35.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0545):   553.61  13.871     6.50    35.62
        + ID2= 2 (0542):    25.25   5.333     6.00    61.38
          ===================================================
          ID = 3 (0546):   578.86  14.994     6.00    36.75

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0546):   578.86  14.994     6.00    36.75
        + ID2= 2 (0543):    14.99   3.310     6.00    61.38
          ===================================================
          ID = 3 (0547):   593.85  18.304     6.00    37.37

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0547):   593.85  18.304     6.00    37.37
        + ID2= 2 (0544):     1.13    .266     6.00    61.38
          ===================================================
          ID = 3 (0548):   594.98  18.570     6.00    37.41

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************


--------------------
|    READ STORM    |    Filename: Y:\SPrimmer\OTTHYMO\Ci
|                  |              tyview Ridge\100yrSCS12hr.stm
| Ptotal= 90.18 mm |    Comments: 100 year SCS Type II 12hr design storm
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	2.26	3.25	3.61	6.25	16.23	9.25	3.16
.50	2.26	3.50	3.61	6.50	16.23	9.50	3.16
.75	2.26	3.75	3.61	6.75	7.21	9.75	3.16
1.00	2.26	4.00	3.61	7.00	7.21	10.00	3.16
1.25	2.26	4.25	5.41	7.25	5.41	10.25	1.80
1.50	2.26	4.50	5.41	7.50	5.41	10.50	1.80
1.75	2.26	4.75	7.21	7.75	5.41	10.75	1.80
2.00	2.26	5.00	7.21	8.00	5.41	11.00	1.80
2.25	2.70	5.25	10.82	8.25	3.16	11.25	1.80
2.50	2.70	5.50	10.82	8.50	3.16	11.50	1.80
2.75	2.70	5.75	43.29	8.75	3.16	11.75	1.80
3.00	2.70	6.00	119.04	9.00	3.16	12.00	1.80

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--------------------
| CALIB            |
| STANDHYD  (0480) |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10         25.00
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     680.00         40.00
     Mannings n           =       .013          .300

         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
.083	2.26	3.083	3.61	6.083	16.23	9.08	3.16
.167	2.26	3.167	3.61	6.167	16.23	9.17	3.16
.250	2.26	3.250	3.61	6.250	16.23	9.25	3.16
.333	2.26	3.333	3.61	6.333	16.23	9.33	3.16
.417	2.26	3.417	3.61	6.417	16.23	9.42	3.16
.500	2.26	3.500	3.61	6.500	16.23	9.50	3.16
.583	2.26	3.583	3.61	6.583	7.21	9.58	3.16
.667	2.26	3.667	3.61	6.667	7.21	9.67	3.16
.750	2.26	3.750	3.61	6.750	7.21	9.75	3.16
.833	2.26	3.833	3.61	6.833	7.21	9.83	3.16
.917	2.26	3.917	3.61	6.917	7.21	9.92	3.16
1.000	2.26	4.000	3.61	7.000	7.21	10.00	3.16
1.083	2.26	4.083	5.41	7.083	5.41	10.08	1.80
1.167	2.26	4.167	5.41	7.167	5.41	10.17	1.80
1.250	2.26	4.250	5.41	7.250	5.41	10.25	1.80
1.333	2.26	4.333	5.41	7.333	5.41	10.33	1.80
1.417	2.26	4.417	5.41	7.417	5.41	10.42	1.80
1.500	2.26	4.500	5.41	7.500	5.41	10.50	1.80
1.583	2.26	4.583	7.21	7.583	5.41	10.58	1.80
1.667	2.26	4.667	7.21	7.667	5.41	10.67	1.80
1.750	2.26	4.750	7.21	7.750	5.41	10.75	1.80
1.833	2.26	4.833	7.21	7.833	5.41	10.83	1.80
1.917	2.26	4.917	7.21	7.917	5.41	10.92	1.80
2.000	2.26	5.000	7.21	8.000	5.41	11.00	1.80
2.083	2.70	5.083	10.82	8.083	3.16	11.08	1.80
2.167	2.70	5.167	10.82	8.167	3.16	11.17	1.80
2.250	2.70	5.250	10.82	8.250	3.16	11.25	1.80
2.333	2.70	5.333	10.82	8.333	3.16	11.33	1.80
2.417	2.70	5.417	10.82	8.417	3.16	11.42	1.80
2.500	2.70	5.500	10.82	8.500	3.16	11.50	1.80
2.583	2.70	5.583	43.29	8.583	3.16	11.58	1.80
2.667	2.70	5.667	43.29	8.667	3.16	11.67	1.80
2.750	2.70	5.750	43.29	8.750	3.16	11.75	1.80
2.833	2.70	5.833	119.04	8.833	3.16	11.83	1.80
2.917	2.70	5.917	119.04	8.917	3.16	11.92	1.80
3.000	2.70	6.000	119.04	9.000	3.16	12.00	1.80

```
     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       6.11 (ii)    12.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .19           .08
```

```
                                                          *TOTALS*
     PEAK FLOW        (cms)=       2.82          6.56          8.721 (iii)
     TIME TO PEAK     (hrs)=       6.00          6.08           6.00
     RUNOFF VOLUME     (mm)=      88.68         36.13          47.17
     TOTAL RAINFALL    (mm)=      90.18         90.18          90.18
     RUNOFF COEFFICIENT   =         .98           .40            .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       2.10          2.89
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=       2.86          2.86
     Length             (m)=     185.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         10.00
     Storage Coeff.  (min)=       2.51 (ii)     8.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=        .29           .12
                                                          *TOTALS*
     PEAK FLOW        (cms)=        .35           .96          1.304 (iii)
     TIME TO PEAK     (hrs)=       6.00          6.00           6.00
     RUNOFF VOLUME     (mm)=      88.68         36.13          47.17
     TOTAL RAINFALL    (mm)=      90.18         90.18          90.18
     RUNOFF COEFFICIENT   =         .98           .40            .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      10.16         14.04
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=       2.00          2.00
     Length             (m)=     401.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
```

```
            over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.45 (ii)   11.16 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .23          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.64         3.90         5.204 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       15.12        20.88
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=        2.03         2.03
     Length            (m)=      465.00        40.00
     Mannings n          =        .013         .300

     Max.Eff.Inten.(mm/hr)=      119.04       149.56
            over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.84 (ii)   11.52 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.43         5.73         7.639 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        5.33         7.37
     Dep. Storage     (mm)=        1.50         5.00
```

```
          Hadati Creek Watershed - Post Development with Cityview Ridge
     Average Slope      (%)=       1.71          1.71
     Length             (m)=     300.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       3.92 (ii)    10.95 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .24           .09
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .87          2.06          2.756 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08           6.00
     RUNOFF VOLUME    (mm)=      88.68         36.13          47.17
     TOTAL RAINFALL   (mm)=      90.18         90.18          90.18
     RUNOFF COEFFICIENT   =        .98           .40            .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD  (0395)   |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.12         46.08
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     900.00         40.00
     Mannings n           =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        112.64
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       7.23 (ii)    14.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .17           .08
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .78          8.19          8.631 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08           6.08
     RUNOFF VOLUME    (mm)=      88.68         31.49          34.35
     TOTAL RAINFALL   (mm)=      90.18         90.18          90.18
     RUNOFF COEFFICIENT   =        .98           .35            .38

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
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           Hadati Creek Watershed - Post Development with Cityview Ridge
| STANDHYD  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       140.44
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.75 (ii)   11.63 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.83         4.81         6.183 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        35.04         45.23
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .39           .50

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.88 (ii)   13.13 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.10         2.45         3.299 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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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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| CALIB            |
| STANDHYD  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.17          7.13
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       1.60          1.60
     Length            (m)=     286.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       3.89 (ii)    11.05 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .25           .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .84          1.99        2.661 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         36.13        47.17
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .40          .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      49.35         68.15
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     885.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       7.16 (ii)    13.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .17           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       7.49         17.25       22.881 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         36.13        47.17
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .40          .52
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      (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (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  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.55        29.77
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     550.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.38 (ii)   12.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21         .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.42         8.01        10.668 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98         .40           .52


      (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01         8.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     287.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.64 (ii)   10.35 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .25         .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .98         2.37          3.171 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
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     TOTAL RAINFALL   (mm)=      90.18        90.18          90.18
     RUNOFF COEFFICIENT   =        .98          .40            .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.81 (ii)   10.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .25          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.12         2.69         3.593 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98        11.02
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     365.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.21 (ii)   10.91 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
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     Unit Hyd. peak  (cms)=        .24          .09
                                                              *TOTALS*
     PEAK FLOW       (cms)=       1.30         3.09           4.123 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08            6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13           47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18           90.18
     RUNOFF COEFFICIENT   =        .98          .40             .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0600) |   Area    (ha)=  11.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.78         6.60
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.11 (ii)   12.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .19          .08
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .75         1.73           2.303 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08            6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13           47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18           90.18
     RUNOFF COEFFICIENT   =        .98          .40             .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0601) |   Area    (ha)=   7.62
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.51         4.11
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300
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        Hadati Creek Watershed - Post Development with Cityview Ridge
     Max.Eff.Inten.(mm/hr)=     119.04        161.60
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       6.11 (ii)    12.61 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .19           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .50          1.19        1.576 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         37.55        48.29
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .42          .54


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0607) |   Area    (ha)=   5.97
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=   2.50
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.51          3.46
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     680.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        187.59
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       6.11 (ii)    12.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .19           .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .05          1.19        1.215 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.08
     RUNOFF VOLUME    (mm)=      88.68         39.89        41.11
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .44          .46

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70           .93
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     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=        .55           .55
     Length             (m)=     150.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        111.85
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       3.64 (ii)    14.73 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .25           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.20           .16        1.339 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         31.37        76.65
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .35          .85

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0500)   |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=     112.24        131.76
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=        .80           .80
     Length             (m)=    1275.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        150.55
                over (min)       10.00         25.00
     Storage Coeff.  (min)=      11.73 (ii)    20.53 (ii)
     Unit Hyd. Tpeak (min)=      10.00         25.00
     Unit Hyd. peak  (cms)=        .10           .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=      15.54         24.76       34.262 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.25         6.17
     RUNOFF VOLUME    (mm)=      88.68         36.25        49.88
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .40          .55


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0510)   |   Area    (ha)=  16.00
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          Hadati Creek Watershed - Post Development with Cityview Ridge
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.80         3.20
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .50          .20
     Length            (m)=     400.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04        91.82
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       6.74 (ii)   22.99 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .18          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.88          .40         4.080 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.25          6.00
     RUNOFF VOLUME    (mm)=      88.68        31.37         76.65
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .35           .85


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.20         5.05
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     350.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       111.85
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.05 (ii)   17.13 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       6.23          .77         6.749 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.00
     RUNOFF VOLUME    (mm)=      88.68        31.37         76.65
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .35           .85


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       11.99          3.00
     Dep. Storage     (mm)=        1.50          5.00
     Average Slope     (%)=         .55           .55
     Length            (m)=      200.00         40.00
     Mannings n          =        .013          .300

     Max.Eff.Inten.(mm/hr)=      119.04        111.85
                over (min)         5.00         20.00
     Storage Coeff.  (min)=        4.32 (ii)    15.41 (ii)
     Unit Hyd. Tpeak (min)=        5.00         20.00
     Unit Hyd. peak  (cms)=         .23           .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        3.84           .48        4.164 (iii)
     TIME TO PEAK    (hrs)=        6.00          6.17         6.00
     RUNOFF VOLUME    (mm)=       88.68         31.37        76.65
     TOTAL RAINFALL   (mm)=       90.18         90.18        90.18
     RUNOFF COEFFICIENT   =         .98           .35          .85

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=         .90           .23
     Dep. Storage     (mm)=        1.50          5.00
     Average Slope     (%)=         .55           .55
     Length            (m)=       50.00         40.00
     Mannings n          =        .013          .300

     Max.Eff.Inten.(mm/hr)=      119.04        111.85
                over (min)         5.00         15.00
     Storage Coeff.  (min)=        1.88 (ii)    12.97 (ii)
     Unit Hyd. Tpeak (min)=        5.00         15.00
     Unit Hyd. peak  (cms)=         .32           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=         .30           .04         .333 (iii)
     TIME TO PEAK    (hrs)=        6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=       88.68         31.37        76.65
     TOTAL RAINFALL   (mm)=       90.18         90.18        90.18
     RUNOFF COEFFICIENT   =         .98           .35          .85

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
```

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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

--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0415):     4.99   1.304     6.00    47.17
        + ID2= 2 (0410):    24.20   5.204     6.00    47.17
          ===================================================
          ID = 3 (0420):    29.19   6.509     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0465) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0460):    36.00   7.639     6.00    47.17
        + ID2= 2 (0455):    12.70   2.756     6.00    47.17
          ===================================================
          ID = 3 (0465):    48.70  10.395     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0362) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00           .40         .0300
                   5.50           .15     .0300 / .0150  Main Channel
                   5.51           .00         .0150      Main Channel
                  10.00           .09         .0150      Main Channel
                  14.49           .00         .0150      Main Channel
                  14.50           .15     .0150 / .0300  Main Channel
                  20.00           .40         .0300

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .02      .02    .176E+02        .0           .21       80.52
        .04      .04    .702E+02        .0           .33       50.72
        .06      .06    .158E+03        .1           .43       38.71
        .08      .08    .281E+03        .1           .52       31.95
        .09      .09    .438E+03        .3           .62       26.84
        .11      .11    .607E+03        .5           .77       21.66
        .13      .13    .776E+03        .7           .90       18.45
        .15      .15    .944E+03       1.0          1.03       16.22
```

.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	6.18	6.00	45.23	.35	1.71
OUTFLOW: ID= 1 (0362)	30.00	4.88	6.17	45.22	.31	1.63

```
| ROUTE CHN (0353) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	3.30	6.00	47.17	.26	1.34
OUTFLOW: ID= 1 (0353)	16.30	2.44	6.17	47.13	.22	1.29

```
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	2.66	6.00	47.17	.23	1.31
OUTFLOW: ID= 1 (0358)	12.30	1.86	6.17	47.12	.20	1.23

```
--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5000	.4000
.0100	.0100	6.6000	.8000
.0260	.2300	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0105)	51.320	10.668	6.00	47.17
OUTFLOW: ID= 1 (0106)	51.320	7.689	6.17	47.16

PEAK FLOW REDUCTION [Qout/Qin](%)= 72.08
TIME SHIFT OF PEAK FLOW (min)= 10.00

```
                MAXIMUM  STORAGE   USED       (ha.m.)=   .8782

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

--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0102):    14.32   3.171     6.00    47.17
        + ID2= 2 (0101):    16.32   3.593     6.00    47.17
          ==================================================
          ID = 3 (0103):    30.64   6.763     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.0000      1.0000
                            .0100      .0100    |  20.0000      1.1000
                            .0120      .1000    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)      19.000      4.123        6.00       47.17
     OUTFLOW: ID= 1 (0111)      19.000       .613        6.58       47.16

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.87
                TIME SHIFT OF PEAK FLOW         (min)= 35.00
                MAXIMUM  STORAGE   USED       (ha.m.)=   .6478

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--------------------
| ADD HYD   (0602) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0600):    11.38   2.303     6.00    47.17
        + ID2= 2 (0601):     7.62   1.576     6.00    48.29
          ==================================================
          ID = 3 (0602):    19.00   3.878     6.00    47.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |      AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1): 244.00     34.26      6.17    49.88
     ======================================================
     MAJOR SYS.(ID= 2): 102.03     25.26      6.17    49.88
     MINOR SYS.(ID= 3): 141.97      9.00      5.83    49.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0505):   141.97   9.000     5.83    49.88
        + ID2= 2 (0510):    16.00   4.080     6.00    76.65
          ==================================================
          ID = 3 (0515):   157.97  13.080     6.00    52.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  29.19      6.51      6.00   47.17
     ====================================================
     MAJOR SYS.(ID= 2):  10.15      4.53      6.00   47.17
     MINOR SYS.(ID= 3):  19.04      1.98      5.83   47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0425):    10.15   4.529     6.00    47.17
        + ID2= 2 (0465):    48.70  10.395     6.00    47.17
          ==================================================
          ID = 3 (0470):    58.85  14.924     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0353):    16.30   2.435     6.17    47.13
        + ID2= 2 (0358):    12.30   1.856     6.17    47.12
          ==================================================
          ID = 3 (0359):    28.60   4.291     6.17    47.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   1.0000       .5000
                           .0100      .0100    |  10.0000       .6000
                           .0150      .1332    |    .0000       .0000

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

Hadati Creek Watershed - Post Development with Cityview Ridge

```
INFLOW : ID= 2 (0103)     30.640      6.763        6.00       47.17
OUTFLOW: ID= 1 (0104)     30.640      7.048        6.08       47.16

              PEAK   FLOW   REDUCTION [Qout/Qin](%)=104.21
              TIME SHIFT OF PEAK FLOW         (min)=  5.00
              MAXIMUM  STORAGE   USED       (ha.m.)=   .5855

**** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                 CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0114) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0104):    30.64   7.048     6.08    47.16
       + ID2= 2 (0111):    19.00    .613     6.58    47.16
         ==================================================
         ID = 3 (0114):    49.64   7.421     6.08    47.16

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0563) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   2.2) ------>
              Distance      Elevation       Manning
                   .00          1.00         .0350
                 2.00           .50          .0350
                 4.00           .00      .0350 / .0350  Main Channel
                 4.50           .00          .0350      Main Channel
                 5.00           .00      .0350 / .0350  Main Channel
                 7.00           .50          .0350
                 9.00          1.00          .0350

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .05      .05    .745E+01        .0           .64       3.06
        .11      .11    .175E+02        .1           .96       2.03
        .16      .16    .301E+02        .3          1.21       1.61
        .21      .21    .454E+02        .6          1.42       1.37
        .26      .26    .632E+02        .9          1.61       1.21
        .32      .32    .836E+02       1.3          1.77       1.10
        .37      .37    .107E+03       1.8          1.93       1.01
        .42      .42    .132E+03       2.3          2.08        .94
        .47      .47    .160E+03       3.0          2.22        .88
        .53      .53    .191E+03       3.8          2.35        .83
        .58      .58    .225E+03       4.8          2.48        .79
        .63      .63    .261E+03       5.8          2.60        .75
        .68      .68    .299E+03       7.0          2.72        .72
        .74      .74    .340E+03       8.2          2.84        .69
        .79      .79    .384E+03       9.7          2.95        .66
        .84      .84    .430E+03      11.3          3.06        .64
        .89      .89    .479E+03      13.0          3.17        .62
        .95      .95    .531E+03      14.8          3.27        .60
       1.00     1.00    .585E+03      16.9          3.38        .58

                                   <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
```

```
INFLOW : ID= 2 (0602)   19.00     3.88    6.00  47.62       .53      2.35
OUTFLOW: ID= 1 (0563)   19.00     3.76    6.08  47.62       .52      2.33


--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                   .00        101.50         .0500
                  1.00        100.70         .0500
                  1.50        100.55     .0500 / .0300  Main Channel
                  2.00         99.50         .0300      Main Channel
                  3.50         99.60         .0300      Main Channel
                  4.50        100.65     .0300 / .0500  Main Channel
                  6.00        101.45         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .10    99.60    .353E+02        .0           .19      43.69
        .19    99.69    .112E+03        .1           .37      22.76
        .29    99.79    .195E+03        .2           .49      17.03
        .38    99.88    .285E+03        .3           .59      14.23
        .48    99.98    .381E+03        .5           .67      12.51
        .57   100.07    .484E+03        .7           .74      11.32
        .67   100.17    .594E+03        .9           .80      10.43
        .76   100.26    .710E+03       1.2           .86       9.74
        .86   100.36    .832E+03       1.5           .91       9.18
        .95   100.45    .961E+03       1.8           .96       8.72
       1.05   100.55    .110E+04       2.2          1.00       8.32
       1.16   100.66    .127E+04       2.7          1.07       7.80
       1.28   100.78    .148E+04       3.4          1.14       7.31
       1.39   100.89    .170E+04       4.1          1.20       6.94
       1.50   101.00    .195E+04       4.9          1.25       6.65
       1.61   101.11    .221E+04       5.8          1.30       6.41
       1.72   101.22    .250E+04       6.7          1.34       6.22
       1.84   101.34    .280E+04       7.7          1.38       6.04
       1.95   101.45    .313E+04       8.8          1.41       5.90

     **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                   <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
     INFLOW : ID= 2 (0505)  102.03    25.26    6.17  49.88     1.80      1.37
     OUTFLOW: ID= 1 (0564)  102.03    39.67    6.58  49.88     1.95      1.41

     **** WARNING:  COMPUTATIONS FAILED TO CONVERGE.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |      AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1): 157.97     13.08      6.00    52.60
     ==================================================
     MAJOR SYS.(ID= 2):  67.54     10.03      6.00    52.60
     MINOR SYS.(ID= 3):  90.43      3.05      5.58    52.60
```

Hadati Creek Watershed - Post Development with Cityview Ridge
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02
1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29
2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0470)	58.85	14.92	6.00	47.17	.78	1.54
OUTFLOW:	ID= 1 (0475)	58.85	13.38	6.08	47.17	.74	1.49

```
--------------------
| ADD HYD   (0363) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0362):	30.00	4.880	6.17	45.22
+ ID2= 2 (0359):	28.60	4.291	6.17	47.13
ID = 3 (0363):	58.60	9.171	6.17	46.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0106):    51.32   7.689     6.17    47.16
        + ID2= 2 (0114):    49.64   7.421     6.08    47.16
          ===================================================
          ID = 3 (0115):   100.96  14.393     6.08    47.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0563):    19.00   3.758     6.08    47.62
        + ID2= 2 (0607):     5.97   1.215     6.08    41.11
          ===================================================
          ID = 3 (0492):    24.97   4.973     6.08    46.06

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0525):      .00    .001      .00  *******
        + ID2= 2 (0520):    67.54  10.030     6.00    52.60
          ===================================================
          ID = 3 (0526):    67.54  10.030     6.00    52.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0363):    58.60   9.171     6.17    46.15
        + ID2= 2 (0365):   117.50  22.881     6.00    47.17
          ===================================================
          ID = 3 (0380):   176.10  30.231     6.08    46.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .2910      .3795
                          .2590      .0579    |    .2970      .4503
                          .2660      .1180    |   1.6320      .5232
                          .2720      .1802    |   4.1680      .5983
                          .2790      .2445    |   7.5660      .6756
                          .2850      .3109    |    .0000      .0000
```

Hadati Creek Watershed - Post Development with Cityview Ridge

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0492)	24.970	4.973	6.08	46.06
OUTFLOW: ID= 1 (0482)	24.970	3.025	6.25	46.06

PEAK FLOW REDUCTION [Qout/Qin](%)= 60.83
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .5657

ROUTE CHN (0527)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	313.20	.0500	
140.00	312.40	.0500 / .0300	Main Channel
140.50	310.80	.0300	Main Channel
141.50	310.80	.0300	Main Channel
142.00	312.40	.0300 / .0500	Main Channel
160.00	313.20	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.12	310.92	.575E+02	.1	.40	18.86
.25	311.05	.119E+03	.2	.57	13.13
.37	311.17	.185E+03	.3	.69	10.87
.49	311.29	.256E+03	.4	.78	9.61
.62	311.42	.330E+03	.6	.86	8.77
.74	311.54	.409E+03	.8	.92	8.17
.86	311.66	.492E+03	1.1	.97	7.70
.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0526)	67.54	10.03	6.00	52.60	2.13	.74
OUTFLOW: ID= 1 (0527)	67.54	7.92	6.08	52.59	2.04	.76

RESERVOIR (0390)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

Hadati Creek Watershed - Post Development with Cityview Ridge

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	30.231	6.08	46.83
OUTFLOW: ID= 1 (0390)	176.100	1.430	7.25	46.83

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.73
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 6.3304

ADD HYD (0400)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0395):	51.20	8.631	6.08	34.35
+ ID2= 2 (0390):	176.10	1.430	7.25	46.83
ID = 3 (0400):	227.30	9.969	6.08	44.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0403)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

	<---- hydrograph ---->			<-pipe / channel->	
AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)

```
INFLOW : ID= 2 (0400)  227.30     9.97    6.08  44.02       .54      1.50
OUTFLOW: ID= 1 (0403)  227.30     6.22    6.25  44.02       .43      1.29

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

--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0403):   227.30   6.216     6.25    44.02
        + ID2= 2 (0115):   100.96  14.393     6.08    47.16
          ==================================================
          ID = 3 (0407):   328.26  18.926     6.17    44.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.6000      6.4000
                           1.1000     2.9000    |   9.1000     10.0000
                           1.3000     4.3000    |  12.0000     20.0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0407)     328.260     18.926        6.17       44.98
     OUTFLOW: ID= 1 (0113)     328.260      1.552       12.50       44.98

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.20
                    TIME SHIFT OF PEAK FLOW         (min)=380.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  6.0640

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

--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0113):   328.26   1.552    12.50    44.98
        + ID2= 2 (0425):    19.04   1.980     5.83    47.17
          ==================================================
          ID = 3 (0430):   347.30   3.000     6.33    45.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        325.40         .0600
                 120.00        324.60         .0600
                 126.00        323.90         .0600
                 130.00        323.00         .0600
                 140.00        322.30     .0600 / .0300  Main Channel
                 142.00        322.30     .0300 / .0600  Main Channel
                 150.00        323.90         .0600
```

155.00	324.60	.0600
160.00	325.40	.0600

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0430)	347.30	3.00	6.33	45.10	.38	1.33
OUTFLOW: ID= 1 (0440)	347.30	2.86	6.42	45.10	.37	1.31

ADD HYD (0485)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0475):	58.85	13.381	6.08	47.17
	+ ID2= 2 (0440):	347.30	2.860	6.42	45.10
	ID = 3 (0485):	406.15	15.674	6.08	45.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0490)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0480):	43.10	8.721	6.00	47.17
	+ ID2= 2 (0485):	406.15	15.674	6.08	45.40
	ID = 3 (0490):	449.25	23.705	6.08	45.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0491)

```
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0490):   449.25  23.705     6.08    45.57
        + ID2= 2 (0482):    24.97   3.025     6.25    46.06
          ==================================================
          ID = 3 (0491):   474.22  24.000     6.08    45.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   7.0800      2.4860
                           .2760      .0600    |   8.1000      3.3240
                          1.2000      .3400    |   9.7980      4.6420
                          2.0400      .6182    |  10.4940      7.4397
                          2.6400     1.1630    |  11.6850     10.3000
                          3.1200     1.7070    |  12.3480     11.4000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)    474.220     24.000        6.08       45.60
     OUTFLOW: ID= 1 (0483)    474.220      8.205        6.58       45.60

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 34.19
                   TIME SHIFT OF PEAK FLOW         (min)= 30.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  3.4099

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

--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0483):   474.22   8.205     6.58    45.60
        + ID2= 2 (0540):     4.63   1.339     6.00    76.65
          ==================================================
          ID = 3 (0530):   478.85   8.393     6.50    45.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0530):   478.85   8.393     6.50    45.90
        + ID2= 2 (0527):    67.54   7.924     6.08    52.59
          ==================================================
          ID = 3 (0545):   546.39  15.614     6.33    46.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
```

```
          ID1= 1 (0545):   546.39  15.614     6.33    46.72
        + ID2= 2 (0542):    25.25   6.749     6.00    76.65
          ==================================================
          ID = 3 (0546):   571.64  18.214     6.00    48.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0546):   571.64  18.214     6.00    48.05
        + ID2= 2 (0543):    14.99   4.164     6.00    76.65
          ==================================================
          ID = 3 (0547):   586.63  22.378     6.00    48.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0547):   586.63  22.378     6.00    48.78
        + ID2= 2 (0544):     1.13    .333     6.00    76.65
          ==================================================
          ID = 3 (0548):   587.76  22.711     6.00    48.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   5 **
  ****************************


--------------------
|    READ STORM    |     Filename: Y:\SPrimmer\OTTHYMO\Ci
|                  |               tyview Ridge\RegSCS12hr.stm
| Ptotal=211.07 mm |     Comments: Regional SCS Type II 12hr design storm
--------------------
                 TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .25    6.35 |  3.25   12.70 |  6.25   23.11 |  9.25   52.83
                  .50    6.35 |  3.50   12.70 |  6.50   23.11 |  9.50   52.83
                  .75    6.35 |  3.75   12.70 |  6.75   23.11 |  9.75   52.83
                 1.00    6.35 |  4.00   12.70 |  7.00   23.11 | 10.00   52.83
                 1.25    4.32 |  4.25   16.76 |  7.25   12.70 | 10.25   37.85
                 1.50    4.32 |  4.50   16.76 |  7.50   12.70 | 10.50   37.85
                 1.75    4.32 |  4.75   16.76 |  7.75   12.70 | 10.75   37.85
                 2.00    4.32 |  5.00   16.76 |  8.00   12.70 | 11.00   37.85
                 2.25    6.35 |  5.25   12.70 |  8.25   12.70 | 11.25   12.70
                 2.50    6.35 |  5.50   12.70 |  8.50   12.70 | 11.50   12.70
                 2.75    6.35 |  5.75   12.70 |  8.75   12.70 | 11.75   12.70
                 3.00    6.35 |  6.00   12.70 |  9.00   12.70 | 12.00   12.70

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| CALIB            |
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Hadati Creek Watershed - Post Development with Cityview Ridge

| STANDHYD (0480) | Area (ha)= 43.10
|ID= 1 DT= 5.0 min | Total Imp(%)= 42.00 Dir. Conn.(%)= 21.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	18.10	25.00
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	680.00	40.00
Mannings n	=	.013	.300

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
.083	6.35	3.083	12.70	6.083	23.11	9.08	52.83
.167	6.35	3.167	12.70	6.167	23.11	9.17	52.83
.250	6.35	3.250	12.70	6.250	23.11	9.25	52.83
.333	6.35	3.333	12.70	6.333	23.11	9.33	52.83
.417	6.35	3.417	12.70	6.417	23.11	9.42	52.83
.500	6.35	3.500	12.70	6.500	23.11	9.50	52.83
.583	6.35	3.583	12.70	6.583	23.11	9.58	52.83
.667	6.35	3.667	12.70	6.667	23.11	9.67	52.83
.750	6.35	3.750	12.70	6.750	23.11	9.75	52.83
.833	6.35	3.833	12.70	6.833	23.11	9.83	52.83
.917	6.35	3.917	12.70	6.917	23.11	9.92	52.83
1.000	6.35	4.000	12.70	7.000	23.11	10.00	52.83
1.083	4.32	4.083	16.76	7.083	12.70	10.08	37.85
1.167	4.32	4.167	16.76	7.167	12.70	10.17	37.85
1.250	4.32	4.250	16.76	7.250	12.70	10.25	37.85
1.333	4.32	4.333	16.76	7.333	12.70	10.33	37.85
1.417	4.32	4.417	16.76	7.417	12.70	10.42	37.85
1.500	4.32	4.500	16.76	7.500	12.70	10.50	37.85
1.583	4.32	4.583	16.76	7.583	12.70	10.58	37.85
1.667	4.32	4.667	16.76	7.667	12.70	10.67	37.85
1.750	4.32	4.750	16.76	7.750	12.70	10.75	37.85
1.833	4.32	4.833	16.76	7.833	12.70	10.83	37.85
1.917	4.32	4.917	16.76	7.917	12.70	10.92	37.85
2.000	4.32	5.000	16.76	8.000	12.70	11.00	37.85
2.083	6.35	5.083	12.70	8.083	12.70	11.08	12.70
2.167	6.35	5.167	12.70	8.167	12.70	11.17	12.70
2.250	6.35	5.250	12.70	8.250	12.70	11.25	12.70
2.333	6.35	5.333	12.70	8.333	12.70	11.33	12.70
2.417	6.35	5.417	12.70	8.417	12.70	11.42	12.70
2.500	6.35	5.500	12.70	8.500	12.70	11.50	12.70
2.583	6.35	5.583	12.70	8.583	12.70	11.58	12.70
2.667	6.35	5.667	12.70	8.667	12.70	11.67	12.70
2.750	6.35	5.750	12.70	8.750	12.70	11.75	12.70
2.833	6.35	5.833	12.70	8.833	12.70	11.83	12.70
2.917	6.35	5.917	12.70	8.917	12.70	11.92	12.70
3.000	6.35	6.000	12.70	9.000	12.70	12.00	12.70

Max.Eff.Inten.(mm/hr)=		52.83	59.46	
over (min)		10.00	20.00	
Storage Coeff.	(min)=	8.46 (ii)	18.15 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	20.00	
Unit Hyd. peak	(cms)=	.12	.06	
				TOTALS
PEAK FLOW	(cms)=	1.33	3.90	5.222 (iii)
TIME TO PEAK	(hrs)=	10.00	10.00	10.00
RUNOFF VOLUME	(mm)=	209.57	107.20	128.70
TOTAL RAINFALL	(mm)=	211.07	211.07	211.07

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RUNOFF COEFFICIENT   =        .99          .51            .61


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.10         2.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.86         2.86
     Length            (m)=     185.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.48 (ii)   12.19 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .26          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .15          .47          .626 (iii)
     TIME TO PEAK    (hrs)=       9.92        10.00         10.00
     RUNOFF VOLUME    (mm)=     209.57       107.20        128.70
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .51           .61

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

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16        14.04
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     401.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.16 (ii)   15.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .07
                                                          *TOTALS*
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PEAK FLOW        (cms)=        .75          2.23          2.975 (iii)
TIME TO PEAK     (hrs)=      10.00         10.00          10.00
RUNOFF VOLUME     (mm)=     209.57        107.20         128.70
TOTAL RAINFALL    (mm)=     211.07        211.07         211.07
RUNOFF COEFFICIENT   =        .99           .51            .61


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=       15.12         20.88
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        2.03          2.03
Length             (m)=      465.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         59.46
           over (min)         5.00         20.00
Storage Coeff.  (min)=        6.71 (ii)    16.36 (ii)
Unit Hyd. Tpeak (min)=        5.00         20.00
Unit Hyd. peak  (cms)=         .18           .06
                                                        *TOTALS*
PEAK FLOW        (cms)=        1.11          3.30          4.413 (iii)
TIME TO PEAK     (hrs)=       10.00         10.00          10.00
RUNOFF VOLUME     (mm)=      209.57        107.20         128.70
TOTAL RAINFALL    (mm)=      211.07        211.07         211.07
RUNOFF COEFFICIENT   =         .99           .51            .61


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=        5.33          7.37
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        1.71          1.71
Length             (m)=      300.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         59.46
           over (min)         5.00         20.00
Storage Coeff.  (min)=        5.43 (ii)    15.59 (ii)
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Unit Hyd. Tpeak (min)=        5.00        20.00
Unit Hyd. peak  (cms)=         .20          .07
                                                        *TOTALS*
PEAK FLOW       (cms)=         .39         1.17          1.564 (iii)
TIME TO PEAK    (hrs)=       10.00        10.00          10.00
RUNOFF VOLUME    (mm)=      209.57       107.20         128.70
TOTAL RAINFALL   (mm)=      211.07       211.07         211.07
RUNOFF COEFFICIENT   =         .99          .51            .61


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0395) |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=          5.12         46.08
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          2.00          2.00
Length            (m)=        900.00         40.00
Mannings n           =          .013          .300

Max.Eff.Inten.(mm/hr)=         52.83         43.26
            over (min)         10.00         25.00
Storage Coeff.  (min)=         10.01 (ii)    21.02 (ii)
Unit Hyd. Tpeak (min)=         10.00         25.00
Unit Hyd. peak  (cms)=           .11           .05
                                                        *TOTALS*
PEAK FLOW       (cms)=           .37          5.03          5.388 (iii)
TIME TO PEAK    (hrs)=         10.00         10.08          10.08
RUNOFF VOLUME    (mm)=        209.57         81.91          88.29
TOTAL RAINFALL   (mm)=        211.07        211.07         211.07
RUNOFF COEFFICIENT   =           .99           .39            .42

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=         11.10         18.90
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          2.00          2.00
Length            (m)=        447.00         40.00
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     Mannings n              =       .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         55.42
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       6.58 (ii)    16.55 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .18           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .84          2.78        3.618 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        101.80       122.28
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .48          .58

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       6.75 (ii)    18.68 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .18           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .50          1.47        1.968 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20       128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .51          .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
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Hadati Creek Watershed - Post Development with Cityview Ridge

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	5.17	7.13	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	1.60	1.60	
Length	(m)=	286.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.(mm/hr)=		52.83	59.46	
over (min)		5.00	20.00	
Storage Coeff.	(min)=	5.38 (ii)	15.74 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.21	.07	
				TOTALS
PEAK FLOW	(cms)=	.38	1.13	1.513 (iii)
TIME TO PEAK	(hrs)=	10.00	10.00	10.00
RUNOFF VOLUME	(mm)=	209.57	107.20	128.70
TOTAL RAINFALL	(mm)=	211.07	211.07	211.07
RUNOFF COEFFICIENT	=	.99	.51	.61

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(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  (0365)   |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
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		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	49.35	68.15	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	885.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.(mm/hr)=		52.83	59.46	
over (min)		10.00	20.00	
Storage Coeff.	(min)=	9.91 (ii)	19.60 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	20.00	
Unit Hyd. peak	(cms)=	.11	.06	
				TOTALS
PEAK FLOW	(cms)=	3.61	10.49	14.089 (iii)
TIME TO PEAK	(hrs)=	10.00	10.08	10.00
RUNOFF VOLUME	(mm)=	209.57	107.20	128.70
TOTAL RAINFALL	(mm)=	211.07	211.07	211.07
RUNOFF COEFFICIENT	=	.99	.51	.61

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
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| STANDHYD  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.55         29.77
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     550.00         40.00
     Mannings n          =        .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       7.45 (ii)    17.14 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .17           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.58          4.68        6.260 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20       128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .51          .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01          8.31
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     287.00         40.00
     Mannings n          =        .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       5.04 (ii)    14.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .21           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .44          1.34        1.780 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20       128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .51          .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85          9.47
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     309.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       5.27 (ii)    14.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .21           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .50          1.52        2.027 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20       128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .51          .61

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98         11.02
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     365.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       5.82 (ii)    15.52 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .20           .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .59          1.75        2.340 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20       128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .51          .61

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
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          THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0600) |   Area    (ha)=  11.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.78         6.60
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)      10.00        20.00
     Storage Coeff.  (min)=       8.46 (ii)   18.15 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .35         1.03          1.379 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00          10.00
     RUNOFF VOLUME    (mm)=     209.57       107.20         128.70
     TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
     RUNOFF COEFFICIENT   =        .99          .51            .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0601) |   Area    (ha)=   7.62
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.51         4.11
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        64.79
                over (min)      10.00        20.00
     Storage Coeff.  (min)=       8.46 (ii)   17.83 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .23          .70           .936 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00          10.00
     RUNOFF VOLUME    (mm)=     209.57       113.39         133.59
     TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
     RUNOFF COEFFICIENT   =        .99          .54            .63


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
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          Hadati Creek Watershed - Post Development with Cityview Ridge
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (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  (0607)   |   Area    (ha)=   5.97
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=   2.50
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.51         3.46
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        76.31
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       8.46 (ii)   17.23 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .02          .70          .721 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00         10.00
     RUNOFF VOLUME    (mm)=     209.57       124.06        126.19
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .59           .60

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD  (0540)   |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70         .93
     Dep. Storage     (mm)=       1.50        5.00
     Average Slope     (%)=        .55         .55
     Length            (m)=     150.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        42.97
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       5.03 (ii)   21.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .21          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .54          .10          .636 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.08         10.00
     RUNOFF VOLUME    (mm)=     209.57        81.35        182.64
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```
TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .39            .87


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       112.24        131.76
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=          .80           .80
Length            (m)=      1275.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         59.90
           over (min)         15.00         30.00
Storage Coeff.  (min)=        16.24 (ii)    28.96 (ii)
Unit Hyd. Tpeak (min)=        15.00         30.00
Unit Hyd. peak  (cms)=          .07           .04
                                                        *TOTALS*
PEAK FLOW       (cms)=         9.05         18.51         27.108 (iii)
TIME TO PEAK    (hrs)=        10.00         10.25          10.08
RUNOFF VOLUME    (mm)=       209.57        107.75         134.22
TOTAL RAINFALL   (mm)=       211.07        211.07         211.07
RUNOFF COEFFICIENT   =          .99           .51            .64


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0510) |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=        12.80          3.20
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=          .50           .20
Length            (m)=       400.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         42.97
           over (min)         10.00         35.00
Storage Coeff.  (min)=         9.33 (ii)    31.35 (ii)
Unit Hyd. Tpeak (min)=        10.00         35.00
Unit Hyd. peak  (cms)=          .12           .03
                                                        *TOTALS*
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```
PEAK FLOW        (cms)=       1.85          .31          2.134 (iii)
TIME TO PEAK     (hrs)=      10.00        10.33          10.00
RUNOFF VOLUME     (mm)=     209.57        81.35         182.64
TOTAL RAINFALL    (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .39            .87


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=        20.20          5.05
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=          .55           .55
Length            (m)=       350.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         42.97
            over (min)        10.00         25.00
Storage Coeff.  (min)=         8.37 (ii)    24.63 (ii)
Unit Hyd. Tpeak (min)=        10.00         25.00
Unit Hyd. peak  (cms)=          .12           .05
                                                        *TOTALS*
PEAK FLOW        (cms)=         2.92           .53        3.443 (iii)
TIME TO PEAK     (hrs)=        10.00         10.17        10.00
RUNOFF VOLUME     (mm)=       209.57         81.35       182.64
TOTAL RAINFALL    (mm)=       211.07        211.07       211.07
RUNOFF COEFFICIENT   =          .99           .39          .87


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=        11.99          3.00
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=          .55           .55
Length            (m)=       200.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         42.97
            over (min)         5.00         25.00
Storage Coeff.  (min)=         5.98 (ii)    22.24 (ii)
```

```
Unit Hyd. Tpeak (min)=       5.00        25.00
Unit Hyd. peak  (cms)=        .19          .05
                                                        *TOTALS*
PEAK FLOW       (cms)=       1.74          .32          2.054 (iii)
TIME TO PEAK    (hrs)=      10.00        10.08          10.00
RUNOFF VOLUME    (mm)=     209.57        81.35         182.64
TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .39            .87


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=          .90           .23
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=          .55           .55
Length            (m)=        50.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         42.97
            over (min)         5.00         20.00
Storage Coeff.  (min)=         2.60 (ii)    18.86 (ii)
Unit Hyd. Tpeak (min)=         5.00         20.00
Unit Hyd. peak  (cms)=          .29           .06
                                                        *TOTALS*
PEAK FLOW       (cms)=          .13           .03           .156 (iii)
TIME TO PEAK    (hrs)=         9.67         10.00          10.00
RUNOFF VOLUME    (mm)=       209.57        81.35         182.64
TOTAL RAINFALL   (mm)=       211.07       211.07         211.07
RUNOFF COEFFICIENT   =          .99           .39            .87

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

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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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--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
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	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0415):	4.99	.626	10.00	128.70
+ ID2= 2 (0410):	24.20	2.975	10.00	128.70
ID = 3 (0420):	29.19	3.602	10.00	128.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0465)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0460):	36.00	4.413	10.00	128.70
+ ID2= 2 (0455):	12.70	1.564	10.00	128.70
ID = 3 (0465):	48.70	5.977	10.00	128.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0362)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	3.62	10.00	122.28	.27	1.53

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OUTFLOW: ID= 1 (0362)   30.00     3.50   10.08 122.26       .27      1.52

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--------------------
| ROUTE CHN (0353) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00           .26         .0300
                   5.50           .15     .0300 / .0150  Main Channel
                   5.51           .00         .0150      Main Channel
                  10.00           .09         .0150      Main Channel
                  14.49           .00         .0150      Main Channel
                  14.50           .15     .0150 / .0300  Main Channel
                  20.00           .26         .0300

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .01      .01    .929E+01       .0           .17       99.56
        .03      .03    .372E+02       .0           .27       62.72
        .04      .04    .836E+02       .0           .35       47.86
        .05      .05    .149E+03       .1           .42       39.51
        .07      .07    .232E+03       .1           .49       34.05
        .08      .08    .334E+03       .2           .55       30.15
        .10      .10    .454E+03       .3           .64       26.24
        .11      .11    .576E+03       .4           .74       22.41
        .12      .12    .699E+03       .6           .84       19.75
        .14      .14    .822E+03       .8           .94       17.76
        .15      .15    .944E+03      1.0          1.03       16.22
        .16      .16    .108E+04      1.2          1.11       15.07
        .18      .18    .123E+04      1.4          1.17       14.28
        .19      .19    .140E+04      1.7          1.21       13.72
        .20      .20    .159E+04      2.0          1.25       13.31
        .22      .22    .180E+04      2.3          1.28       13.01
        .23      .23    .203E+04      2.6          1.31       12.76
        .25      .25    .227E+04      3.0          1.33       12.57
        .26      .26    .254E+04      3.4          1.34       12.41

                                   <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
INFLOW : ID= 2 (0350)   16.30     1.97   10.00 128.70       .20      1.25
OUTFLOW: ID= 1 (0353)   16.30     1.87   10.08 128.66       .20      1.24

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--------------------
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00           .26         .0300
                   5.50           .15     .0300 / .0150  Main Channel
                   5.51           .00         .0150      Main Channel
                  10.00           .09         .0150      Main Channel
                  14.49           .00         .0150      Main Channel
                  14.50           .15     .0150 / .0300  Main Channel
                  20.00           .26         .0300
```

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	1.51	10.00	128.70	.18	1.18
OUTFLOW: ID= 1 (0358)	12.30	1.44	10.08	128.64	.18	1.17

RESERVOIR (0106) IN= 2---> OUT= 1 DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.5000	.4000
	.0100	.0100	6.6000	.8000
	.0260	.2300	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0105)	51.320	6.260	10.00	128.70
OUTFLOW: ID= 1 (0106)	51.320	5.997	10.08	128.69

PEAK FLOW REDUCTION [Qout/Qin](%)= 95.79
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= .7608

ADD HYD (0103) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	14.32	1.780	10.00	128.70
+ ID2= 2 (0101):	16.32	2.027	10.00	128.70
ID = 3 (0103):	30.64	3.807	10.00	128.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   1.0000      1.0000
                           .0100      .0100    |  20.0000      1.1000
                           .0120      .1000    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)      19.000      2.340       10.00      128.70
     OUTFLOW: ID= 1 (0111)      19.000      2.069       10.50      128.68

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 88.39
                    TIME SHIFT OF PEAK FLOW         (min)= 30.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  1.0100

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--------------------
| ADD HYD   (0602) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0600):     11.38    1.379    10.00   128.70
        + ID2= 2 (0601):      7.62     .936    10.00   133.59
          ==================================================
          ID = 3 (0602):     19.00    2.315    10.00   130.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00      27.11     10.08  134.22
     ==================================================
     MAJOR SYS.(ID= 2):  78.53      18.11     10.08  134.22
     MINOR SYS.(ID= 3): 165.47       9.00      6.75  134.22

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0505):    165.47    9.000     6.75   134.22
        + ID2= 2 (0510):     16.00    2.134    10.00   182.64
          ==================================================
          ID = 3 (0515):    181.47   11.134    10.00   138.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
```

```
          Hadati Creek Watershed - Post Development with Cityview Ridge
| Total(cms)=  2.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  29.19      3.60     10.00  128.70
     ==================================================
     MAJOR SYS.(ID= 2):   4.95      1.62     10.00  128.70
     MINOR SYS.(ID= 3):  24.24      1.98      9.33  128.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0425):     4.95   1.622    10.00   128.70
        + ID2= 2 (0465):    48.70   5.977    10.00   128.70
          ==================================================
          ID = 3 (0470):    53.65   7.598    10.00   128.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0353):    16.30   1.875    10.08   128.66
        + ID2= 2 (0358):    12.30   1.436    10.08   128.64
          ==================================================
          ID = 3 (0359):    28.60   3.311    10.08   128.65

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.0000      .5000
                            .0100      .0100    |  10.0000      .6000
                            .0150      .1332    |    .0000      .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0103)     30.640      3.807       10.00      128.70
     OUTFLOW: ID= 1 (0104)     30.640      3.797       10.00      128.69

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 99.73
                    TIME SHIFT OF PEAK FLOW         (min)=   .00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .5312

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--------------------
| ADD HYD   (0114) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0104):    30.64   3.797    10.00   128.69
        + ID2= 2 (0111):    19.00   2.069    10.50   128.68
          ==================================================
```

Hadati Creek Watershed - Post Development with Cityview Ridge
ID = 3 (0114): 49.64 4.896 10.50 128.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN (0563) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

<------ DATA FOR SECTION (2.2) ------>

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.745E+01	.0	.64	3.06
.11	.11	.175E+02	.1	.96	2.03
.16	.16	.301E+02	.3	1.21	1.61
.21	.21	.454E+02	.6	1.42	1.37
.26	.26	.632E+02	.9	1.61	1.21
.32	.32	.836E+02	1.3	1.77	1.10
.37	.37	.107E+03	1.8	1.93	1.01
.42	.42	.132E+03	2.3	2.08	.94
.47	.47	.160E+03	3.0	2.22	.88
.53	.53	.191E+03	3.8	2.35	.83
.58	.58	.225E+03	4.8	2.48	.79
.63	.63	.261E+03	5.8	2.60	.75
.68	.68	.299E+03	7.0	2.72	.72
.74	.74	.340E+03	8.2	2.84	.69
.79	.79	.384E+03	9.7	2.95	.66
.84	.84	.430E+03	11.3	3.06	.64
.89	.89	.479E+03	13.0	3.17	.62
.95	.95	.531E+03	14.8	3.27	.60
1.00	1.00	.585E+03	16.9	3.38	.58

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0602)	19.00	2.31	10.00	130.66	.42	2.07
OUTFLOW: ID= 1 (0563)	19.00	2.31	10.00	130.66	.42	2.07

```
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	101.50	.0500	
1.00	100.70	.0500	
1.50	100.55	.0500 / .0300	Main Channel
2.00	99.50	.0300	Main Channel
3.50	99.60	.0300	Main Channel
4.50	100.65	.0300 / .0500	Main Channel
6.00	101.45	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.10	99.60	.353E+02	.0	.19	43.69
.19	99.69	.112E+03	.1	.37	22.76
.29	99.79	.195E+03	.2	.49	17.03
.38	99.88	.285E+03	.3	.59	14.23
.48	99.98	.381E+03	.5	.67	12.51
.57	100.07	.484E+03	.7	.74	11.32
.67	100.17	.594E+03	.9	.80	10.43
.76	100.26	.710E+03	1.2	.86	9.74
.86	100.36	.832E+03	1.5	.91	9.18
.95	100.45	.961E+03	1.8	.96	8.72
1.05	100.55	.110E+04	2.2	1.00	8.32
1.16	100.66	.127E+04	2.7	1.07	7.80
1.28	100.78	.148E+04	3.4	1.14	7.31
1.39	100.89	.170E+04	4.1	1.20	6.94
1.50	101.00	.195E+04	4.9	1.25	6.65
1.61	101.11	.221E+04	5.8	1.30	6.41
1.72	101.22	.250E+04	6.7	1.34	6.22
1.84	101.34	.280E+04	7.7	1.38	6.04
1.95	101.45	.313E+04	8.8	1.41	5.90

**** WARNING: TRAVEL TIME TABLE EXCEEDED

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0505)	78.53	18.11	10.08	134.22	1.92	1.40
OUTFLOW:	ID= 1 (0564)	78.53	17.83	10.25	134.22	1.95	1.41

DUHYD (0520)
Inlet Cap.=3.050
#of Inlets= 1
Total(cms)= 3.0

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	181.47	11.13	10.00	138.49
MAJOR SYS.(ID= 2):	98.04	8.08	10.00	138.49
MINOR SYS.(ID= 3):	83.43	3.05	4.25	138.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0475)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

Hadati Creek Watershed - Post Development with Cityview Ridge

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02
1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29
2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0470)	53.65	7.60	10.00	128.70	.58	1.33
OUTFLOW: ID= 1 (0475)	53.65	7.51	10.00	128.70	.58	1.33

ADD HYD (0363)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0362):	30.00	3.504	10.08	122.26
	+ ID2= 2 (0359):	28.60	3.311	10.08	128.65
	ID = 3 (0363):	58.60	6.814	10.08	125.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0115)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0106):	51.32	5.997	10.08	128.69
	+ ID2= 2 (0114):	49.64	4.896	10.50	128.69
	ID = 3 (0115):	100.96	10.540	10.08	128.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0492)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0563):	19.00	2.311	10.00	130.66
	+ ID2= 2 (0607):	5.97	.721	10.00	126.19

```
          ==================================================
          ID = 3 (0492):    24.97   3.032    10.00   129.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0525):       .00     .001      .00  *******
        + ID2= 2 (0520):     98.04    8.084    10.00   138.49
          ==================================================
          ID = 3 (0526):     98.04    8.084    10.00   138.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0363):     58.60    6.814    10.08   125.38
        + ID2= 2 (0365):    117.50   14.089    10.00   128.70
          ==================================================
          ID = 3 (0380):    176.10   20.834    10.00   127.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |    .2910      .3795
                            .2590      .0579    |    .2970      .4503
                            .2660      .1180    |   1.6320      .5232
                            .2720      .1802    |   4.1680      .5983
                            .2790      .2445    |   7.5660      .6756
                            .2850      .3109    |    .0000      .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0492)      24.970      3.032       10.00      129.59
     OUTFLOW: ID= 1 (0482)      24.970      3.007       10.08      129.59

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 99.18
                    TIME SHIFT OF PEAK FLOW         (min)=  5.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .5640

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--------------------
| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
                <------ DATA FOR SECTION (   1.1) ------>
                Distance      Elevation       Manning
                  100.00        313.20         .0500
                  140.00        312.40     .0500 / .0300  Main Channel
                  140.50        310.80         .0300      Main Channel
```

141.50	310.80	.0300	Main Channel
142.00	312.40	.0300 / .0500	Main Channel
160.00	313.20	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.12	310.92	.575E+02	.1	.40	18.86
.25	311.05	.119E+03	.2	.57	13.13
.37	311.17	.185E+03	.3	.69	10.87
.49	311.29	.256E+03	.4	.78	9.61
.62	311.42	.330E+03	.6	.86	8.77
.74	311.54	.409E+03	.8	.92	8.17
.86	311.66	.492E+03	1.1	.97	7.70
.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0526)	98.04	8.08	10.00	138.49	2.05	.76
OUTFLOW: ID= 1 (0527)	98.04	7.97	10.08	138.49	2.04	.76

RESERVOIR (0390)	
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	20.834	10.00	127.59
OUTFLOW: ID= 1 (0390)	176.100	1.714	12.33	127.59

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.23
TIME SHIFT OF PEAK FLOW (min)=140.00
MAXIMUM STORAGE USED (ha.m.)= 17.4981

ADD HYD (0400)	
1 + 2 = 3	

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0395):	51.20	5.388	10.08	88.29
+ ID2= 2 (0390):	176.10	1.714	12.33	127.59
ID = 3 (0400):	227.30	6.909	10.08	118.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0403) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0400)	227.30	6.91	10.08	118.74	.46	1.36
OUTFLOW: ID= 1 (0403)	227.30	6.38	10.33	118.74	.44	1.30

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--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0403):	227.30	6.377	10.33	118.74
+ ID2= 2 (0115):	100.96	10.540	10.08	128.69
ID = 3 (0407):	328.26	16.526	10.17	121.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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```
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.6000	6.4000
1.1000	2.9000	9.1000	10.0000
1.3000	4.3000	12.0000	20.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0407)	328.260	16.526	10.17	121.80
OUTFLOW: ID= 1 (0113)	328.260	9.456	11.50	121.80

```
PEAK   FLOW   REDUCTION [Qout/Qin](%)= 57.22
TIME SHIFT OF PEAK FLOW         (min)= 80.00
MAXIMUM  STORAGE   USED       (ha.m.)= 11.2348
```

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--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0113):	328.26	9.456	11.50	121.80
+ ID2= 2 (0425):	24.24	1.980	9.33	128.70
ID = 3 (0430):	352.50	11.349	11.08	122.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	325.40	.0600	
120.00	324.60	.0600	
126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18

2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0430)	352.50	11.35	11.08	122.27	.72	1.73
OUTFLOW:	ID= 1 (0440)	352.50	11.32	11.08	122.27	.71	1.73

ADD HYD (0485)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0475):	53.65	7.511	10.00	128.70
	+ ID2= 2 (0440):	352.50	11.321	11.08	122.27
	ID = 3 (0485):	406.15	16.120	10.75	123.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0490)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0480):	43.10	5.222	10.00	128.70
	+ ID2= 2 (0485):	406.15	16.120	10.75	123.12
	ID = 3 (0490):	449.25	19.973	10.67	123.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0491)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0490):	449.25	19.973	10.67	123.66
	+ ID2= 2 (0482):	24.97	3.007	10.08	129.59
	ID = 3 (0491):	474.22	22.680	10.17	123.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0483)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	7.0800	2.4860
.2760	.0600	8.1000	3.3240
1.2000	.3400	9.7980	4.6420
2.0400	.6182	10.4940	7.4397

```
                    2.6400     1.1630   |  11.6850     10.3000
                    3.1200     1.7070   |  12.3480     11.4000

                              AREA      QPEAK       TPEAK       R.V.
                              (ha)      (cms)       (hrs)       (mm)
INFLOW : ID= 2 (0491)    474.220     22.680       10.17      123.97
OUTFLOW: ID= 1 (0483)    474.220     11.709       12.08      123.97

              PEAK   FLOW   REDUCTION [Qout/Qin](%)= 51.63
              TIME SHIFT OF PEAK FLOW         (min)=115.00
              MAXIMUM  STORAGE   USED       (ha.m.)= 10.3422

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--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0483):   474.22  11.709    12.08   123.97
        + ID2= 2 (0540):     4.63    .636    10.00   182.64
          ====================================================
          ID = 3 (0530):   478.85  11.843    12.00   124.54

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0530):   478.85  11.843    12.00   124.54
        + ID2= 2 (0527):    98.04   7.968    10.08   138.49
          ====================================================
          ID = 3 (0545):   576.89  19.057    11.00   126.91

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0545):   576.89  19.057    11.00   126.91
        + ID2= 2 (0542):    25.25   3.443    10.00   182.64
          ====================================================
          ID = 3 (0546):   602.14  21.640    10.08   129.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0546):   602.14  21.640    10.08   129.24
        + ID2= 2 (0543):    14.99   2.054    10.00   182.64
          ====================================================
          ID = 3 (0547):   617.13  23.544    10.00   130.54

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

Hadati Creek Watershed - Post Development with Cityview Ridge

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--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0547):    617.13  23.544    10.00   130.54
        + ID2= 2 (0544):      1.13    .156    10.00   182.64
          ====================================================
          ID = 3 (0548):    618.26  23.700    10.00   130.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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Hadati Creek Watershed - Post Development with Cityview Ridge

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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  LLLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O

 OOO     T      T    H   H    Y    M   M   OOO
```


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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.2\voin.dat

Output filename: Y:\SPrimmer\OTTHYMO\Cityview Ridge\Hadati Creek Watershed - Post Development with Cityview Ridge.out
Summary filename: Y:\SPrimmer\OTTHYMO\Cityview Ridge\Hadati Creek Watershed - Post Development with Cityview Ridge.sum

DATE: 3/30/2015 TIME: 3:05:13 PM

USER:

COMMENTS: _____

```
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************
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--------------------
|    READ STORM    |    Filename: Y:\SPrimmer\OTTHYMO\Ci
|                  |              tyview Ridge\25mm4hr.stm
| Ptotal= 25.00 mm |    Comments: 25 mm - 4 hour - 10 Minute Time Step
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	.53	1.17	17.57	2.17	2.95	3.17	.76
.33	.71	1.33	61.55	2.33	2.19	3.33	.65
.50	.99	1.50	24.02	2.50	1.69	3.50	.57
.67	1.51	1.67	11.16	2.67	1.34	3.67	.49
.83	2.57	1.83	6.44	2.83	1.09	3.83	.44
1.00	5.31	2.00	4.20	3.00	.90	4.00	.38

Hadati Creek Watershed - Post Development with Cityview Ridge

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--------------------
| CALIB            |
| STANDHYD  (0480) |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10        25.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n           =       .013         .300

         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
                .083     .53 | 1.083   17.57 | 2.083    2.95 | 3.08     .76
                .167     .53 | 1.167   17.57 | 2.167    2.95 | 3.17     .76
                .250     .71 | 1.250   61.55 | 2.250    2.19 | 3.25     .65
                .333     .71 | 1.333   61.55 | 2.333    2.19 | 3.33     .65
                .417     .99 | 1.417   24.02 | 2.417    1.69 | 3.42     .57
                .500     .99 | 1.500   24.02 | 2.500    1.69 | 3.50     .57
                .583    1.51 | 1.583   11.16 | 2.583    1.34 | 3.58     .49
                .667    1.51 | 1.667   11.16 | 2.667    1.34 | 3.67     .49
                .750    2.57 | 1.750    6.44 | 2.750    1.09 | 3.75     .44
                .833    2.57 | 1.833    6.44 | 2.833    1.09 | 3.83     .44
                .917    5.31 | 1.917    4.20 | 2.917     .90 | 3.92     .38
               1.000    5.31 | 2.000    4.20 | 3.000     .90 | 4.00     .38

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)       10.00        35.00
     Storage Coeff.  (min)=      7.96 (ii)    30.70 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .13          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.09          .23        1.142 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.83         1.42
     RUNOFF VOLUME    (mm)=      23.50         2.16         6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .09          .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.10         2.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.86         2.86
     Length            (m)=     185.00        40.00
```

```
     Mannings n           =       .013          .300

     Max.Eff.Inten.(mm/hr)=      61.55          8.82
                over (min)        5.00         25.00
     Storage Coeff.  (min)=       3.27 (ii)    21.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00         25.00
     Unit Hyd. peak  (cms)=        .27           .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .17           .04          .179 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.67          1.33
     RUNOFF VOLUME    (mm)=      23.50          2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00         25.00         25.00
     RUNOFF COEFFICIENT   =        .94           .09           .27

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16         14.04
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     401.00         40.00
     Mannings n           =       .013          .300

     Max.Eff.Inten.(mm/hr)=      61.55          7.05
                over (min)        5.00         30.00
     Storage Coeff.  (min)=       5.80 (ii)    28.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00         30.00
     Unit Hyd. peak  (cms)=        .20           .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .75           .14          .770 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50          2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00         25.00         25.00
     RUNOFF COEFFICIENT   =        .94           .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
```

Hadati Creek Watershed - Post Development with Cityview Ridge

Surface Area	(ha)=	15.12	20.88	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	2.03	2.03	
Length	(m)=	465.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.	(mm/hr)=	61.55	7.05	
over	(min)	5.00	30.00	
Storage Coeff.	(min)=	6.31 (ii)	28.95 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	30.00	
Unit Hyd. peak	(cms)=	.19	.04	
				TOTALS
PEAK FLOW	(cms)=	1.09	.21	1.117 (iii)
TIME TO PEAK	(hrs)=	1.33	1.75	1.33
RUNOFF VOLUME	(mm)=	23.50	2.16	6.64
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.94	.09	.27

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB              |
| STANDHYD  (0455)   |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
```

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	5.33	7.37	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	1.71	1.71	
Length	(m)=	300.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.	(mm/hr)=	61.55	7.05	
over	(min)	5.00	30.00	
Storage Coeff.	(min)=	5.11 (ii)	28.94 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	30.00	
Unit Hyd. peak	(cms)=	.21	.04	
				TOTALS
PEAK FLOW	(cms)=	.41	.07	.417 (iii)
TIME TO PEAK	(hrs)=	1.33	1.75	1.33
RUNOFF VOLUME	(mm)=	23.50	2.16	6.64
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.94	.09	.27

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB              |
| STANDHYD  (0395)   |   Area    (ha)=  51.20
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          Hadati Creek Watershed - Post Development with Cityview Ridge
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.12        46.08
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     900.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55          .00
                over (min)       10.00       230.00
     Storage Coeff.  (min)=       9.42 (ii)  225.31 (ii)
     Unit Hyd. Tpeak (min)=      10.00       230.00
     Unit Hyd. peak  (cms)=        .12          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .29          .00          .292 (iii)
     TIME TO PEAK    (hrs)=       1.42          .00         1.42
     RUNOFF VOLUME    (mm)=      23.50          .00         1.17
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .00          .05

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         2.81
                over (min)        5.00        40.00
     Storage Coeff.  (min)=       6.19 (ii)   39.07 (ii)
     Unit Hyd. Tpeak (min)=       5.00        40.00
     Unit Hyd. peak  (cms)=        .19          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .83          .08          .834 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.92         1.33
     RUNOFF VOLUME    (mm)=      23.50         1.27         5.50
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .05          .22

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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          Hadati Creek Watershed - Post Development with Cityview Ridge
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         5.04
                over (min)        5.00        40.00
     Storage Coeff.  (min)=       6.35 (ii)   38.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        40.00
     Unit Hyd. peak  (cms)=        .19          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .49          .07          .499 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.92          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.17         7.13
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.60         1.60
     Length            (m)=     286.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       5.06 (ii)   29.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .21          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .40          .07          .405 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27
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          Hadati Creek Watershed - Post Development with Cityview Ridge
       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      49.35        68.15
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     885.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)       10.00        35.00
     Storage Coeff.  (min)=       9.32 (ii)   32.06 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .12          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.82          .62         2.960 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.83          1.42
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.55        29.77
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     550.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       7.01 (ii)   29.75 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .17          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.50          .30         1.538 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
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RUNOFF COEFFICIENT   =        .94          .09            .27


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01         8.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     287.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       4.74 (ii)   27.48 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .22          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .47          .09          .479 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27

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

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       4.96 (ii)   27.70 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .22          .04
                                                          *TOTALS*
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     PEAK FLOW       (cms)=        .53          .10          .540 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98        11.02
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     365.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       5.48 (ii)   28.22 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .20          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .60          .11          .614 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .09           .27


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0600) |   Area    (ha)=  11.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.78         6.60
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55         7.05
                over (min)       10.00        35.00
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Storage Coeff.  (min)=       7.96 (ii)   30.70 (ii)
Unit Hyd. Tpeak (min)=      10.00        35.00
Unit Hyd. peak  (cms)=        .13          .04
                                                      *TOTALS*
PEAK FLOW       (cms)=        .29          .06          .301 (iii)
TIME TO PEAK    (hrs)=       1.42         1.83          1.42
RUNOFF VOLUME    (mm)=      23.50         2.16          6.64
TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
RUNOFF COEFFICIENT   =        .94          .09           .27


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0601) |   Area    (ha)=   7.62
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  21.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       3.51          4.11
Dep. Storage     (mm)=       1.50          5.00
Average Slope     (%)=       2.00          2.00
Length            (m)=     680.00         40.00
Mannings n           =       .013          .300

Max.Eff.Inten.(mm/hr)=      61.55         13.97
           over (min)       10.00         30.00
Storage Coeff.  (min)=       7.96 (ii)   25.26 (ii)
Unit Hyd. Tpeak (min)=      10.00         30.00
Unit Hyd. peak  (cms)=        .13          .04
                                                      *TOTALS*
PEAK FLOW       (cms)=        .19          .07          .212 (iii)
TIME TO PEAK    (hrs)=       1.42         1.75          1.42
RUNOFF VOLUME    (mm)=      23.50         3.18          7.45
TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
RUNOFF COEFFICIENT   =        .94          .13           .30


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0607) |   Area    (ha)=   5.97
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=   2.50
--------------------
                             IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       2.51          3.46
Dep. Storage     (mm)=       1.50          5.00
Average Slope     (%)=       2.00          2.00
Length            (m)=     680.00         40.00
Mannings n           =       .013          .300
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     Max.Eff.Inten.(mm/hr)=      61.55        33.18
                over (min)       10.00        25.00
     Storage Coeff.  (min)=       7.96 (ii)   20.20 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .13          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .02          .13          .141 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.67         1.67
     RUNOFF VOLUME    (mm)=      23.50         4.97         5.44
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .20          .22

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70          .93
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     150.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55          .00
                over (min)        5.00       325.00
     Storage Coeff.  (min)=       4.73 (ii)  322.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00       325.00
     Unit Hyd. peak  (cms)=        .22          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .57          .00          .569 (iii)
     TIME TO PEAK    (hrs)=       1.33          .00         1.33
     RUNOFF VOLUME    (mm)=      23.50          .00        18.56
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.00
     RUNOFF COEFFICIENT   =        .94          .00          .74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
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                                IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      112.24       131.76
     Dep. Storage      (mm)=        1.50         5.00
     Average Slope      (%)=         .80          .80
     Length             (m)=     1275.00        40.00
     Mannings n            =        .013         .300

     Max.Eff.Inten.(mm/hr)=       42.79         5.28
                over (min)        20.00        55.00
     Storage Coeff.  (min)=       17.67 (ii)   51.28 (ii)
     Unit Hyd. Tpeak (min)=       20.00        55.00
     Unit Hyd. peak  (cms)=         .06          .02
                                                          *TOTALS*
     PEAK FLOW       (cms)=        5.07          .82        5.342 (iii)
     TIME TO PEAK    (hrs)=        1.58         2.17         1.58
     RUNOFF VOLUME    (mm)=       23.50         2.25         7.77
     TOTAL RAINFALL   (mm)=       25.00        25.00        25.00
     RUNOFF COEFFICIENT   =         .94          .09          .31


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0510) |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       12.80         3.20
     Dep. Storage      (mm)=        1.50         5.00
     Average Slope      (%)=         .50          .20
     Length             (m)=      400.00        40.00
     Mannings n            =        .013         .300

     Max.Eff.Inten.(mm/hr)=       61.55          .00
                over (min)        10.00       440.00
     Storage Coeff.  (min)=        8.77 (ii)  439.54 (ii)
     Unit Hyd. Tpeak (min)=       10.00       440.00
     Unit Hyd. peak  (cms)=         .12          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        1.48          .00        1.475 (iii)
     TIME TO PEAK    (hrs)=        1.42          .00         1.42
     RUNOFF VOLUME    (mm)=       23.50          .00        18.56
     TOTAL RAINFALL   (mm)=       25.00        25.00        25.00
     RUNOFF COEFFICIENT   =         .94          .00          .74

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       20.20         5.05
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=         .55          .55
     Length            (m)=      350.00        40.00
     Mannings n          =        .013         .300

     Max.Eff.Inten.(mm/hr)=       61.55          .00
                over (min)       10.00       330.00
     Storage Coeff.  (min)=        7.87 (ii)  325.88 (ii)
     Unit Hyd. Tpeak (min)=       10.00       330.00
     Unit Hyd. peak  (cms)=         .13          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        2.41          .00        2.408 (iii)
     TIME TO PEAK    (hrs)=        1.42          .00         1.42
     RUNOFF VOLUME    (mm)=       23.50          .00        18.56
     TOTAL RAINFALL   (mm)=       25.00        25.00        25.00
     RUNOFF COEFFICIENT   =         .94          .00          .74

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       11.99         3.00
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=         .55          .55
     Length            (m)=      200.00        40.00
     Mannings n          =        .013         .300

     Max.Eff.Inten.(mm/hr)=       61.55          .00
                over (min)        5.00       325.00
     Storage Coeff.  (min)=        5.63 (ii)  323.64 (ii)
     Unit Hyd. Tpeak (min)=        5.00       325.00
     Unit Hyd. peak  (cms)=         .20          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        1.77          .00        1.767 (iii)
     TIME TO PEAK    (hrs)=        1.33          .00         1.33
     RUNOFF VOLUME    (mm)=       23.50          .00        18.56
     TOTAL RAINFALL   (mm)=       25.00        25.00        25.00
     RUNOFF COEFFICIENT   =         .94          .00          .74

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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          Hadati Creek Watershed - Post Development with Cityview Ridge
      (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  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .90          .23
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=      50.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      61.55          .00
                over (min)        5.00       325.00
     Storage Coeff.  (min)=       2.45 (ii)  320.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00       325.00
     Unit Hyd. peak  (cms)=        .30          .00
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .15          .00          .151 (iii)
     TIME TO PEAK    (hrs)=       1.33          .00          1.33
     RUNOFF VOLUME    (mm)=      23.50          .00         18.56
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .94          .00           .74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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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--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0415):      4.99     .179     1.33     6.64
        + ID2= 2 (0410):     24.20     .770     1.33     6.64
          ==================================================
          ID = 3 (0420):     29.19     .948     1.33     6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0465) |
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Hadati Creek Watershed - Post Development with Cityview Ridge

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0460):	36.00	1.117	1.33	6.64
+ ID2= 2 (0455):	12.70	.417	1.33	6.64
ID = 3 (0465):	48.70	1.534	1.33	6.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0362)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	.83	1.33	5.50	.14	.96
OUTFLOW: ID= 1 (0362)	30.00	.41	1.50	5.48	.11	.71

ROUTE CHN (0353)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel

5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	.50	1.33	6.64	.12	.78
OUTFLOW: ID= 1 (0353)	16.30	.22	1.58	6.60	.09	.57

ROUTE CHN (0358)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72

.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	.40	1.33	6.64	.11	.72
OUTFLOW: ID= 1 (0358)	12.30	.15	1.58	6.59	.08	.52

RESERVOIR (0106)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.5000	.4000
	.0100	.0100	6.6000	.8000
	.0260	.2300	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0105)	51.320	1.538	1.33	6.64
OUTFLOW: ID= 1 (0106)	51.320	.155	2.42	6.63

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.08
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= .2763

ADD HYD (0103)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	14.32	.479	1.33	6.64
+ ID2= 2 (0101):	16.32	.540	1.33	6.64
ID = 3 (0103):	30.64	1.019	1.33	6.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0111)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	1.0000	1.0000
	.0100	.0100	20.0000	1.1000
	.0120	.1000	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0110)	19.000	.614	1.33	6.64

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OUTFLOW: ID= 1 (0111)     19.000       .024        2.92        6.63

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.93
                TIME SHIFT OF PEAK FLOW         (min)= 95.00
                MAXIMUM  STORAGE   USED       (ha.m.)=   .1111

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| ADD HYD   (0602) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0600):    11.38     .301     1.42     6.64
        + ID2= 2 (0601):     7.62     .212     1.42     7.45
          ====================================================
          ID = 3 (0602):    19.00     .514     1.42     6.96

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00      5.34      1.58    7.77
     ====================================================
     MAJOR SYS.(ID= 2):    .00       .00       .00     .00
     MINOR SYS.(ID= 3): 244.00      5.34      1.58    7.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0505):   244.00   5.342     1.58     7.77
        + ID2= 2 (0510):    16.00   1.475     1.42    18.56
          ====================================================
          ID = 3 (0515):   260.00   6.307     1.58     8.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  29.19       .95      1.33    6.64
     ====================================================
     MAJOR SYS.(ID= 2):    .00       .00       .00     .00
     MINOR SYS.(ID= 3):  29.19       .95      1.33    6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH 0425 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH 0470 = HYDROGRAPH 0465
*** W A R N I N G :  HYDROGRAPH 0470 = HYDROGRAPH 0465
          ID1= 1 (0425):      .00    .000      .00      .00
        + ID2= 2 (0465):    48.70   1.534     1.33     6.64
          ====================================================
          ID = 3 (0470):    48.70   1.534     1.33     6.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0359) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0353):    16.30    .216     1.58     6.60
        + ID2= 2 (0358):    12.30    .153     1.58     6.59
          ====================================================
          ID = 3 (0359):    28.60    .369     1.58     6.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |   1.0000      .5000
                          .0100      .0100    |  10.0000      .6000
                          .0150      .1332    |    .0000      .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0103)     30.640      1.019        1.33        6.64
     OUTFLOW: ID= 1 (0104)     30.640       .097        2.33        6.63

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.52
                    TIME SHIFT OF PEAK FLOW         (min)= 60.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .1639

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| ADD HYD   (0114) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0104):    30.64    .097     2.33     6.63
        + ID2= 2 (0111):    19.00    .024     2.92     6.63
          ====================================================
          ID = 3 (0114):    49.64    .118     2.42     6.63

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ROUTE CHN (0563) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
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Hadati Creek Watershed - Post Development with Cityview Ridge

<------ DATA FOR SECTION (2.2) ------>

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.745E+01	.0	.64	3.06
.11	.11	.175E+02	.1	.96	2.03
.16	.16	.301E+02	.3	1.21	1.61
.21	.21	.454E+02	.6	1.42	1.37
.26	.26	.632E+02	.9	1.61	1.21
.32	.32	.836E+02	1.3	1.77	1.10
.37	.37	.107E+03	1.8	1.93	1.01
.42	.42	.132E+03	2.3	2.08	.94
.47	.47	.160E+03	3.0	2.22	.88
.53	.53	.191E+03	3.8	2.35	.83
.58	.58	.225E+03	4.8	2.48	.79
.63	.63	.261E+03	5.8	2.60	.75
.68	.68	.299E+03	7.0	2.72	.72
.74	.74	.340E+03	8.2	2.84	.69
.79	.79	.384E+03	9.7	2.95	.66
.84	.84	.430E+03	11.3	3.06	.64
.89	.89	.479E+03	13.0	3.17	.62
.95	.95	.531E+03	14.8	3.27	.60
1.00	1.00	.585E+03	16.9	3.38	.58

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0602)	19.00	.51	1.42	6.96	.20	1.38
OUTFLOW: ID= 1 (0563)	19.00	.53	1.42	6.96	.21	1.40

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| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
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<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	101.50	.0500	
1.00	100.70	.0500	
1.50	100.55	.0500 / .0300	Main Channel
2.00	99.50	.0300	Main Channel
3.50	99.60	.0300	Main Channel
4.50	100.65	.0300 / .0500	Main Channel
6.00	101.45	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.10	99.60	.353E+02	.0	.19	43.69
.19	99.69	.112E+03	.1	.37	22.76
.29	99.79	.195E+03	.2	.49	17.03
.38	99.88	.285E+03	.3	.59	14.23
.48	99.98	.381E+03	.5	.67	12.51

.57	100.07	.484E+03	.7	.74	11.32
.67	100.17	.594E+03	.9	.80	10.43
.76	100.26	.710E+03	1.2	.86	9.74
.86	100.36	.832E+03	1.5	.91	9.18
.95	100.45	.961E+03	1.8	.96	8.72
1.05	100.55	.110E+04	2.2	1.00	8.32
1.16	100.66	.127E+04	2.7	1.07	7.80
1.28	100.78	.148E+04	3.4	1.14	7.31
1.39	100.89	.170E+04	4.1	1.20	6.94
1.50	101.00	.195E+04	4.9	1.25	6.65
1.61	101.11	.221E+04	5.8	1.30	6.41
1.72	101.22	.250E+04	6.7	1.34	6.22
1.84	101.34	.280E+04	7.7	1.38	6.04
1.95	101.45	.313E+04	8.8	1.41	5.90

**** WARNING: INFLOW HYDROGRAPH IS DRY!!

```
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	260.00	6.31	1.58	8.44
MAJOR SYS.(ID= 2):	59.59	3.26	1.58	8.44
MINOR SYS.(ID= 3):	200.41	3.05	1.33	8.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |
```

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02
1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29

2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0470)	48.70	1.53	1.33	6.64	.26	.91
OUTFLOW: ID= 1 (0475)	48.70	1.10	1.42	6.64	.23	.87

```
--------------------
| ADD HYD   (0363) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0362):	30.00	.406	1.50	5.48
+ ID2= 2 (0359):	28.60	.369	1.58	6.60
ID = 3 (0363):	58.60	.769	1.50	6.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0106):	51.32	.155	2.42	6.63
+ ID2= 2 (0114):	49.64	.118	2.42	6.63
ID = 3 (0115):	100.96	.273	2.42	6.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0563):	19.00	.533	1.42	6.96
+ ID2= 2 (0607):	5.97	.141	1.67	5.44
ID = 3 (0492):	24.97	.596	1.42	6.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0525):	.00	.001	.00	*******
+ ID2= 2 (0520):	59.59	3.257	1.58	8.44

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```
ID = 3 (0526):    59.59   3.257     1.58     8.44

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0363):    58.60     .769     1.50     6.03
        + ID2= 2 (0365):   117.50    2.960     1.42     6.64
          ==================================================
          ID = 3 (0380):   176.10    3.653     1.42     6.44

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |    .2910       .3795
                            .2590      .0579    |    .2970       .4503
                            .2660      .1180    |   1.6320       .5232
                            .2720      .1802    |   4.1680       .5983
                            .2790      .2445    |   7.5660       .6756
                            .2850      .3109    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0492)      24.970       .596        1.42        6.60
     OUTFLOW: ID= 1 (0482)      24.970       .260        2.00        6.60

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 43.68
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .0700

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        313.20         .0500
                 140.00        312.40     .0500 / .0300  Main Channel
                 140.50        310.80         .0300      Main Channel
                 141.50        310.80         .0300      Main Channel
                 142.00        312.40     .0300 / .0500  Main Channel
                 160.00        313.20         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .12    310.92    .575E+02        .1           .40       18.86
        .25    311.05    .119E+03        .2           .57       13.13
        .37    311.17    .185E+03        .3           .69       10.87
        .49    311.29    .256E+03        .4           .78        9.61
        .62    311.42    .330E+03        .6           .86        8.77
        .74    311.54    .409E+03        .8           .92        8.17
        .86    311.66    .492E+03       1.1           .97        7.70
```

.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0526)	59.59	3.26	1.58	8.44	1.66	1.16
OUTFLOW: ID= 1 (0527)	59.59	2.80	1.67	8.44	1.54	1.21

```
--------------------
| RESERVOIR (0390) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	3.653	1.42	6.44
OUTFLOW: ID= 1 (0390)	176.100	.982	2.25	6.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 26.88
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= .5820

```
--------------------
| ADD HYD   (0400) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0395):	51.20	.292	1.42	1.17
+ ID2= 2 (0390):	176.10	.982	2.25	6.43
ID = 3 (0400):	227.30	1.022	1.58	5.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0403) |
| IN= 2---> OUT= 1 |
--------------------
```

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	

148.00	335.30	.0500
156.00	336.00	.0500
165.00	338.30	.0000

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0400)	227.30	1.02	1.58	5.25	.17	.73
OUTFLOW: ID= 1 (0403)	227.30	.88	3.17	5.25	.16	.71

ADD HYD (0407)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0403):	227.30	.881	3.17	5.25
	+ ID2= 2 (0115):	100.96	.273	2.42	6.63
	ID = 3 (0407):	328.26	1.112	2.83	5.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0113)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.6000	6.4000
1.1000	2.9000	9.1000	10.0000
1.3000	4.3000	12.0000	20.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0407)	328.260	1.112	2.83	5.67
OUTFLOW: ID= 1 (0113)	328.260	.354	5.83	5.67

PEAK FLOW REDUCTION [Qout/Qin](%)= 31.88

Hadati Creek Watershed - Post Development with Cityview Ridge
TIME SHIFT OF PEAK FLOW (min)=180.00
MAXIMUM STORAGE USED (ha.m.)= .9343

```
--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0113):   328.26     .354     5.83     5.67
        + ID2= 2 (0425):    29.19     .948     1.33     6.64
          ==================================================
          ID = 3 (0430):   357.45     .951     1.33     5.75
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	325.40	.0600	
120.00	324.60	.0600	
126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0430)	357.45	.95	1.33	5.75	.20	1.02
OUTFLOW: ID= 1 (0440)	357.45	.72	1.42	5.75	.18	.98

```
--------------------
| ADD HYD   (0485) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0475):    48.70   1.101     1.42     6.64
        + ID2= 2 (0440):   357.45    .720     1.42     5.75
          ==================================================
          ID = 3 (0485):   406.15   1.820     1.42     5.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0490) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0480):    43.10   1.142     1.42     6.64
        + ID2= 2 (0485):   406.15   1.820     1.42     5.86
          ==================================================
          ID = 3 (0490):   449.25   2.962     1.42     5.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0491) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0490):   449.25   2.962     1.42     5.93
        + ID2= 2 (0482):    24.97    .260     2.00     6.60
          ==================================================
          ID = 3 (0491):   474.22   3.086     1.42     5.97

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   7.0800      2.4860
                           .2760      .0600    |   8.1000      3.3240
                          1.2000      .3400    |   9.7980      4.6420
                          2.0400      .6182    |  10.4940      7.4397
                          2.6400     1.1630    |  11.6850     10.3000
                          3.1200     1.7070    |  12.3480     11.4000

                                AREA      QPEAK       TPEAK       R.V.
                                (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)    474.220    3.086        1.42        5.97
     OUTFLOW: ID= 1 (0483)    474.220    1.344        2.00        5.97

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 43.57
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .3886
```

```
--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0483):   474.22   1.344     2.00     5.97
        + ID2= 2 (0540):     4.63    .569     1.33    18.56
          ==================================================
          ID = 3 (0530):   478.85   1.391     2.00     6.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0530):   478.85   1.391     2.00     6.09
        + ID2= 2 (0527):    59.59   2.796     1.67     8.44
          ==================================================
          ID = 3 (0545):   538.44   4.086     1.67     6.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0545):   538.44   4.086     1.67     6.35
        + ID2= 2 (0542):    25.25   2.408     1.42    18.56
          ==================================================
          ID = 3 (0546):   563.69   5.474     1.58     6.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0546):   563.69   5.474     1.58     6.90
        + ID2= 2 (0543):    14.99   1.767     1.33    18.56
          ==================================================
          ID = 3 (0547):   578.68   6.159     1.50     7.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0547):   578.68   6.159     1.50     7.20
        + ID2= 2 (0544):     1.13    .151     1.33    18.56
          ==================================================
          ID = 3 (0548):   579.81   6.220     1.50     7.22

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

```
****************************
** SIMULATION NUMBER:   2 **
****************************
```

READ STORM	Filename: Y:\SPrimmer\OTTHYMO\Cityview Ridge\5yrSCS12hr.stm
Ptotal= 53.41 mm	Comments: 5 year SCS Type II 12hour design storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	1.34	3.25	2.14	6.25	9.61	9.25	1.87
.50	1.34	3.50	2.14	6.50	9.61	9.50	1.87
.75	1.34	3.75	2.14	6.75	4.27	9.75	1.87
1.00	1.34	4.00	2.14	7.00	4.27	10.00	1.87
1.25	1.34	4.25	3.20	7.25	3.20	10.25	1.07
1.50	1.34	4.50	3.20	7.50	3.20	10.50	1.07
1.75	1.34	4.75	4.27	7.75	3.20	10.75	1.07
2.00	1.34	5.00	4.27	8.00	3.20	11.00	1.07
2.25	1.60	5.25	6.41	8.25	1.87	11.25	1.07
2.50	1.60	5.50	6.41	8.50	1.87	11.50	1.07
2.75	1.60	5.75	25.64	8.75	1.87	11.75	1.07
3.00	1.60	6.00	70.50	9.00	1.87	12.00	1.07

CALIB STANDHYD (0480) ID= 1 DT= 5.0 min	Area (ha)= 43.10 Total Imp(%)= 42.00 Dir. Conn.(%)= 21.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	18.10	25.00
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	680.00	40.00
Mannings n	=	.013	.300

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
.083	1.34	3.083	2.14	6.083	9.61	9.08	1.87
.167	1.34	3.167	2.14	6.167	9.61	9.17	1.87
.250	1.34	3.250	2.14	6.250	9.61	9.25	1.87
.333	1.34	3.333	2.14	6.333	9.61	9.33	1.87
.417	1.34	3.417	2.14	6.417	9.61	9.42	1.87
.500	1.34	3.500	2.14	6.500	9.61	9.50	1.87
.583	1.34	3.583	2.14	6.583	4.27	9.58	1.87
.667	1.34	3.667	2.14	6.667	4.27	9.67	1.87
.750	1.34	3.750	2.14	6.750	4.27	9.75	1.87
.833	1.34	3.833	2.14	6.833	4.27	9.83	1.87
.917	1.34	3.917	2.14	6.917	4.27	9.92	1.87
1.000	1.34	4.000	2.14	7.000	4.27	10.00	1.87
1.083	1.34	4.083	3.20	7.083	3.20	10.08	1.07
1.167	1.34	4.167	3.20	7.167	3.20	10.17	1.07
1.250	1.34	4.250	3.20	7.250	3.20	10.25	1.07
1.333	1.34	4.333	3.20	7.333	3.20	10.33	1.07
1.417	1.34	4.417	3.20	7.417	3.20	10.42	1.07

1.500	1.34	4.500	3.20	7.500	3.20	10.50	1.07
1.583	1.34	4.583	4.27	7.583	3.20	10.58	1.07
1.667	1.34	4.667	4.27	7.667	3.20	10.67	1.07
1.750	1.34	4.750	4.27	7.750	3.20	10.75	1.07
1.833	1.34	4.833	4.27	7.833	3.20	10.83	1.07
1.917	1.34	4.917	4.27	7.917	3.20	10.92	1.07
2.000	1.34	5.000	4.27	8.000	3.20	11.00	1.07
2.083	1.60	5.083	6.41	8.083	1.87	11.08	1.07
2.167	1.60	5.167	6.41	8.167	1.87	11.17	1.07
2.250	1.60	5.250	6.41	8.250	1.87	11.25	1.07
2.333	1.60	5.333	6.41	8.333	1.87	11.33	1.07
2.417	1.60	5.417	6.41	8.417	1.87	11.42	1.07
2.500	1.60	5.500	6.41	8.500	1.87	11.50	1.07
2.583	1.60	5.583	25.64	8.583	1.87	11.58	1.07
2.667	1.60	5.667	25.64	8.667	1.87	11.67	1.07
2.750	1.60	5.750	25.64	8.750	1.87	11.75	1.07
2.833	1.60	5.833	70.50	8.833	1.87	11.83	1.07
2.917	1.60	5.917	70.50	8.917	1.87	11.92	1.07
3.000	1.60	6.000	70.50	9.000	1.87	12.00	1.07

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Max.Eff.Inten.(mm/hr)=      70.50        81.70
           over (min)       10.00        20.00
Storage Coeff.  (min)=       7.54 (ii)   16.07 (ii)
Unit Hyd. Tpeak (min)=      10.00        20.00
Unit Hyd. peak  (cms)=        .13          .06
                                                        *TOTALS*
PEAK FLOW       (cms)=       1.52         2.56          3.608 (iii)
TIME TO PEAK    (hrs)=       6.00         6.17           6.08
RUNOFF VOLUME    (mm)=      51.91        14.24          22.15
TOTAL RAINFALL   (mm)=      53.41        53.41          53.41
RUNOFF COEFFICIENT   =        .97          .27            .41


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=        2.10          2.89
Dep. Storage     (mm)=        1.50          5.00
Average Slope     (%)=        2.86          2.86
Length            (m)=      185.00         40.00
Mannings n           =        .013          .300

Max.Eff.Inten.(mm/hr)=      70.50        81.70
           over (min)        5.00        15.00
Storage Coeff.  (min)=       3.10 (ii)   10.77 (ii)
Unit Hyd. Tpeak (min)=       5.00        15.00
Unit Hyd. peak  (cms)=        .27          .09
                                                        *TOTALS*
PEAK FLOW       (cms)=        .20          .39            .532 (iii)
TIME TO PEAK    (hrs)=       6.00         6.08           6.00
RUNOFF VOLUME    (mm)=      51.91        14.24          22.15
TOTAL RAINFALL   (mm)=      53.41        53.41          53.41
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     RUNOFF COEFFICIENT   =        .97          .27            .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16        14.04
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     401.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.49 (ii)   14.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .20          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .95         1.66         2.307 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27            .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.12        20.88
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.03         2.03
     Length            (m)=     465.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.97 (ii)   14.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .19          .08
                                                          *TOTALS*
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PEAK FLOW        (cms)=       1.40          2.42          3.376 (iii)
TIME TO PEAK     (hrs)=       6.00          6.08           6.00
RUNOFF VOLUME     (mm)=      51.91         14.24          22.15
TOTAL RAINFALL    (mm)=      53.41         53.41          53.41
RUNOFF COEFFICIENT   =        .97           .27            .41


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=        5.33          7.37
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        1.71          1.71
Length             (m)=      300.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=       70.50         81.70
            over (min)        5.00         15.00
Storage Coeff.  (min)=        4.84 (ii)    13.78 (ii)
Unit Hyd. Tpeak (min)=        5.00         15.00
Unit Hyd. peak  (cms)=         .22           .08
                                                        *TOTALS*
PEAK FLOW        (cms)=        .51           .88          1.226 (iii)
TIME TO PEAK     (hrs)=       6.00          6.08           6.00
RUNOFF VOLUME     (mm)=      51.91         14.24          22.15
TOTAL RAINFALL    (mm)=      53.41         53.41          53.41
RUNOFF COEFFICIENT   =        .97           .27            .41

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

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0395) |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=        5.12         46.08
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        2.00          2.00
Length             (m)=      900.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=       70.50         58.39
            over (min)       10.00         20.00
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     Storage Coeff.  (min)=       8.92 (ii)   18.68 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .41         2.36         2.601 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.25          6.17
     RUNOFF VOLUME    (mm)=      51.91         9.64         11.75
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .18           .22

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        75.96
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.86 (ii)   14.65 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .20          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.06         1.94         2.582 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        13.31         20.64
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .25           .39

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
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                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
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        Hadati Creek Watershed - Post Development with Cityview Ridge
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=       1.00          1.00
     Length             (m)=     330.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         77.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       6.01 (ii)    16.75 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .19           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .63           .95        1.186 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.17         6.00
     RUNOFF VOLUME    (mm)=      51.91         14.24        22.15
     TOTAL RAINFALL   (mm)=      53.41         53.41        53.41
     RUNOFF COEFFICIENT   =        .97           .27          .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.17          7.13
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       1.60          1.60
     Length            (m)=     286.00         40.00
     Mannings n           =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         81.70
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       4.79 (ii)    13.92 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .22           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .49           .85        1.183 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      51.91         14.24        22.15
     TOTAL RAINFALL   (mm)=      53.41         53.41        53.41
     RUNOFF COEFFICIENT   =        .97           .27          .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0365) |   Area    (ha)= 117.50
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          Hadati Creek Watershed - Post Development with Cityview Ridge
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      49.35        68.15
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     885.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)      10.00        20.00
     Storage Coeff.  (min)=       8.83 (ii)   17.37 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.95         6.70         9.481 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.08
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.55        29.77
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     550.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)       5.00        20.00
     Storage Coeff.  (min)=       6.64 (ii)   15.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .18          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.96         3.14         3.870 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.08
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01         8.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     287.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.49 (ii)   13.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .23          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .58         1.02         1.415 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        81.70
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.70 (ii)   13.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .65         1.15         1.601 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      51.91        14.24         22.15
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .27           .41

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
```

```
          Hadati Creek Watershed - Post Development with Cityview Ridge
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98         11.02
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     365.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         81.70
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       5.19 (ii)    13.73 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .21           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .75          1.32        1.831 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      51.91         14.24        22.15
     TOTAL RAINFALL   (mm)=      53.41         53.41        53.41
     RUNOFF COEFFICIENT   =        .97           .27          .41


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0600) |   Area    (ha)=  11.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.78          6.60
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     680.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         81.70
                over (min)       10.00         20.00
     Storage Coeff.  (min)=       7.54 (ii)    16.07 (ii)
     Unit Hyd. Tpeak (min)=      10.00         20.00
     Unit Hyd. peak  (cms)=        .13           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .40           .68         .953 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.17         6.08
     RUNOFF VOLUME    (mm)=      51.91         14.24        22.15
     TOTAL RAINFALL   (mm)=      53.41         53.41        53.41
     RUNOFF COEFFICIENT   =        .97           .27          .41
```

```
          Hadati Creek Watershed - Post Development with Cityview Ridge
       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0601) |   Area    (ha)=   7.62
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.51         4.11
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        89.23
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.54 (ii)   15.78 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .27          .49          .679 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.08
     RUNOFF VOLUME    (mm)=      51.91        15.62        23.24
     TOTAL RAINFALL   (mm)=      53.41        53.41        53.41
     RUNOFF COEFFICIENT   =        .97          .29          .44


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0607) |   Area    (ha)=   5.97
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=   2.50
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.51         3.46
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50       105.29
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.54 (ii)   15.25 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .03          .52          .534 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.17
     RUNOFF VOLUME    (mm)=      51.91        17.87        18.72
     TOTAL RAINFALL   (mm)=      53.41        53.41        53.41
```

```
     RUNOFF COEFFICIENT   =        .97          .33            .35

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70          .93
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     150.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        30.06
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       4.48 (ii)   23.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .23          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .70          .04          .713 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.25          6.00
     RUNOFF VOLUME    (mm)=      51.91         9.54         43.01
     TOTAL RAINFALL   (mm)=      53.41        53.41         53.41
     RUNOFF COEFFICIENT   =        .97          .18           .81

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     112.24       131.76
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .80          .80
     Length            (m)=    1275.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      70.50        78.43
                over (min)       15.00        30.00
     Storage Coeff.  (min)=      14.47 (ii)   25.89 (ii)
     Unit Hyd. Tpeak (min)=      15.00        30.00
```

```
Unit Hyd. peak  (cms)=        .08          .04
                                                        *TOTALS*
PEAK FLOW       (cms)=       8.08         9.34          14.467 (iii)
TIME TO PEAK    (hrs)=       6.08         6.33            6.25
RUNOFF VOLUME    (mm)=      51.91        14.36           24.12
TOTAL RAINFALL   (mm)=      53.41        53.41           53.41
RUNOFF COEFFICIENT   =        .97          .27             .45


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0510) |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       12.80         3.20
Dep. Storage     (mm)=        1.50         5.00
Average Slope     (%)=         .50          .20
Length            (m)=      400.00        40.00
Mannings n           =        .013         .300

Max.Eff.Inten.(mm/hr)=       70.50        20.04
            over (min)       10.00        40.00
Storage Coeff.  (min)=        8.31 (ii)   38.19 (ii)
Unit Hyd. Tpeak (min)=       10.00        40.00
Unit Hyd. peak  (cms)=         .13          .03
                                                        *TOTALS*
PEAK FLOW       (cms)=        2.06          .09           2.080 (iii)
TIME TO PEAK    (hrs)=        6.00         6.50            6.00
RUNOFF VOLUME    (mm)=       51.91         9.54           43.01
TOTAL RAINFALL   (mm)=       53.41        53.41           53.41
RUNOFF COEFFICIENT   =         .97          .18             .81


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       20.20         5.05
Dep. Storage     (mm)=        1.50         5.00
Average Slope     (%)=         .55          .55
Length            (m)=      350.00        40.00
Mannings n           =        .013         .300

Max.Eff.Inten.(mm/hr)=       70.50        30.06
```

```
            over (min)        5.00        30.00
     Storage Coeff.  (min)=   7.45 (ii)   26.21 (ii)
     Unit Hyd. Tpeak (min)=   5.00        30.00
     Unit Hyd. peak  (cms)=    .17          .04
                                                        *TOTALS*
     PEAK FLOW       (cms)=   3.56          .19          3.608 (iii)
     TIME TO PEAK    (hrs)=   6.00         6.33           6.00
     RUNOFF VOLUME    (mm)=  51.91         9.54          43.01
     TOTAL RAINFALL   (mm)=  53.41        53.41          53.41
     RUNOFF COEFFICIENT   =    .97          .18            .81

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.99          3.00
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=        .55           .55
     Length            (m)=     200.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         30.06
            over (min)         5.00         25.00
     Storage Coeff.  (min)=     5.33 (ii)    24.09 (ii)
     Unit Hyd. Tpeak (min)=     5.00         25.00
     Unit Hyd. peak  (cms)=      .21           .05
                                                        *TOTALS*
     PEAK FLOW       (cms)=     2.23           .12          2.271 (iii)
     TIME TO PEAK    (hrs)=     6.00         6.33           6.00
     RUNOFF VOLUME    (mm)=    51.91         9.54          43.01
     TOTAL RAINFALL   (mm)=    53.41        53.41          53.41
     RUNOFF COEFFICIENT   =      .97          .18            .81

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .90           .23
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=        .55           .55
     Length            (m)=      50.00         40.00
```

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          Hadati Creek Watershed - Post Development with Cityview Ridge
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=      70.50         30.06
                over (min)        5.00         25.00
     Storage Coeff.  (min)=       2.32 (ii)    21.08 (ii)
     Unit Hyd. Tpeak (min)=       5.00         25.00
     Unit Hyd. peak  (cms)=        .30           .05
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .17           .01            .178 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.25            6.00
     RUNOFF VOLUME    (mm)=      51.91          9.54           43.01
     TOTAL RAINFALL   (mm)=      53.41         53.41           53.41
     RUNOFF COEFFICIENT   =        .97           .18             .81

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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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--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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

--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0415):     4.99     .532     6.00    22.15
        + ID2= 2 (0410):    24.20    2.307     6.00    22.15
          ===================================================
          ID = 3 (0420):    29.19    2.839     6.00    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0465) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0460):    36.00    3.376     6.00    22.15
        + ID2= 2 (0455):    12.70    1.226     6.00    22.15
          ===================================================
          ID = 3 (0465):    48.70    4.602     6.00    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0362) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
```

.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	2.58	6.00	20.64	.23	1.41
OUTFLOW: ID= 1 (0362)	30.00	2.01	6.17	20.63	.21	1.31

ROUTE CHN (0353)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24

.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	1.19	6.00	22.15	.16	1.10
OUTFLOW: ID= 1 (0353)	16.30	.95	6.25	22.11	.15	1.02

```
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	1.18	6.00	22.15	.16	1.10
OUTFLOW: ID= 1 (0358)	12.30	.74	6.17	22.10	.13	.92

```
--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)    |   (cms)     (ha.m.)
                            .0000      .0000     |    .5000       .4000
                            .0100      .0100     |   6.6000       .8000
                            .0260      .2300     |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0105)      51.320      3.870        6.08       22.15
     OUTFLOW: ID= 1 (0106)      51.320      2.731        6.33       22.14

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 70.57
                    TIME SHIFT OF PEAK FLOW         (min)= 15.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .5507

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

--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0102):    14.32   1.415     6.00    22.15
        + ID2= 2 (0101):    16.32   1.601     6.00    22.15
          ==================================================
          ID = 3 (0103):    30.64   3.016     6.00    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)    |   (cms)     (ha.m.)
                            .0000      .0000     |   1.0000      1.0000
                            .0100      .0100     |  20.0000      1.1000
                            .0120      .1000     |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)      19.000      1.831        6.00       22.15
     OUTFLOW: ID= 1 (0111)      19.000       .238        6.58       22.14

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.98
                    TIME SHIFT OF PEAK FLOW         (min)= 35.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .3060

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

--------------------
| ADD HYD   (0602) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0600):    11.38    .953     6.08    22.15
        + ID2= 2 (0601):     7.62    .679     6.08    23.24
          ==================================================
          ID = 3 (0602):    19.00   1.632     6.08    22.59
```

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

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00     14.47      6.25   24.12
     ==================================================
     MAJOR SYS.(ID= 2):  33.53      5.47      6.25   24.12
     MINOR SYS.(ID= 3): 210.47      9.00      6.00   24.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0505):   210.47   9.000     6.00    24.12
        + ID2= 2 (0510):    16.00   2.080     6.00    43.01
          ==================================================
          ID = 3 (0515):   226.47  11.080     6.00    25.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  29.19      2.84      6.00   22.15
     ==================================================
     MAJOR SYS.(ID= 2):   2.28       .86      6.00   22.15
     MINOR SYS.(ID= 3):  26.91      1.98      6.00   22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0425):     2.28     .859     6.00    22.15
        + ID2= 2 (0465):    48.70   4.602     6.00    22.15
          ==================================================
          ID = 3 (0470):    50.98   5.461     6.00    22.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```

```
          ID1= 1 (0353):    16.30    .952     6.25    22.11
        + ID2= 2 (0358):    12.30    .744     6.17    22.10
          ==================================================
          ID = 3 (0359):    28.60   1.680     6.25    22.11

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.0000      .5000
                            .0100      .0100    |  10.0000      .6000
                            .0150      .1332    |    .0000      .0000

                                   AREA      QPEAK       TPEAK       R.V.
                                   (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0103)      30.640      3.016        6.00       22.15
     OUTFLOW: ID= 1 (0104)      30.640       .801        6.42       22.14

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 26.57
                   TIME SHIFT OF PEAK FLOW         (min)= 25.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .4263

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

--------------------
| ADD HYD   (0114) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0104):    30.64    .801     6.42    22.14
        + ID2= 2 (0111):    19.00    .238     6.58    22.14
          ==================================================
          ID = 3 (0114):    49.64   1.029     6.50    22.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0563) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   2.2) ------>
               Distance      Elevation       Manning
                    .00          1.00         .0350
                   2.00           .50         .0350
                   4.00           .00     .0350 / .0350  Main Channel
                   4.50           .00         .0350      Main Channel
                   5.00           .00     .0350 / .0350  Main Channel
                   7.00           .50         .0350
                   9.00          1.00         .0350

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .05      .05    .745E+01        .0           .64       3.06
        .11      .11    .175E+02        .1           .96       2.03
        .16      .16    .301E+02        .3          1.21       1.61
        .21      .21    .454E+02        .6          1.42       1.37
        .26      .26    .632E+02        .9          1.61       1.21
        .32      .32    .836E+02       1.3          1.77       1.10
```

.37	.37	.107E+03	1.8	1.93	1.01
.42	.42	.132E+03	2.3	2.08	.94
.47	.47	.160E+03	3.0	2.22	.88
.53	.53	.191E+03	3.8	2.35	.83
.58	.58	.225E+03	4.8	2.48	.79
.63	.63	.261E+03	5.8	2.60	.75
.68	.68	.299E+03	7.0	2.72	.72
.74	.74	.340E+03	8.2	2.84	.69
.79	.79	.384E+03	9.7	2.95	.66
.84	.84	.430E+03	11.3	3.06	.64
.89	.89	.479E+03	13.0	3.17	.62
.95	.95	.531E+03	14.8	3.27	.60
1.00	1.00	.585E+03	16.9	3.38	.58

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0602)	19.00	1.63	6.08	22.59	.35	1.89
OUTFLOW: ID= 1 (0563)	19.00	1.61	6.08	22.59	.35	1.88

```
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	101.50	.0500	
1.00	100.70	.0500	
1.50	100.55	.0500 / .0300	Main Channel
2.00	99.50	.0300	Main Channel
3.50	99.60	.0300	Main Channel
4.50	100.65	.0300 / .0500	Main Channel
6.00	101.45	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.10	99.60	.353E+02	.0	.19	43.69
.19	99.69	.112E+03	.1	.37	22.76
.29	99.79	.195E+03	.2	.49	17.03
.38	99.88	.285E+03	.3	.59	14.23
.48	99.98	.381E+03	.5	.67	12.51
.57	100.07	.484E+03	.7	.74	11.32
.67	100.17	.594E+03	.9	.80	10.43
.76	100.26	.710E+03	1.2	.86	9.74
.86	100.36	.832E+03	1.5	.91	9.18
.95	100.45	.961E+03	1.8	.96	8.72
1.05	100.55	.110E+04	2.2	1.00	8.32
1.16	100.66	.127E+04	2.7	1.07	7.80
1.28	100.78	.148E+04	3.4	1.14	7.31
1.39	100.89	.170E+04	4.1	1.20	6.94
1.50	101.00	.195E+04	4.9	1.25	6.65
1.61	101.11	.221E+04	5.8	1.30	6.41
1.72	101.22	.250E+04	6.7	1.34	6.22
1.84	101.34	.280E+04	7.7	1.38	6.04
1.95	101.45	.313E+04	8.8	1.41	5.90

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0505)	33.53	5.47	6.25	24.12	1.58	1.28

```
OUTFLOW: ID= 1 (0564)   33.53     4.91    6.33  24.12      1.50      1.25

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 226.47     11.08      6.00   25.46
     ==========================================================
     MAJOR SYS.(ID= 2):  88.85      8.03      6.00   25.46
     MINOR SYS.(ID= 3): 137.62      3.05      5.75   25.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        324.60         .0500
                 115.00        321.60         .0500
                 120.00        320.80     .0500 / .0300  Main Channel
                 122.00        320.80     .0300 / .0500  Main Channel
                 138.00        321.60         .0500
                 148.00        322.30         .0500
                 154.00        323.10         .0500
                 164.00        324.60         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .20   321.00    .398E+03        .8           .84        8.53
        .40   321.20    .125E+04       3.3          1.13        6.33
        .60   321.40    .255E+04       8.1          1.36        5.27
        .80   321.60    .430E+04      15.6          1.56        4.59
       1.00   321.80    .644E+04      26.8          1.79        4.01
       1.20   322.00    .892E+04      41.2          1.99        3.61
       1.40   322.20    .117E+05      59.3          2.17        3.30
       1.60   322.40    .148E+05      81.9          2.37        3.02
       1.80   322.60    .182E+05     109.1          2.58        2.78
       2.00   322.80    .218E+05     140.2          2.77        2.59
       2.20   323.00    .256E+05     175.3          2.95        2.43
       2.40   323.20    .296E+05     214.7          3.12        2.29
       2.60   323.40    .338E+05     258.6          3.29        2.18
       2.80   323.60    .382E+05     306.7          3.46        2.07
       3.00   323.80    .428E+05     359.1          3.61        1.98
       3.20   324.00    .476E+05     416.0          3.76        1.91
       3.40   324.20    .526E+05     477.5          3.91        1.83
       3.60   324.40    .578E+05     543.5          4.05        1.77
       3.80   324.60    .632E+05     614.3          4.18        1.71

                                  <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)    (hrs)    (mm)     (m)      (m/s)
     INFLOW : ID= 2 (0470)   50.98    5.46     6.00   22.15     .49      1.23
     OUTFLOW: ID= 1 (0475)   50.98    4.60     6.08   22.15     .45      1.19
```

```
--------------------
| ADD HYD   (0363) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0362):    30.00   2.013     6.17    20.63
        + ID2= 2 (0359):    28.60   1.680     6.25    22.11
          ===================================================
          ID = 3 (0363):    58.60   3.649     6.17    21.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0106):    51.32   2.731     6.33    22.14
        + ID2= 2 (0114):    49.64   1.029     6.50    22.14
          ===================================================
          ID = 3 (0115):   100.96   3.732     6.33    22.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0563):    19.00   1.610     6.08    22.59
        + ID2= 2 (0607):     5.97    .534     6.17    18.72
          ===================================================
          ID = 3 (0492):    24.97   2.115     6.08    21.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0525):      .00    .001      .00  *******
        + ID2= 2 (0520):    88.85   8.030     6.00    25.46
          ===================================================
          ID = 3 (0526):    88.85   8.030     6.00    25.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0363):    58.60   3.649     6.17    21.35
        + ID2= 2 (0365):   117.50   9.481     6.08    22.15
          ===================================================
          ID = 3 (0380):   176.10  12.674     6.17    21.88
```

Hadati Creek Watershed - Post Development with Cityview Ridge
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)    |   (cms)     (ha.m.)
                            .0000      .0000     |    .2910       .3795
                            .2590      .0579     |    .2970       .4503
                            .2660      .1180     |   1.6320       .5232
                            .2720      .1802     |   4.1680       .5983
                            .2790      .2445     |   7.5660       .6756
                            .2850      .3109     |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0492)      24.970      2.115        6.08       21.66
     OUTFLOW: ID= 1 (0482)      24.970       .288        6.83       21.66

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 13.60
                TIME SHIFT OF PEAK FLOW         (min)= 45.00
                MAXIMUM  STORAGE   USED       (ha.m.)=   .3412

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        313.20         .0500
                 140.00        312.40     .0500 / .0300  Main Channel
                 140.50        310.80         .0300      Main Channel
                 141.50        310.80         .0300      Main Channel
                 142.00        312.40     .0300 / .0500  Main Channel
                 160.00        313.20         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
        .12    310.92    .575E+02        .1           .40      18.86
        .25    311.05    .119E+03        .2           .57      13.13
        .37    311.17    .185E+03        .3           .69      10.87
        .49    311.29    .256E+03        .4           .78       9.61
        .62    311.42    .330E+03        .6           .86       8.77
        .74    311.54    .409E+03        .8           .92       8.17
        .86    311.66    .492E+03       1.1           .97       7.70
        .98    311.78    .579E+03       1.3          1.02       7.32
       1.11    311.91    .671E+03       1.6          1.07       7.01
       1.23    312.03    .767E+03       1.9          1.11       6.74
       1.35    312.15    .867E+03       2.2          1.15       6.50
       1.48    312.28    .971E+03       2.6          1.19       6.29
       1.60    312.40    .108E+04       2.9          1.23       6.11
       1.73    312.53    .149E+04       3.6          1.10       6.85
       1.87    312.67    .248E+04       4.9           .88       8.52
       2.00    312.80    .405E+04       6.9           .77       9.74
       2.13    312.93    .620E+04      10.1           .73      10.21
       2.27    313.07    .893E+04      14.6           .74      10.17
       2.40    313.20    .122E+05      20.7           .76       9.85

                                   <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
```

Hadati Creek Watershed - Post Development with Cityview Ridge

	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0526)	88.85	8.03	6.00	25.46	2.05	.76
OUTFLOW: ID= 1 (0527)	88.85	6.50	6.42	25.46	1.97	.79

```
| RESERVOIR (0390) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	12.674	6.17	21.88
OUTFLOW: ID= 1 (0390)	176.100	1.333	7.08	21.88

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.52
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 2.5065

```
| ADD HYD   (0400) |
|   1 +  2 =  3    |
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0395):	51.20	2.601	6.17	11.75
+ ID2= 2 (0390):	176.10	1.333	7.08	21.88
ID = 3 (0400):	227.30	3.883	6.17	19.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN (0403) |
| IN= 2---> OUT= 1 |
```

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02

1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0400)	227.30	3.88	6.17	19.60	.34	1.13
OUTFLOW: ID= 1 (0403)	227.30	2.23	6.42	19.60	.25	.89

```
--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0403):	227.30	2.232	6.42	19.60
+ ID2= 2 (0115):	100.96	3.732	6.33	22.14
ID = 3 (0407):	328.26	5.857	6.33	20.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.6000	6.4000
1.1000	2.9000	9.1000	10.0000
1.3000	4.3000	12.0000	20.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0407)	328.260	5.857	6.33	20.38
OUTFLOW: ID= 1 (0113)	328.260	1.137	12.67	20.38

PEAK FLOW REDUCTION [Qout/Qin](%)= 19.42
TIME SHIFT OF PEAK FLOW (min)=380.00
MAXIMUM STORAGE USED (ha.m.)= 3.1599

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--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0113):	328.26	1.137	12.67	20.38
+ ID2= 2 (0425):	26.91	1.980	6.00	22.15
ID = 3 (0430):	355.17	2.137	6.17	20.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	325.40	.0600	
120.00	324.60	.0600	
126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0430)	355.17	2.14	6.17	20.51	.33	1.26
OUTFLOW: ID= 1 (0440)	355.17	2.11	6.17	20.51	.32	1.26

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--------------------
| ADD HYD   (0485) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0475):	50.98	4.600	6.08	22.15
+ ID2= 2 (0440):	355.17	2.113	6.17	20.51
ID = 3 (0485):	406.15	6.641	6.08	20.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0490) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0480):    43.10   3.608     6.08    22.15
        + ID2= 2 (0485):   406.15   6.641     6.08    20.72
          ==================================================
          ID = 3 (0490):   449.25  10.249     6.08    20.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0491) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0490):   449.25  10.249     6.08    20.86
        + ID2= 2 (0482):    24.97    .288     6.83    21.66
          ==================================================
          ID = 3 (0491):   474.22  10.516     6.08    20.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   7.0800      2.4860
                            .2760      .0600    |   8.1000      3.3240
                           1.2000      .3400    |   9.7980      4.6420
                           2.0400      .6182    |  10.4940      7.4397
                           2.6400     1.1630    |  11.6850     10.3000
                           3.1200     1.7070    |  12.3480     11.4000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)    474.220     10.516        6.08       20.90
     OUTFLOW: ID= 1 (0483)    474.220      2.907        6.67       20.90

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 27.65
                    TIME SHIFT OF PEAK FLOW         (min)= 35.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  1.4680

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--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0483):   474.22   2.907     6.67    20.90
        + ID2= 2 (0540):     4.63    .713     6.00    43.01
          ==================================================
          ID = 3 (0530):   478.85   3.002     6.50    21.11

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
```

Hadati Creek Watershed - Post Development with Cityview Ridge

```
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0530):   478.85   3.002     6.50    21.11
        + ID2= 2 (0527):    88.85   6.502     6.42    25.46
          ===================================================
          ID = 3 (0545):   567.70   9.482     6.50    21.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0545):   567.70   9.482     6.50    21.79
        + ID2= 2 (0542):    25.25   3.608     6.00    43.01
          ===================================================
          ID = 3 (0546):   592.95  10.345     6.00    22.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0546):   592.95  10.345     6.00    22.70
        + ID2= 2 (0543):    14.99   2.271     6.00    43.01
          ===================================================
          ID = 3 (0547):   607.94  12.615     6.00    23.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0547):   607.94  12.615     6.00    23.20
        + ID2= 2 (0544):     1.13    .178     6.00    43.01
          ===================================================
          ID = 3 (0548):   609.07  12.793     6.00    23.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************


--------------------
|    READ STORM    |     Filename: Y:\SPrimmer\OTTHYMO\Ci
|                  |               tyview Ridge\25yrSCS12hr.stm
| Ptotal= 73.56 mm |     Comments: 25 year SCS Type II 12hr design storm
--------------------
                 TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .25    1.84 |  3.25    2.94 |  6.25   13.24 |  9.25    2.58
                  .50    1.84 |  3.50    2.94 |  6.50   13.24 |  9.50    2.58
```

.75	1.84	3.75	2.94	6.75	5.89	9.75	2.58
1.00	1.84	4.00	2.94	7.00	5.89	10.00	2.58
1.25	1.84	4.25	4.41	7.25	4.41	10.25	1.47
1.50	1.84	4.50	4.41	7.50	4.41	10.50	1.47
1.75	1.84	4.75	5.89	7.75	4.41	10.75	1.47
2.00	1.84	5.00	5.89	8.00	4.41	11.00	1.47
2.25	2.21	5.25	8.83	8.25	2.58	11.25	1.47
2.50	2.21	5.50	8.83	8.50	2.58	11.50	1.47
2.75	2.21	5.75	35.31	8.75	2.58	11.75	1.47
3.00	2.21	6.00	97.10	9.00	2.58	12.00	1.47

```
--------------------
| CALIB            |
| STANDHYD  (0480) |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10         25.00
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     680.00         40.00
     Mannings n          =        .013          .300

         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
.083	1.84	3.083	2.94	6.083	13.24	9.08	2.58
.167	1.84	3.167	2.94	6.167	13.24	9.17	2.58
.250	1.84	3.250	2.94	6.250	13.24	9.25	2.58
.333	1.84	3.333	2.94	6.333	13.24	9.33	2.58
.417	1.84	3.417	2.94	6.417	13.24	9.42	2.58
.500	1.84	3.500	2.94	6.500	13.24	9.50	2.58
.583	1.84	3.583	2.94	6.583	5.89	9.58	2.58
.667	1.84	3.667	2.94	6.667	5.89	9.67	2.58
.750	1.84	3.750	2.94	6.750	5.89	9.75	2.58
.833	1.84	3.833	2.94	6.833	5.89	9.83	2.58
.917	1.84	3.917	2.94	6.917	5.89	9.92	2.58
1.000	1.84	4.000	2.94	7.000	5.88	10.00	2.58
1.083	1.84	4.083	4.41	7.083	4.41	10.08	1.47
1.167	1.84	4.167	4.41	7.167	4.41	10.17	1.47
1.250	1.84	4.250	4.41	7.250	4.41	10.25	1.47
1.333	1.84	4.333	4.41	7.333	4.41	10.33	1.47
1.417	1.84	4.417	4.41	7.417	4.41	10.42	1.47
1.500	1.84	4.500	4.41	7.500	4.41	10.50	1.47
1.583	1.84	4.583	5.88	7.583	4.41	10.58	1.47
1.667	1.84	4.667	5.89	7.667	4.41	10.67	1.47
1.750	1.84	4.750	5.89	7.750	4.41	10.75	1.47
1.833	1.84	4.833	5.89	7.833	4.41	10.83	1.47
1.917	1.84	4.917	5.89	7.917	4.41	10.92	1.47
2.000	1.84	5.000	5.89	8.000	4.41	11.00	1.47
2.083	2.21	5.083	8.83	8.083	2.58	11.08	1.47
2.167	2.21	5.167	8.83	8.167	2.58	11.17	1.47
2.250	2.21	5.250	8.83	8.250	2.58	11.25	1.47
2.333	2.21	5.333	8.83	8.333	2.58	11.33	1.47
2.417	2.21	5.417	8.83	8.417	2.58	11.42	1.47
2.500	2.21	5.500	8.83	8.500	2.58	11.50	1.47
2.583	2.21	5.583	35.31	8.583	2.58	11.58	1.47
2.667	2.21	5.667	35.31	8.667	2.58	11.67	1.47

```
          2.750    2.21 | 5.750   35.31 | 8.750    2.58 | 11.75    1.47
          2.833    2.21 | 5.833   97.10 | 8.833    2.58 | 11.83    1.47
          2.917    2.21 | 5.917   97.10 | 8.917    2.58 | 11.92    1.47
          3.000    2.21 | 6.000   97.10 | 9.000    2.58 | 12.00    1.47

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.63 (ii)   13.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .18          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.27         4.88         6.559 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0415)   |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.10         2.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.86         2.86
     Length            (m)=     185.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.73 (ii)    9.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .29          .12
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .28          .73         1.007 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.00          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0410)   |   Area    (ha)=  24.20
```

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          Hadati Creek Watershed - Post Development with Cityview Ridge
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16        14.04
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     401.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.83 (ii)   12.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.33         2.92         3.938 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.12        20.88
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.03         2.03
     Length            (m)=     465.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.26 (ii)   12.56 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.96         4.29         5.772 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.33         7.37
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.71         1.71
     Length            (m)=     300.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.25 (ii)   11.94 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .23          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .71         1.55        2.088 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08         6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53        36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .36          .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0395) |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.12        46.08
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     900.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        88.55
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.85 (ii)   16.11 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .58         5.35        5.668 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.17
     RUNOFF VOLUME    (mm)=      72.06        21.36        23.89
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .29          .32

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
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          Hadati Creek Watershed - Post Development with Cityview Ridge
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0360)   |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       111.81
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.16 (ii)   12.69 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.48         3.58         4.647 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        25.57         34.40
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .35           .47

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350)   |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.29 (ii)   14.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .89         1.82         2.485 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
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TOTAL RAINFALL   (mm)=      73.56        73.56          73.56
RUNOFF COEFFICIENT   =        .98          .36            .49


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=          5.17          7.13
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          1.60          1.60
Length            (m)=        286.00         40.00
Mannings n           =          .013          .300

Max.Eff.Inten.(mm/hr)=         97.10        119.40
           over (min)           5.00         15.00
Storage Coeff.  (min)=          4.22 (ii)    12.06 (ii)
Unit Hyd. Tpeak (min)=          5.00         15.00
Unit Hyd. peak  (cms)=           .24           .09
                                                        *TOTALS*
PEAK FLOW       (cms)=           .68          1.49        2.015 (iii)
TIME TO PEAK    (hrs)=          6.00          6.08         6.00
RUNOFF VOLUME    (mm)=         72.06         26.53        36.09
TOTAL RAINFALL   (mm)=         73.56         73.56        73.56
RUNOFF COEFFICIENT   =           .98           .36          .49

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

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=         49.35         68.15
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          2.00          2.00
Length            (m)=        885.00         40.00
Mannings n           =          .013          .300

Max.Eff.Inten.(mm/hr)=         97.10        119.40
           over (min)          10.00         20.00
Storage Coeff.  (min)=          7.77 (ii)    15.10 (ii)
Unit Hyd. Tpeak (min)=         10.00         20.00
Unit Hyd. peak  (cms)=           .13           .07
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                                                          *TOTALS*
PEAK FLOW        (cms)=       5.65        11.98          16.238 (iii)
TIME TO PEAK     (hrs)=       6.00         6.17            6.08
RUNOFF VOLUME     (mm)=      72.06        26.53           36.09
TOTAL RAINFALL    (mm)=      73.56        73.56           73.56
RUNOFF COEFFICIENT   =         .98          .36             .49

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=       21.55         29.77
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        2.00          2.00
Length             (m)=      550.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=       97.10        119.40
            over (min)        5.00         15.00
Storage Coeff.  (min)=        5.84 (ii)    13.17 (ii)
Unit Hyd. Tpeak (min)=        5.00         15.00
Unit Hyd. peak  (cms)=         .20           .08
                                                          *TOTALS*
PEAK FLOW        (cms)=       2.76          5.98           8.044 (iii)
TIME TO PEAK     (hrs)=       6.00          6.08            6.00
RUNOFF VOLUME     (mm)=      72.06         26.53           36.09
TOTAL RAINFALL    (mm)=      73.56         73.56           73.56
RUNOFF COEFFICIENT   =         .98           .36             .49

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=        6.01          8.31
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        2.00          2.00
Length             (m)=      287.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=       97.10        119.40
            over (min)        5.00         15.00
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     Storage Coeff.  (min)=       3.95 (ii)   11.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .24          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .80         1.79         2.406 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.13 (ii)   11.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .24          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .91         2.02         2.725 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98        11.02
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
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          Hadati Creek Watershed - Post Development with Cityview Ridge
     Length              (m)=     365.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.57 (ii)   11.90 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .23          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.05         2.32         3.122 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0600) |   Area    (ha)=  11.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.78         6.60
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n            =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       119.40
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.63 (ii)   13.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .18          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .60         1.29         1.732 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        26.53         36.09
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .36           .49


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0601) |   Area    (ha)=   7.62
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  21.00
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Hadati Creek Watershed - Post Development with Cityview Ridge

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	3.51	4.11	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	680.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.(mm/hr)=		97.10	129.34	
over (min)		5.00	15.00	
Storage Coeff. (min)=		6.63 (ii)	13.74 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.18	.08	
				TOTALS
PEAK FLOW	(cms)=	.40	.89	1.186 (iii)
TIME TO PEAK	(hrs)=	6.00	6.08	6.00
RUNOFF VOLUME	(mm)=	72.06	27.57	36.92
TOTAL RAINFALL	(mm)=	73.56	73.56	73.56
RUNOFF COEFFICIENT	=	.98	.37	.50

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB              |
| STANDHYD  (0607)   |   Area    (ha)=   5.97
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=   2.50
```

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	2.51	3.46	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	680.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.(mm/hr)=		97.10	150.66	
over (min)		5.00	15.00	
Storage Coeff. (min)=		6.63 (ii)	13.32 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.18	.08	
				TOTALS
PEAK FLOW	(cms)=	.04	.90	.921 (iii)
TIME TO PEAK	(hrs)=	6.00	6.08	6.08
RUNOFF VOLUME	(mm)=	72.06	29.58	30.64
TOTAL RAINFALL	(mm)=	73.56	73.56	73.56
RUNOFF COEFFICIENT	=	.98	.40	.42

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Hadati Creek Watershed - Post Development with Cityview Ridge

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| CALIB            |
| STANDHYD  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70          .93
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     150.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       3.94 (ii)   16.20 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .24          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .97          .11        1.036 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17         6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22        61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .29          .83

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     112.24       131.76
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .80          .80
     Length            (m)=    1275.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10       120.22
                over (min)       15.00        25.00
     Storage Coeff.  (min)=      12.73 (ii)   22.36 (ii)
     Unit Hyd. Tpeak (min)=      15.00        25.00
     Unit Hyd. peak  (cms)=        .08          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=      11.66        18.11       27.658 (iii)
     TIME TO PEAK    (hrs)=       6.08         6.25         6.17
     RUNOFF VOLUME    (mm)=      72.06        26.62        38.44
     TOTAL RAINFALL   (mm)=      73.56        73.56        73.56
     RUNOFF COEFFICIENT   =        .98          .36          .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
```

```
          THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0510) |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.80         3.20
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .50          .20
     Length            (m)=     400.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        65.53
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       7.31 (ii)   25.92 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .17          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.12          .25         3.209 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.33          6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22         61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .29           .83


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.20         5.05
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     350.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.56 (ii)   18.81 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .18          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       5.02          .53         5.333 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22         61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .29           .83


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
```

```
          Hadati Creek Watershed - Post Development with Cityview Ridge
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.99         3.00
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     200.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       4.69 (ii)   16.94 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .22          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.11          .34         3.310 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22         61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
     RUNOFF COEFFICIENT   =        .98          .29           .83

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .90          .23
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=      50.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      97.10        87.19
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.04 (ii)   14.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .31          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .24          .03          .266 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      72.06        21.22         61.38
     TOTAL RAINFALL   (mm)=      73.56        73.56         73.56
```

```
          Hadati Creek Watershed - Post Development with Cityview Ridge
     RUNOFF COEFFICIENT   =        .98          .29            .83

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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

--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0415):     4.99   1.007     6.00    36.09
        + ID2= 2 (0410):    24.20   3.938     6.00    36.09
          ==================================================
          ID = 3 (0420):    29.19   4.945     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0465) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0460):    36.00   5.772     6.00    36.09
        + ID2= 2 (0455):    12.70   2.088     6.00    36.09
          ==================================================
          ID = 3 (0465):    48.70   7.859     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0362) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00           .40         .0300
                   5.50           .15     .0300 / .0150  Main Channel
                   5.51           .00         .0150      Main Channel
                  10.00           .09         .0150      Main Channel
                  14.49           .00         .0150      Main Channel
                  14.50           .15     .0150 / .0300  Main Channel
                  20.00           .40         .0300

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .02      .02    .176E+02        .0           .21      80.52
```

.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	4.65	6.00	34.40	.31	1.61
OUTFLOW: ID= 1 (0362)	30.00	3.64	6.17	34.39	.27	1.53

ROUTE CHN (0353)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	2.49	6.00	36.09	.23	1.29
OUTFLOW: ID= 1 (0353)	16.30	1.83	6.17	36.06	.20	1.23

```
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	2.02	6.00	36.09	.21	1.25
OUTFLOW: ID= 1 (0358)	12.30	1.38	6.17	36.04	.17	1.15

```
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5000	.4000
.0100	.0100	6.6000	.8000
.0260	.2300	.0000	.0000

```
                                AREA      QPEAK       TPEAK       R.V.
                                (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0105)     51.320     8.044        6.00       36.09
     OUTFLOW: ID= 1 (0106)     51.320     5.545        6.17       36.09

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 68.94
                   TIME SHIFT OF PEAK FLOW         (min)= 10.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .7419

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

--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0102):    14.32   2.406     6.00    36.09
        + ID2= 2 (0101):    16.32   2.725     6.00    36.09
          ====================================================
          ID = 3 (0103):    30.64   5.131     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.0000      1.0000
                            .0100      .0100    |  20.0000      1.1000
                            .0120      .1000    |    .0000       .0000

                                AREA      QPEAK       TPEAK       R.V.
                                (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)     19.000     3.122        6.00       36.09
     OUTFLOW: ID= 1 (0111)     19.000      .447        6.58       36.08

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.31
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .4965

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

--------------------
| ADD HYD   (0602) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0600):    11.38   1.732     6.00    36.09
        + ID2= 2 (0601):     7.62   1.186     6.00    36.92
          ====================================================
          ID = 3 (0602):    19.00   2.918     6.00    36.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00     27.66      6.17   38.44
     ======================================================
```

```
     MAJOR SYS.(ID= 2):  81.12      18.66      6.17   38.44
     MINOR SYS.(ID= 3): 162.88       9.00      5.92   38.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0505):    162.88    9.000     5.92    38.44
        + ID2= 2 (0510):     16.00    3.209     6.00    61.38
          ====================================================
          ID = 3 (0515):    178.88   12.209     6.00    40.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |       AREA     QPEAK     TPEAK     R.V.
--------------------       (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):   29.19      4.94      6.00    36.09
     ====================================================
     MAJOR SYS.(ID= 2):    7.51      2.96      6.00    36.09
     MINOR SYS.(ID= 3):   21.68      1.98      5.83    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0425):      7.51    2.965     6.00    36.09
        + ID2= 2 (0465):     48.70    7.859     6.00    36.09
          ====================================================
          ID = 3 (0470):     56.21   10.824     6.00    36.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0353):     16.30    1.826     6.17    36.06
        + ID2= 2 (0358):     12.30    1.378     6.17    36.04
          ====================================================
          ID = 3 (0359):     28.60    3.204     6.17    36.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW     STORAGE    |  OUTFLOW     STORAGE
```

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(cms)	(ha.m.)	(cms)	(ha.m.)
.0000	.0000	1.0000	.5000
.0100	.0100	10.0000	.6000
.0150	.1332	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0103)	30.640	5.131	6.00	36.09
OUTFLOW: ID= 1 (0104)	30.640	4.550	6.17	36.08

PEAK FLOW REDUCTION [Qout/Qin](%)= 88.67
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .5514

ADD HYD (0114)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0104):	30.64	4.550	6.17	36.08
+ ID2= 2 (0111):	19.00	.447	6.58	36.08
ID = 3 (0114):	49.64	4.877	6.17	36.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0563)
IN= 2---> OUT= 1 Routing time step (min)'= 5.00

<------ DATA FOR SECTION (2.2) ------>

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.745E+01	.0	.64	3.06
.11	.11	.175E+02	.1	.96	2.03
.16	.16	.301E+02	.3	1.21	1.61
.21	.21	.454E+02	.6	1.42	1.37
.26	.26	.632E+02	.9	1.61	1.21
.32	.32	.836E+02	1.3	1.77	1.10
.37	.37	.107E+03	1.8	1.93	1.01
.42	.42	.132E+03	2.3	2.08	.94
.47	.47	.160E+03	3.0	2.22	.88
.53	.53	.191E+03	3.8	2.35	.83
.58	.58	.225E+03	4.8	2.48	.79
.63	.63	.261E+03	5.8	2.60	.75
.68	.68	.299E+03	7.0	2.72	.72
.74	.74	.340E+03	8.2	2.84	.69
.79	.79	.384E+03	9.7	2.95	.66
.84	.84	.430E+03	11.3	3.06	.64
.89	.89	.479E+03	13.0	3.17	.62
.95	.95	.531E+03	14.8	3.27	.60

```
  1.00     1.00    .585E+03      16.9          3.38        .58

                                <---- hydrograph ---->   <-pipe / channel->
                          AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                          (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
INFLOW : ID= 2 (0602)   19.00     2.92    6.00  36.42       .46      2.19
OUTFLOW: ID= 1 (0563)   19.00     2.87    6.08  36.42       .46      2.18


-------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00        101.50         .0500
                   1.00        100.70         .0500
                   1.50        100.55     .0500 / .0300  Main Channel
                   2.00         99.50         .0300      Main Channel
                   3.50         99.60         .0300      Main Channel
                   4.50        100.65     .0300 / .0500  Main Channel
                   6.00        101.45         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
        .10     99.60    .353E+02        .0           .19      43.69
        .19     99.69    .112E+03        .1           .37      22.76
        .29     99.79    .195E+03        .2           .49      17.03
        .38     99.88    .285E+03        .3           .59      14.23
        .48     99.98    .381E+03        .5           .67      12.51
        .57    100.07    .484E+03        .7           .74      11.32
        .67    100.17    .594E+03        .9           .80      10.43
        .76    100.26    .710E+03       1.2           .86       9.74
        .86    100.36    .832E+03       1.5           .91       9.18
        .95    100.45    .961E+03       1.8           .96       8.72
       1.05    100.55    .110E+04       2.2          1.00       8.32
       1.16    100.66    .127E+04       2.7          1.07       7.80
       1.28    100.78    .148E+04       3.4          1.14       7.31
       1.39    100.89    .170E+04       4.1          1.20       6.94
       1.50    101.00    .195E+04       4.9          1.25       6.65
       1.61    101.11    .221E+04       5.8          1.30       6.41
       1.72    101.22    .250E+04       6.7          1.34       6.22
       1.84    101.34    .280E+04       7.7          1.38       6.04
       1.95    101.45    .313E+04       8.8          1.41       5.90

     **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                <---- hydrograph ---->   <-pipe / channel->
                          AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                          (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
INFLOW : ID= 2 (0505)   81.12    18.66    6.17  38.44      1.72      1.34
OUTFLOW: ID= 1 (0564)   81.12    28.30    6.50  38.44      1.95      1.41

     **** WARNING:  COMPUTATIONS FAILED TO CONVERGE.

-------------------------------------------------------------------------------
--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |      AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
```

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TOTAL HYD.(ID= 1):	178.88	12.21	6.00	40.49
MAJOR SYS.(ID= 2):	74.76	9.16	6.00	40.49
MINOR SYS.(ID= 3):	104.13	3.05	5.67	40.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0475)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02
1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29
2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0470)	56.21	10.82	6.00	36.09	.67	1.43
OUTFLOW: ID= 1 (0475)	56.21	9.54	6.08	36.09	.64	1.39

ADD HYD (0363)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0362):	30.00	3.642	6.17	34.39
+ ID2= 2 (0359):	28.60	3.204	6.17	36.05
ID = 3 (0363):	58.60	6.846	6.17	35.20

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

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| ADD HYD   (0115) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0106):    51.32   5.545     6.17    36.09
        + ID2= 2 (0114):    49.64   4.877     6.17    36.08
          ==================================================
          ID = 3 (0115):   100.96  10.422     6.17    36.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0492) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0563):    19.00   2.866     6.08    36.42
        + ID2= 2 (0607):     5.97    .921     6.08    30.64
          ==================================================
          ID = 3 (0492):    24.97   3.787     6.08    35.04

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0525):      .00     .001      .00  *******
        + ID2= 2 (0520):    74.76   9.159     6.00    40.49
          ==================================================
          ID = 3 (0526):    74.76   9.159     6.00    40.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0363):    58.60   6.846     6.17    35.20
        + ID2= 2 (0365):   117.50  16.238     6.08    36.09
          ==================================================
          ID = 3 (0380):   176.10  22.579     6.08    35.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .2910       .3795
                          .2590      .0579    |    .2970       .4503
```

.2660	.1180	1.6320	.5232
.2720	.1802	4.1680	.5983
.2790	.2445	7.5660	.6756
.2850	.3109	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0492)	24.970	3.787	6.08	35.04
OUTFLOW: ID= 1 (0482)	24.970	1.351	6.42	35.04

PEAK FLOW REDUCTION [Qout/Qin](%)= 35.67
TIME SHIFT OF PEAK FLOW (min)= 20.00
MAXIMUM STORAGE USED (ha.m.)= .5079

ROUTE CHN (0527)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	313.20	.0500	
140.00	312.40	.0500 / .0300	Main Channel
140.50	310.80	.0300	Main Channel
141.50	310.80	.0300	Main Channel
142.00	312.40	.0300 / .0500	Main Channel
160.00	313.20	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.12	310.92	.575E+02	.1	.40	18.86
.25	311.05	.119E+03	.2	.57	13.13
.37	311.17	.185E+03	.3	.69	10.87
.49	311.29	.256E+03	.4	.78	9.61
.62	311.42	.330E+03	.6	.86	8.77
.74	311.54	.409E+03	.8	.92	8.17
.86	311.66	.492E+03	1.1	.97	7.70
.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0526)	74.76	9.16	6.00	40.49	2.09	.74
OUTFLOW: ID= 1 (0527)	74.76	7.08	6.17	40.49	2.01	.77

RESERVOIR (0390)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW STORAGE | OUTFLOW STORAGE

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(cms)	(ha.m.)	(cms)	(ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	22.579	6.08	35.79
OUTFLOW: ID= 1 (0390)	176.100	1.387	7.17	35.79

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.14
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 4.6291

ADD HYD (0400)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0395):	51.20	5.668	6.17	23.89
	+ ID2= 2 (0390):	176.10	1.387	7.17	35.79
	ID = 3 (0400):	227.30	6.995	6.17	33.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0403)
IN= 2---> OUT= 1 Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20

```
 3.00   338.30    .234E+06     561.0          4.56       6.95

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
INFLOW : ID= 2 (0400)  227.30     7.00    6.17  33.11       .46      1.36
OUTFLOW: ID= 1 (0403)  227.30     4.32    6.33  33.11       .36      1.16


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--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0403):   227.30   4.324     6.33    33.11
        + ID2= 2 (0115):   100.96  10.422     6.17    36.08
          ====================================================
          ID = 3 (0407):   328.26  13.657     6.17    34.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.6000      6.4000
                           1.1000     2.9000    |   9.1000     10.0000
                           1.3000     4.3000    |  12.0000     20.0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
INFLOW : ID= 2 (0407)    328.260     13.657        6.17       34.03
OUTFLOW: ID= 1 (0113)    328.260      1.367       15.17       34.02

                 PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.01
                 TIME SHIFT OF PEAK FLOW         (min)=540.00
                 MAXIMUM  STORAGE   USED       (ha.m.)=  4.7719

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--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0113):   328.26   1.367    15.17    34.02
        + ID2= 2 (0425):    21.68   1.980     5.83    36.09
          ====================================================
          ID = 3 (0430):   349.94   2.494     6.25    34.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        325.40         .0600
                 120.00        324.60         .0600
```

126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0430)	349.94	2.49	6.25	34.15	.35	1.29
OUTFLOW:	ID= 1 (0440)	349.94	2.40	6.33	34.15	.34	1.28

ADD HYD (0485)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0475):	56.21	9.543	6.08	36.09
	+ ID2= 2 (0440):	349.94	2.403	6.33	34.15
	ID = 3 (0485):	406.15	11.718	6.08	34.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0490)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0480):	43.10	6.559	6.00	36.09
	+ ID2= 2 (0485):	406.15	11.718	6.08	34.42
	ID = 3 (0490):	449.25	17.844	6.08	34.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0491) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0490):    449.25  17.844     6.08    34.58
        + ID2= 2 (0482):     24.97   1.351     6.42    35.04
          ===================================================
          ID = 3 (0491):    474.22  18.128     6.08    34.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   7.0800      2.4860
                            .2760      .0600    |   8.1000      3.3240
                           1.2000      .3400    |   9.7980      4.6420
                           2.0400      .6182    |  10.4940      7.4397
                           2.6400     1.1630    |  11.6850     10.3000
                           3.1200     1.7070    |  12.3480     11.4000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)     474.220    18.128        6.08       34.60
     OUTFLOW: ID= 1 (0483)     474.220     6.839        6.50       34.60

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 37.72
                    TIME SHIFT OF PEAK FLOW         (min)= 25.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  2.4478

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--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0483):    474.22   6.839     6.50    34.60
        + ID2= 2 (0540):      4.63   1.036     6.00    61.38
          ===================================================
          ID = 3 (0530):    478.85   7.014     6.50    34.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0530):    478.85   7.014     6.50    34.86
        + ID2= 2 (0527):     74.76   7.076     6.17    40.49
          ===================================================
          ID = 3 (0545):    553.61  13.871     6.50    35.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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```

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--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0545):   553.61  13.871     6.50    35.62
        + ID2= 2 (0542):    25.25   5.333     6.00    61.38
          ===================================================
          ID = 3 (0546):   578.86  14.994     6.00    36.75

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0546):   578.86  14.994     6.00    36.75
        + ID2= 2 (0543):    14.99   3.310     6.00    61.38
          ===================================================
          ID = 3 (0547):   593.85  18.304     6.00    37.37

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0547):   593.85  18.304     6.00    37.37
        + ID2= 2 (0544):     1.13    .266     6.00    61.38
          ===================================================
          ID = 3 (0548):   594.98  18.570     6.00    37.41

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************


--------------------
|    READ STORM    |    Filename: Y:\SPrimmer\OTTHYMO\Ci
|                  |              tyview Ridge\100yrSCS12hr.stm
| Ptotal= 90.18 mm |    Comments: 100 year SCS Type II 12hr design storm
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	2.26	3.25	3.61	6.25	16.23	9.25	3.16
.50	2.26	3.50	3.61	6.50	16.23	9.50	3.16
.75	2.26	3.75	3.61	6.75	7.21	9.75	3.16
1.00	2.26	4.00	3.61	7.00	7.21	10.00	3.16
1.25	2.26	4.25	5.41	7.25	5.41	10.25	1.80
1.50	2.26	4.50	5.41	7.50	5.41	10.50	1.80
1.75	2.26	4.75	7.21	7.75	5.41	10.75	1.80
2.00	2.26	5.00	7.21	8.00	5.41	11.00	1.80
2.25	2.70	5.25	10.82	8.25	3.16	11.25	1.80
2.50	2.70	5.50	10.82	8.50	3.16	11.50	1.80
2.75	2.70	5.75	43.29	8.75	3.16	11.75	1.80
3.00	2.70	6.00	119.04	9.00	3.16	12.00	1.80

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--------------------
| CALIB            |
| STANDHYD  (0480) |   Area    (ha)=  43.10
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.10         25.00
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     680.00         40.00
     Mannings n           =       .013          .300

         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
.083	2.26	3.083	3.61	6.083	16.23	9.08	3.16
.167	2.26	3.167	3.61	6.167	16.23	9.17	3.16
.250	2.26	3.250	3.61	6.250	16.23	9.25	3.16
.333	2.26	3.333	3.61	6.333	16.23	9.33	3.16
.417	2.26	3.417	3.61	6.417	16.23	9.42	3.16
.500	2.26	3.500	3.61	6.500	16.23	9.50	3.16
.583	2.26	3.583	3.61	6.583	7.21	9.58	3.16
.667	2.26	3.667	3.61	6.667	7.21	9.67	3.16
.750	2.26	3.750	3.61	6.750	7.21	9.75	3.16
.833	2.26	3.833	3.61	6.833	7.21	9.83	3.16
.917	2.26	3.917	3.61	6.917	7.21	9.92	3.16
1.000	2.26	4.000	3.61	7.000	7.21	10.00	3.16
1.083	2.26	4.083	5.41	7.083	5.41	10.08	1.80
1.167	2.26	4.167	5.41	7.167	5.41	10.17	1.80
1.250	2.26	4.250	5.41	7.250	5.41	10.25	1.80
1.333	2.26	4.333	5.41	7.333	5.41	10.33	1.80
1.417	2.26	4.417	5.41	7.417	5.41	10.42	1.80
1.500	2.26	4.500	5.41	7.500	5.41	10.50	1.80
1.583	2.26	4.583	7.21	7.583	5.41	10.58	1.80
1.667	2.26	4.667	7.21	7.667	5.41	10.67	1.80
1.750	2.26	4.750	7.21	7.750	5.41	10.75	1.80
1.833	2.26	4.833	7.21	7.833	5.41	10.83	1.80
1.917	2.26	4.917	7.21	7.917	5.41	10.92	1.80
2.000	2.26	5.000	7.21	8.000	5.41	11.00	1.80
2.083	2.70	5.083	10.82	8.083	3.16	11.08	1.80
2.167	2.70	5.167	10.82	8.167	3.16	11.17	1.80
2.250	2.70	5.250	10.82	8.250	3.16	11.25	1.80
2.333	2.70	5.333	10.82	8.333	3.16	11.33	1.80
2.417	2.70	5.417	10.82	8.417	3.16	11.42	1.80
2.500	2.70	5.500	10.82	8.500	3.16	11.50	1.80
2.583	2.70	5.583	43.29	8.583	3.16	11.58	1.80
2.667	2.70	5.667	43.29	8.667	3.16	11.67	1.80
2.750	2.70	5.750	43.29	8.750	3.16	11.75	1.80
2.833	2.70	5.833	119.04	8.833	3.16	11.83	1.80
2.917	2.70	5.917	119.04	8.917	3.16	11.92	1.80
3.000	2.70	6.000	119.04	9.000	3.16	12.00	1.80

```
     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       6.11 (ii)    12.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .19           .08
```

```
                                                          *TOTALS*
     PEAK FLOW        (cms)=       2.82          6.56          8.721 (iii)
     TIME TO PEAK     (hrs)=       6.00          6.08           6.00
     RUNOFF VOLUME     (mm)=      88.68         36.13          47.17
     TOTAL RAINFALL    (mm)=      90.18         90.18          90.18
     RUNOFF COEFFICIENT   =         .98           .40            .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       2.10          2.89
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=       2.86          2.86
     Length             (m)=     185.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         10.00
     Storage Coeff.  (min)=       2.51 (ii)     8.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=        .29           .12
                                                          *TOTALS*
     PEAK FLOW        (cms)=        .35           .96          1.304 (iii)
     TIME TO PEAK     (hrs)=       6.00          6.00           6.00
     RUNOFF VOLUME     (mm)=      88.68         36.13          47.17
     TOTAL RAINFALL    (mm)=      90.18         90.18          90.18
     RUNOFF COEFFICIENT   =         .98           .40            .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      10.16         14.04
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=       2.00          2.00
     Length             (m)=     401.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
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```
            over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.45 (ii)   11.16 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .23          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.64         3.90         5.204 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       15.12        20.88
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=        2.03         2.03
     Length            (m)=      465.00        40.00
     Mannings n          =        .013         .300

     Max.Eff.Inten.(mm/hr)=      119.04       149.56
            over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.84 (ii)   11.52 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.43         5.73         7.639 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        5.33         7.37
     Dep. Storage     (mm)=        1.50         5.00
```

```
          Hadati Creek Watershed - Post Development with Cityview Ridge
     Average Slope      (%)=       1.71          1.71
     Length             (m)=     300.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       3.92 (ii)    10.95 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .24           .09
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .87          2.06          2.756 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08           6.00
     RUNOFF VOLUME    (mm)=      88.68         36.13          47.17
     TOTAL RAINFALL   (mm)=      90.18         90.18          90.18
     RUNOFF COEFFICIENT   =        .98           .40            .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0395)   |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.12         46.08
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     900.00         40.00
     Mannings n           =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        112.64
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       7.23 (ii)    14.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .17           .08
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .78          8.19          8.631 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08           6.08
     RUNOFF VOLUME    (mm)=      88.68         31.49          34.35
     TOTAL RAINFALL   (mm)=      90.18         90.18          90.18
     RUNOFF COEFFICIENT   =        .98           .35            .38

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
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           Hadati Creek Watershed - Post Development with Cityview Ridge
| STANDHYD  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.10        18.90
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     447.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       140.44
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.75 (ii)   11.63 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.83         4.81         6.183 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        35.04         45.23
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .39           .50

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.88 (ii)   13.13 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.10         2.45         3.299 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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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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--------------------
| CALIB            |
| STANDHYD  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.17          7.13
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       1.60          1.60
     Length            (m)=     286.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       3.89 (ii)    11.05 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .25           .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .84          1.99        2.661 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         36.13        47.17
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .40          .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0365) |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      49.35         68.15
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     885.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        149.56
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       7.16 (ii)    13.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .17           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       7.49         17.25       22.881 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         36.13        47.17
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .40          .52
```

```
      (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.55        29.77
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     550.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.38 (ii)   12.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21         .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.42         8.01        10.668 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98         .40           .52


      (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01         8.31
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     287.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.64 (ii)   10.35 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .25         .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .98         2.37          3.171 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
```

```
     TOTAL RAINFALL   (mm)=      90.18        90.18          90.18
     RUNOFF COEFFICIENT   =        .98          .40            .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     309.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.81 (ii)   10.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .25          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.12         2.69         3.593 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08          6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13         47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .40           .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98        11.02
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     365.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       4.21 (ii)   10.91 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
```

```
     Unit Hyd. peak  (cms)=        .24          .09
                                                              *TOTALS*
     PEAK FLOW       (cms)=       1.30         3.09           4.123 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08            6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13           47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18           90.18
     RUNOFF COEFFICIENT   =        .98          .40             .52

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0600) |   Area    (ha)=  11.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.78         6.60
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       149.56
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.11 (ii)   12.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .19          .08
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .75         1.73           2.303 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.08            6.00
     RUNOFF VOLUME    (mm)=      88.68        36.13           47.17
     TOTAL RAINFALL   (mm)=      90.18        90.18           90.18
     RUNOFF COEFFICIENT   =        .98          .40             .52


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0601) |   Area    (ha)=   7.62
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.51         4.11
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300
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        Hadati Creek Watershed - Post Development with Cityview Ridge
     Max.Eff.Inten.(mm/hr)=     119.04        161.60
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       6.11 (ii)    12.61 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .19           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .50          1.19        1.576 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         37.55        48.29
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .42          .54


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0607) |   Area    (ha)=   5.97
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=   2.50
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.51          3.46
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     680.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        187.59
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       6.11 (ii)    12.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .19           .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .05          1.19        1.215 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.08
     RUNOFF VOLUME    (mm)=      88.68         39.89        41.11
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .44          .46

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0540) |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70           .93
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     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=        .55           .55
     Length             (m)=     150.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        111.85
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       3.64 (ii)    14.73 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .25           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.20           .16        1.339 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=      88.68         31.37        76.65
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .35          .85

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0500)   |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=     112.24        131.76
     Dep. Storage      (mm)=       1.50          5.00
     Average Slope      (%)=        .80           .80
     Length             (m)=    1275.00         40.00
     Mannings n            =       .013          .300

     Max.Eff.Inten.(mm/hr)=     119.04        150.55
                over (min)       10.00         25.00
     Storage Coeff.  (min)=      11.73 (ii)    20.53 (ii)
     Unit Hyd. Tpeak (min)=      10.00         25.00
     Unit Hyd. peak  (cms)=        .10           .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=      15.54         24.76       34.262 (iii)
     TIME TO PEAK    (hrs)=       6.00          6.25         6.17
     RUNOFF VOLUME    (mm)=      88.68         36.25        49.88
     TOTAL RAINFALL   (mm)=      90.18         90.18        90.18
     RUNOFF COEFFICIENT   =        .98           .40          .55


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0510)   |   Area    (ha)=  16.00
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          Hadati Creek Watershed - Post Development with Cityview Ridge
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.80         3.20
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .50          .20
     Length            (m)=     400.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04        91.82
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       6.74 (ii)   22.99 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .18          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.88          .40         4.080 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.25          6.00
     RUNOFF VOLUME    (mm)=      88.68        31.37         76.65
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .35           .85


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.20         5.05
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=        .55          .55
     Length            (m)=     350.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=     119.04       111.85
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.05 (ii)   17.13 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       6.23          .77         6.749 (iii)
     TIME TO PEAK    (hrs)=       6.00         6.17          6.00
     RUNOFF VOLUME    (mm)=      88.68        31.37         76.65
     TOTAL RAINFALL   (mm)=      90.18        90.18         90.18
     RUNOFF COEFFICIENT   =        .98          .35           .85


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       11.99          3.00
     Dep. Storage     (mm)=        1.50          5.00
     Average Slope     (%)=         .55           .55
     Length            (m)=      200.00         40.00
     Mannings n          =        .013          .300

     Max.Eff.Inten.(mm/hr)=      119.04        111.85
                over (min)         5.00         20.00
     Storage Coeff.  (min)=        4.32 (ii)    15.41 (ii)
     Unit Hyd. Tpeak (min)=        5.00         20.00
     Unit Hyd. peak  (cms)=         .23           .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        3.84           .48        4.164 (iii)
     TIME TO PEAK    (hrs)=        6.00          6.17         6.00
     RUNOFF VOLUME    (mm)=       88.68         31.37        76.65
     TOTAL RAINFALL   (mm)=       90.18         90.18        90.18
     RUNOFF COEFFICIENT   =         .98           .35          .85

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=         .90           .23
     Dep. Storage     (mm)=        1.50          5.00
     Average Slope     (%)=         .55           .55
     Length            (m)=       50.00         40.00
     Mannings n          =        .013          .300

     Max.Eff.Inten.(mm/hr)=      119.04        111.85
                over (min)         5.00         15.00
     Storage Coeff.  (min)=        1.88 (ii)    12.97 (ii)
     Unit Hyd. Tpeak (min)=        5.00         15.00
     Unit Hyd. peak  (cms)=         .32           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=         .30           .04         .333 (iii)
     TIME TO PEAK    (hrs)=        6.00          6.08         6.00
     RUNOFF VOLUME    (mm)=       88.68         31.37        76.65
     TOTAL RAINFALL   (mm)=       90.18         90.18        90.18
     RUNOFF COEFFICIENT   =         .98           .35          .85

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

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
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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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--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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

--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0415):     4.99   1.304     6.00    47.17
        + ID2= 2 (0410):    24.20   5.204     6.00    47.17
          ===================================================
          ID = 3 (0420):    29.19   6.509     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0465) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0460):    36.00   7.639     6.00    47.17
        + ID2= 2 (0455):    12.70   2.756     6.00    47.17
          ===================================================
          ID = 3 (0465):    48.70  10.395     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN (0362) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00           .40         .0300
                   5.50           .15     .0300 / .0150  Main Channel
                   5.51           .00         .0150      Main Channel
                  10.00           .09         .0150      Main Channel
                  14.49           .00         .0150      Main Channel
                  14.50           .15     .0150 / .0300  Main Channel
                  20.00           .40         .0300

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .02      .02    .176E+02        .0           .21       80.52
        .04      .04    .702E+02        .0           .33       50.72
        .06      .06    .158E+03        .1           .43       38.71
        .08      .08    .281E+03        .1           .52       31.95
        .09      .09    .438E+03        .3           .62       26.84
        .11      .11    .607E+03        .5           .77       21.66
        .13      .13    .776E+03        .7           .90       18.45
        .15      .15    .944E+03       1.0          1.03       16.22
```

.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	6.18	6.00	45.23	.35	1.71
OUTFLOW: ID= 1 (0362)	30.00	4.88	6.17	45.22	.31	1.63

```
| ROUTE CHN (0353) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.929E+01	.0	.17	99.56
.03	.03	.372E+02	.0	.27	62.72
.04	.04	.836E+02	.0	.35	47.86
.05	.05	.149E+03	.1	.42	39.51
.07	.07	.232E+03	.1	.49	34.05
.08	.08	.334E+03	.2	.55	30.15
.10	.10	.454E+03	.3	.64	26.24
.11	.11	.576E+03	.4	.74	22.41
.12	.12	.699E+03	.6	.84	19.75
.14	.14	.822E+03	.8	.94	17.76
.15	.15	.944E+03	1.0	1.03	16.22
.16	.16	.108E+04	1.2	1.11	15.07
.18	.18	.123E+04	1.4	1.17	14.28
.19	.19	.140E+04	1.7	1.21	13.72
.20	.20	.159E+04	2.0	1.25	13.31
.22	.22	.180E+04	2.3	1.28	13.01
.23	.23	.203E+04	2.6	1.31	12.76
.25	.25	.227E+04	3.0	1.33	12.57
.26	.26	.254E+04	3.4	1.34	12.41

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0350)	16.30	3.30	6.00	47.17	.26	1.34
OUTFLOW: ID= 1 (0353)	16.30	2.44	6.17	47.13	.22	1.29

```
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
.00	.26	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.26	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	2.66	6.00	47.17	.23	1.31
OUTFLOW: ID= 1 (0358)	12.30	1.86	6.17	47.12	.20	1.23

```
--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0106) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5000	.4000
.0100	.0100	6.6000	.8000
.0260	.2300	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0105)	51.320	10.668	6.00	47.17
OUTFLOW: ID= 1 (0106)	51.320	7.689	6.17	47.16

PEAK FLOW REDUCTION [Qout/Qin](%)= 72.08
TIME SHIFT OF PEAK FLOW (min)= 10.00

```
                MAXIMUM  STORAGE   USED       (ha.m.)=   .8782

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

--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0102):    14.32   3.171     6.00    47.17
        + ID2= 2 (0101):    16.32   3.593     6.00    47.17
          ==================================================
          ID = 3 (0103):    30.64   6.763     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.0000      1.0000
                            .0100      .0100    |  20.0000      1.1000
                            .0120      .1000    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)      19.000      4.123        6.00       47.17
     OUTFLOW: ID= 1 (0111)      19.000       .613        6.58       47.16

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.87
                TIME SHIFT OF PEAK FLOW         (min)= 35.00
                MAXIMUM  STORAGE   USED       (ha.m.)=   .6478

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

--------------------
| ADD HYD   (0602) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0600):    11.38   2.303     6.00    47.17
        + ID2= 2 (0601):     7.62   1.576     6.00    48.29
          ==================================================
          ID = 3 (0602):    19.00   3.878     6.00    47.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |      AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1): 244.00     34.26      6.17    49.88
     ======================================================
     MAJOR SYS.(ID= 2): 102.03     25.26      6.17    49.88
     MINOR SYS.(ID= 3): 141.97      9.00      5.83    49.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

```
--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0505):   141.97   9.000     5.83    49.88
        + ID2= 2 (0510):    16.00   4.080     6.00    76.65
          ==================================================
          ID = 3 (0515):   157.97  13.080     6.00    52.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
| Total(cms)=  2.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  29.19      6.51      6.00   47.17
     ====================================================
     MAJOR SYS.(ID= 2):  10.15      4.53      6.00   47.17
     MINOR SYS.(ID= 3):  19.04      1.98      5.83   47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0425):    10.15   4.529     6.00    47.17
        + ID2= 2 (0465):    48.70  10.395     6.00    47.17
          ==================================================
          ID = 3 (0470):    58.85  14.924     6.00    47.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0353):    16.30   2.435     6.17    47.13
        + ID2= 2 (0358):    12.30   1.856     6.17    47.12
          ==================================================
          ID = 3 (0359):    28.60   4.291     6.17    47.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   1.0000       .5000
                           .0100      .0100    |  10.0000       .6000
                           .0150      .1332    |    .0000       .0000

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

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```
INFLOW : ID= 2 (0103)     30.640      6.763        6.00       47.17
OUTFLOW: ID= 1 (0104)     30.640      7.048        6.08       47.16

              PEAK   FLOW   REDUCTION [Qout/Qin](%)=104.21
              TIME SHIFT OF PEAK FLOW         (min)=  5.00
              MAXIMUM  STORAGE   USED       (ha.m.)=   .5855

**** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                 CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0114) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0104):    30.64   7.048     6.08    47.16
       + ID2= 2 (0111):    19.00    .613     6.58    47.16
         ==================================================
         ID = 3 (0114):    49.64   7.421     6.08    47.16

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0563) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   2.2) ------>
              Distance      Elevation       Manning
                   .00          1.00         .0350
                 2.00           .50          .0350
                 4.00           .00      .0350 / .0350  Main Channel
                 4.50           .00          .0350      Main Channel
                 5.00           .00      .0350 / .0350  Main Channel
                 7.00           .50          .0350
                 9.00          1.00          .0350

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        .05      .05    .745E+01        .0           .64       3.06
        .11      .11    .175E+02        .1           .96       2.03
        .16      .16    .301E+02        .3          1.21       1.61
        .21      .21    .454E+02        .6          1.42       1.37
        .26      .26    .632E+02        .9          1.61       1.21
        .32      .32    .836E+02       1.3          1.77       1.10
        .37      .37    .107E+03       1.8          1.93       1.01
        .42      .42    .132E+03       2.3          2.08        .94
        .47      .47    .160E+03       3.0          2.22        .88
        .53      .53    .191E+03       3.8          2.35        .83
        .58      .58    .225E+03       4.8          2.48        .79
        .63      .63    .261E+03       5.8          2.60        .75
        .68      .68    .299E+03       7.0          2.72        .72
        .74      .74    .340E+03       8.2          2.84        .69
        .79      .79    .384E+03       9.7          2.95        .66
        .84      .84    .430E+03      11.3          3.06        .64
        .89      .89    .479E+03      13.0          3.17        .62
        .95      .95    .531E+03      14.8          3.27        .60
       1.00     1.00    .585E+03      16.9          3.38        .58

                                   <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
```

```
INFLOW : ID= 2 (0602)   19.00     3.88    6.00  47.62       .53      2.35
OUTFLOW: ID= 1 (0563)   19.00     3.76    6.08  47.62       .52      2.33


--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                   .00        101.50         .0500
                  1.00        100.70         .0500
                  1.50        100.55     .0500 / .0300  Main Channel
                  2.00         99.50         .0300      Main Channel
                  3.50         99.60         .0300      Main Channel
                  4.50        100.65     .0300 / .0500  Main Channel
                  6.00        101.45         .0500

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .10    99.60    .353E+02        .0           .19      43.69
        .19    99.69    .112E+03        .1           .37      22.76
        .29    99.79    .195E+03        .2           .49      17.03
        .38    99.88    .285E+03        .3           .59      14.23
        .48    99.98    .381E+03        .5           .67      12.51
        .57   100.07    .484E+03        .7           .74      11.32
        .67   100.17    .594E+03        .9           .80      10.43
        .76   100.26    .710E+03       1.2           .86       9.74
        .86   100.36    .832E+03       1.5           .91       9.18
        .95   100.45    .961E+03       1.8           .96       8.72
       1.05   100.55    .110E+04       2.2          1.00       8.32
       1.16   100.66    .127E+04       2.7          1.07       7.80
       1.28   100.78    .148E+04       3.4          1.14       7.31
       1.39   100.89    .170E+04       4.1          1.20       6.94
       1.50   101.00    .195E+04       4.9          1.25       6.65
       1.61   101.11    .221E+04       5.8          1.30       6.41
       1.72   101.22    .250E+04       6.7          1.34       6.22
       1.84   101.34    .280E+04       7.7          1.38       6.04
       1.95   101.45    .313E+04       8.8          1.41       5.90

     **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                   <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
     INFLOW : ID= 2 (0505)  102.03    25.26    6.17  49.88     1.80      1.37
     OUTFLOW: ID= 1 (0564)  102.03    39.67    6.58  49.88     1.95      1.41

     **** WARNING:  COMPUTATIONS FAILED TO CONVERGE.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0520) |
| Inlet Cap.=3.050 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |      AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1): 157.97     13.08      6.00    52.60
     ==================================================
     MAJOR SYS.(ID= 2):  67.54     10.03      6.00    52.60
     MINOR SYS.(ID= 3):  90.43      3.05      5.58    52.60
```

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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0475) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02
1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29
2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0470)	58.85	14.92	6.00	47.17	.78	1.54
OUTFLOW:	ID= 1 (0475)	58.85	13.38	6.08	47.17	.74	1.49

```
--------------------
| ADD HYD   (0363) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0362):	30.00	4.880	6.17	45.22
+ ID2= 2 (0359):	28.60	4.291	6.17	47.13
ID = 3 (0363):	58.60	9.171	6.17	46.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD   (0115) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0106):    51.32   7.689     6.17    47.16
        + ID2= 2 (0114):    49.64   7.421     6.08    47.16
          ===================================================
          ID = 3 (0115):   100.96  14.393     6.08    47.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0492) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0563):    19.00   3.758     6.08    47.62
        + ID2= 2 (0607):     5.97   1.215     6.08    41.11
          ===================================================
          ID = 3 (0492):    24.97   4.973     6.08    46.06

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0525):      .00    .001      .00  *******
        + ID2= 2 (0520):    67.54  10.030     6.00    52.60
          ===================================================
          ID = 3 (0526):    67.54  10.030     6.00    52.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0363):    58.60   9.171     6.17    46.15
        + ID2= 2 (0365):   117.50  22.881     6.00    47.17
          ===================================================
          ID = 3 (0380):   176.10  30.231     6.08    46.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .2910      .3795
                          .2590      .0579    |    .2970      .4503
                          .2660      .1180    |   1.6320      .5232
                          .2720      .1802    |   4.1680      .5983
                          .2790      .2445    |   7.5660      .6756
                          .2850      .3109    |    .0000      .0000
```

Hadati Creek Watershed - Post Development with Cityview Ridge

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0492)	24.970	4.973	6.08	46.06
OUTFLOW: ID= 1 (0482)	24.970	3.025	6.25	46.06

PEAK FLOW REDUCTION [Qout/Qin](%)= 60.83
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .5657

ROUTE CHN (0527)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	313.20	.0500	
140.00	312.40	.0500 / .0300	Main Channel
140.50	310.80	.0300	Main Channel
141.50	310.80	.0300	Main Channel
142.00	312.40	.0300 / .0500	Main Channel
160.00	313.20	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.12	310.92	.575E+02	.1	.40	18.86
.25	311.05	.119E+03	.2	.57	13.13
.37	311.17	.185E+03	.3	.69	10.87
.49	311.29	.256E+03	.4	.78	9.61
.62	311.42	.330E+03	.6	.86	8.77
.74	311.54	.409E+03	.8	.92	8.17
.86	311.66	.492E+03	1.1	.97	7.70
.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0526)	67.54	10.03	6.00	52.60	2.13	.74
OUTFLOW: ID= 1 (0527)	67.54	7.92	6.08	52.59	2.04	.76

RESERVOIR (0390)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

Hadati Creek Watershed - Post Development with Cityview Ridge

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	30.231	6.08	46.83
OUTFLOW: ID= 1 (0390)	176.100	1.430	7.25	46.83

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.73
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 6.3304

ADD HYD (0400)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0395):	51.20	8.631	6.08	34.35
+ ID2= 2 (0390):	176.10	1.430	7.25	46.83
ID = 3 (0400):	227.30	9.969	6.08	44.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0403)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

	<---- hydrograph ---->			<-pipe / channel->	
AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)

```
INFLOW : ID= 2 (0400)  227.30     9.97    6.08  44.02       .54      1.50
OUTFLOW: ID= 1 (0403)  227.30     6.22    6.25  44.02       .43      1.29

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--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0403):   227.30   6.216     6.25    44.02
        + ID2= 2 (0115):   100.96  14.393     6.08    47.16
          ==================================================
          ID = 3 (0407):   328.26  18.926     6.17    44.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.6000      6.4000
                           1.1000     2.9000    |   9.1000     10.0000
                           1.3000     4.3000    |  12.0000     20.0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0407)     328.260     18.926        6.17       44.98
     OUTFLOW: ID= 1 (0113)     328.260      1.552       12.50       44.98

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.20
                    TIME SHIFT OF PEAK FLOW         (min)=380.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  6.0640

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--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0113):   328.26   1.552    12.50    44.98
        + ID2= 2 (0425):    19.04   1.980     5.83    47.17
          ==================================================
          ID = 3 (0430):   347.30   3.000     6.33    45.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                 100.00        325.40         .0600
                 120.00        324.60         .0600
                 126.00        323.90         .0600
                 130.00        323.00         .0600
                 140.00        322.30     .0600 / .0300  Main Channel
                 142.00        322.30     .0300 / .0600  Main Channel
                 150.00        323.90         .0600
```

155.00	324.60	.0600
160.00	325.40	.0600

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18
2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0430)	347.30	3.00	6.33	45.10	.38	1.33
OUTFLOW: ID= 1 (0440)	347.30	2.86	6.42	45.10	.37	1.31

ADD HYD (0485)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0475):	58.85	13.381	6.08	47.17
	+ ID2= 2 (0440):	347.30	2.860	6.42	45.10
	ID = 3 (0485):	406.15	15.674	6.08	45.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0490)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0480):	43.10	8.721	6.00	47.17
	+ ID2= 2 (0485):	406.15	15.674	6.08	45.40
	ID = 3 (0490):	449.25	23.705	6.08	45.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0491)

```
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0490):   449.25  23.705     6.08    45.57
        + ID2= 2 (0482):    24.97   3.025     6.25    46.06
          ==================================================
          ID = 3 (0491):   474.22  24.000     6.08    45.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0483) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   7.0800      2.4860
                           .2760      .0600    |   8.1000      3.3240
                          1.2000      .3400    |   9.7980      4.6420
                          2.0400      .6182    |  10.4940      7.4397
                          2.6400     1.1630    |  11.6850     10.3000
                          3.1200     1.7070    |  12.3480     11.4000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0491)    474.220     24.000        6.08       45.60
     OUTFLOW: ID= 1 (0483)    474.220      8.205        6.58       45.60

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 34.19
                   TIME SHIFT OF PEAK FLOW         (min)= 30.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  3.4099

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--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0483):   474.22   8.205     6.58    45.60
        + ID2= 2 (0540):     4.63   1.339     6.00    76.65
          ==================================================
          ID = 3 (0530):   478.85   8.393     6.50    45.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0530):   478.85   8.393     6.50    45.90
        + ID2= 2 (0527):    67.54   7.924     6.08    52.59
          ==================================================
          ID = 3 (0545):   546.39  15.614     6.33    46.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
```

```
          ID1= 1 (0545):   546.39  15.614     6.33    46.72
        + ID2= 2 (0542):    25.25   6.749     6.00    76.65
          ==================================================
          ID = 3 (0546):   571.64  18.214     6.00    48.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0546):   571.64  18.214     6.00    48.05
        + ID2= 2 (0543):    14.99   4.164     6.00    76.65
          ==================================================
          ID = 3 (0547):   586.63  22.378     6.00    48.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0547):   586.63  22.378     6.00    48.78
        + ID2= 2 (0544):     1.13    .333     6.00    76.65
          ==================================================
          ID = 3 (0548):   587.76  22.711     6.00    48.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   5 **
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|    READ STORM    |     Filename: Y:\SPrimmer\OTTHYMO\Ci
|                  |               tyview Ridge\RegSCS12hr.stm
| Ptotal=211.07 mm |     Comments: Regional SCS Type II 12hr design storm
--------------------
                 TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .25    6.35 |  3.25   12.70 |  6.25   23.11 |  9.25   52.83
                  .50    6.35 |  3.50   12.70 |  6.50   23.11 |  9.50   52.83
                  .75    6.35 |  3.75   12.70 |  6.75   23.11 |  9.75   52.83
                 1.00    6.35 |  4.00   12.70 |  7.00   23.11 | 10.00   52.83
                 1.25    4.32 |  4.25   16.76 |  7.25   12.70 | 10.25   37.85
                 1.50    4.32 |  4.50   16.76 |  7.50   12.70 | 10.50   37.85
                 1.75    4.32 |  4.75   16.76 |  7.75   12.70 | 10.75   37.85
                 2.00    4.32 |  5.00   16.76 |  8.00   12.70 | 11.00   37.85
                 2.25    6.35 |  5.25   12.70 |  8.25   12.70 | 11.25   12.70
                 2.50    6.35 |  5.50   12.70 |  8.50   12.70 | 11.50   12.70
                 2.75    6.35 |  5.75   12.70 |  8.75   12.70 | 11.75   12.70
                 3.00    6.35 |  6.00   12.70 |  9.00   12.70 | 12.00   12.70

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| CALIB            |
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Hadati Creek Watershed - Post Development with Cityview Ridge

| STANDHYD (0480) | Area (ha)= 43.10
|ID= 1 DT= 5.0 min | Total Imp(%)= 42.00 Dir. Conn.(%)= 21.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	18.10	25.00
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	680.00	40.00
Mannings n	=	.013	.300

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
.083	6.35	3.083	12.70	6.083	23.11	9.08	52.83
.167	6.35	3.167	12.70	6.167	23.11	9.17	52.83
.250	6.35	3.250	12.70	6.250	23.11	9.25	52.83
.333	6.35	3.333	12.70	6.333	23.11	9.33	52.83
.417	6.35	3.417	12.70	6.417	23.11	9.42	52.83
.500	6.35	3.500	12.70	6.500	23.11	9.50	52.83
.583	6.35	3.583	12.70	6.583	23.11	9.58	52.83
.667	6.35	3.667	12.70	6.667	23.11	9.67	52.83
.750	6.35	3.750	12.70	6.750	23.11	9.75	52.83
.833	6.35	3.833	12.70	6.833	23.11	9.83	52.83
.917	6.35	3.917	12.70	6.917	23.11	9.92	52.83
1.000	6.35	4.000	12.70	7.000	23.11	10.00	52.83
1.083	4.32	4.083	16.76	7.083	12.70	10.08	37.85
1.167	4.32	4.167	16.76	7.167	12.70	10.17	37.85
1.250	4.32	4.250	16.76	7.250	12.70	10.25	37.85
1.333	4.32	4.333	16.76	7.333	12.70	10.33	37.85
1.417	4.32	4.417	16.76	7.417	12.70	10.42	37.85
1.500	4.32	4.500	16.76	7.500	12.70	10.50	37.85
1.583	4.32	4.583	16.76	7.583	12.70	10.58	37.85
1.667	4.32	4.667	16.76	7.667	12.70	10.67	37.85
1.750	4.32	4.750	16.76	7.750	12.70	10.75	37.85
1.833	4.32	4.833	16.76	7.833	12.70	10.83	37.85
1.917	4.32	4.917	16.76	7.917	12.70	10.92	37.85
2.000	4.32	5.000	16.76	8.000	12.70	11.00	37.85
2.083	6.35	5.083	12.70	8.083	12.70	11.08	12.70
2.167	6.35	5.167	12.70	8.167	12.70	11.17	12.70
2.250	6.35	5.250	12.70	8.250	12.70	11.25	12.70
2.333	6.35	5.333	12.70	8.333	12.70	11.33	12.70
2.417	6.35	5.417	12.70	8.417	12.70	11.42	12.70
2.500	6.35	5.500	12.70	8.500	12.70	11.50	12.70
2.583	6.35	5.583	12.70	8.583	12.70	11.58	12.70
2.667	6.35	5.667	12.70	8.667	12.70	11.67	12.70
2.750	6.35	5.750	12.70	8.750	12.70	11.75	12.70
2.833	6.35	5.833	12.70	8.833	12.70	11.83	12.70
2.917	6.35	5.917	12.70	8.917	12.70	11.92	12.70
3.000	6.35	6.000	12.70	9.000	12.70	12.00	12.70

Max.Eff.Inten.(mm/hr)=		52.83	59.46	
over (min)		10.00	20.00	
Storage Coeff.	(min)=	8.46 (ii)	18.15 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	20.00	
Unit Hyd. peak	(cms)=	.12	.06	
				TOTALS
PEAK FLOW	(cms)=	1.33	3.90	5.222 (iii)
TIME TO PEAK	(hrs)=	10.00	10.00	10.00
RUNOFF VOLUME	(mm)=	209.57	107.20	128.70
TOTAL RAINFALL	(mm)=	211.07	211.07	211.07

```
RUNOFF COEFFICIENT   =        .99          .51            .61


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0415) |   Area    (ha)=   4.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.10         2.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.86         2.86
     Length            (m)=     185.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.48 (ii)   12.19 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .26          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .15          .47          .626 (iii)
     TIME TO PEAK    (hrs)=       9.92        10.00         10.00
     RUNOFF VOLUME    (mm)=     209.57       107.20        128.70
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .51           .61

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

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0410) |   Area    (ha)=  24.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.16        14.04
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     401.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.16 (ii)   15.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .07
                                                          *TOTALS*
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```
PEAK FLOW        (cms)=        .75          2.23          2.975 (iii)
TIME TO PEAK     (hrs)=      10.00         10.00          10.00
RUNOFF VOLUME     (mm)=     209.57        107.20         128.70
TOTAL RAINFALL    (mm)=     211.07        211.07         211.07
RUNOFF COEFFICIENT   =        .99           .51            .61


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0460) |   Area    (ha)=  36.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=       15.12         20.88
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        2.03          2.03
Length             (m)=      465.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         59.46
           over (min)         5.00         20.00
Storage Coeff.  (min)=        6.71 (ii)    16.36 (ii)
Unit Hyd. Tpeak (min)=        5.00         20.00
Unit Hyd. peak  (cms)=         .18           .06
                                                        *TOTALS*
PEAK FLOW        (cms)=        1.11          3.30          4.413 (iii)
TIME TO PEAK     (hrs)=       10.00         10.00          10.00
RUNOFF VOLUME     (mm)=      209.57        107.20         128.70
TOTAL RAINFALL    (mm)=      211.07        211.07         211.07
RUNOFF COEFFICIENT   =         .99           .51            .61


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0455) |   Area    (ha)=  12.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area      (ha)=        5.33          7.37
Dep. Storage      (mm)=        1.50          5.00
Average Slope      (%)=        1.71          1.71
Length             (m)=      300.00         40.00
Mannings n            =        .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         59.46
           over (min)         5.00         20.00
Storage Coeff.  (min)=        5.43 (ii)    15.59 (ii)
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```
Unit Hyd. Tpeak (min)=        5.00        20.00
Unit Hyd. peak  (cms)=         .20          .07
                                                        *TOTALS*
PEAK FLOW       (cms)=         .39         1.17          1.564 (iii)
TIME TO PEAK    (hrs)=       10.00        10.00          10.00
RUNOFF VOLUME    (mm)=      209.57       107.20         128.70
TOTAL RAINFALL   (mm)=      211.07       211.07         211.07
RUNOFF COEFFICIENT   =         .99          .51            .61


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0395) |   Area    (ha)=  51.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.00   Dir. Conn.(%)=   5.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=          5.12         46.08
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          2.00          2.00
Length            (m)=        900.00         40.00
Mannings n           =          .013          .300

Max.Eff.Inten.(mm/hr)=         52.83         43.26
            over (min)         10.00         25.00
Storage Coeff.  (min)=         10.01 (ii)    21.02 (ii)
Unit Hyd. Tpeak (min)=         10.00         25.00
Unit Hyd. peak  (cms)=           .11           .05
                                                        *TOTALS*
PEAK FLOW       (cms)=           .37          5.03          5.388 (iii)
TIME TO PEAK    (hrs)=         10.00         10.08          10.08
RUNOFF VOLUME    (mm)=        209.57         81.91          88.29
TOTAL RAINFALL   (mm)=        211.07        211.07         211.07
RUNOFF COEFFICIENT   =           .99           .39            .42

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0360) |   Area    (ha)=  30.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  19.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=         11.10         18.90
Dep. Storage     (mm)=          1.50          5.00
Average Slope     (%)=          2.00          2.00
Length            (m)=        447.00         40.00
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     Mannings n              =       .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         55.42
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       6.58 (ii)    16.55 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .18           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .84          2.78        3.618 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        101.80       122.28
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .48          .58

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0350) |   Area    (ha)=  16.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85         9.45
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     330.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       6.75 (ii)    18.68 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .18           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .50          1.47        1.968 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20       128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .51          .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0355) |   Area    (ha)=  12.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
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Hadati Creek Watershed - Post Development with Cityview Ridge

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	5.17	7.13	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	1.60	1.60	
Length	(m)=	286.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.(mm/hr)=		52.83	59.46	
over (min)		5.00	20.00	
Storage Coeff.	(min)=	5.38 (ii)	15.74 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.21	.07	
				TOTALS
PEAK FLOW	(cms)=	.38	1.13	1.513 (iii)
TIME TO PEAK	(hrs)=	10.00	10.00	10.00
RUNOFF VOLUME	(mm)=	209.57	107.20	128.70
TOTAL RAINFALL	(mm)=	211.07	211.07	211.07
RUNOFF COEFFICIENT	=	.99	.51	.61

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB              |
| STANDHYD  (0365)   |   Area    (ha)= 117.50
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
```

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	49.35	68.15	
Dep. Storage	(mm)=	1.50	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	885.00	40.00	
Mannings n	=	.013	.300	
Max.Eff.Inten.(mm/hr)=		52.83	59.46	
over (min)		10.00	20.00	
Storage Coeff.	(min)=	9.91 (ii)	19.60 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	20.00	
Unit Hyd. peak	(cms)=	.11	.06	
				TOTALS
PEAK FLOW	(cms)=	3.61	10.49	14.089 (iii)
TIME TO PEAK	(hrs)=	10.00	10.08	10.00
RUNOFF VOLUME	(mm)=	209.57	107.20	128.70
TOTAL RAINFALL	(mm)=	211.07	211.07	211.07
RUNOFF COEFFICIENT	=	.99	.51	.61

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
Fo (mm/hr)= 75.00 K (1/hr)= 4.14
Fc (mm/hr)= 12.50 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
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| STANDHYD  (0105) |   Area    (ha)=  51.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.55         29.77
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     550.00         40.00
     Mannings n          =        .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       7.45 (ii)    17.14 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .17           .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.58          4.68        6.260 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20       128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .51          .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0102) |   Area    (ha)=  14.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.01          8.31
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     287.00         40.00
     Mannings n          =        .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       5.04 (ii)    14.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .21           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .44          1.34        1.780 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20       128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .51          .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0101) |   Area    (ha)=  16.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.85          9.47
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     309.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       5.27 (ii)    14.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .21           .08
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .50          1.52        2.027 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20       128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .51          .61

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0110) |   Area    (ha)=  19.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.98         11.02
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     365.00         40.00
     Mannings n          =       .013          .300

     Max.Eff.Inten.(mm/hr)=      52.83         59.46
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       5.82 (ii)    15.52 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .20           .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .59          1.75        2.340 (iii)
     TIME TO PEAK    (hrs)=      10.00         10.00        10.00
     RUNOFF VOLUME    (mm)=     209.57        107.20       128.70
     TOTAL RAINFALL   (mm)=     211.07        211.07       211.07
     RUNOFF COEFFICIENT   =        .99           .51          .61

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00          K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
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          THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (0600) |   Area    (ha)=  11.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.78         6.60
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        59.46
                over (min)      10.00        20.00
     Storage Coeff.  (min)=       8.46 (ii)   18.15 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .35         1.03          1.379 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00          10.00
     RUNOFF VOLUME    (mm)=     209.57       107.20         128.70
     TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
     RUNOFF COEFFICIENT   =        .99          .51            .61


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
            Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
            Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
      (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  (0601) |   Area    (ha)=   7.62
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  21.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.51         4.11
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n           =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        64.79
                over (min)      10.00        20.00
     Storage Coeff.  (min)=       8.46 (ii)   17.83 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .23          .70           .936 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00          10.00
     RUNOFF VOLUME    (mm)=     209.57       113.39         133.59
     TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
     RUNOFF COEFFICIENT   =        .99          .54            .63


       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
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          Hadati Creek Watershed - Post Development with Cityview Ridge
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (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  (0607)   |   Area    (ha)=   5.97
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  42.00   Dir. Conn.(%)=   2.50
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.51         3.46
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     680.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        76.31
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       8.46 (ii)   17.23 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .12          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .02          .70          .721 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00         10.00
     RUNOFF VOLUME    (mm)=     209.57       124.06        126.19
     TOTAL RAINFALL   (mm)=     211.07       211.07        211.07
     RUNOFF COEFFICIENT   =        .99          .59           .60

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
           Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
           Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD  (0540)   |   Area    (ha)=   4.63
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.70         .93
     Dep. Storage     (mm)=       1.50        5.00
     Average Slope     (%)=        .55         .55
     Length            (m)=     150.00        40.00
     Mannings n          =       .013         .300

     Max.Eff.Inten.(mm/hr)=      52.83        42.97
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       5.03 (ii)   21.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .21          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .54          .10          .636 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.08         10.00
     RUNOFF VOLUME    (mm)=     209.57        81.35        182.64
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TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .39            .87


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0500) |   Area    (ha)= 244.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  46.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=       112.24        131.76
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=          .80           .80
Length            (m)=      1275.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         59.90
           over (min)         15.00         30.00
Storage Coeff.  (min)=        16.24 (ii)    28.96 (ii)
Unit Hyd. Tpeak (min)=        15.00         30.00
Unit Hyd. peak  (cms)=          .07           .04
                                                        *TOTALS*
PEAK FLOW       (cms)=         9.05         18.51         27.108 (iii)
TIME TO PEAK    (hrs)=        10.00         10.25          10.08
RUNOFF VOLUME    (mm)=       209.57        107.75         134.22
TOTAL RAINFALL   (mm)=       211.07        211.07         211.07
RUNOFF COEFFICIENT   =          .99           .51            .64


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0510) |   Area    (ha)=  16.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=        12.80          3.20
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=          .50           .20
Length            (m)=       400.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         42.97
           over (min)         10.00         35.00
Storage Coeff.  (min)=         9.33 (ii)    31.35 (ii)
Unit Hyd. Tpeak (min)=        10.00         35.00
Unit Hyd. peak  (cms)=          .12           .03
                                                        *TOTALS*
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```
PEAK FLOW        (cms)=       1.85          .31          2.134 (iii)
TIME TO PEAK     (hrs)=      10.00        10.33          10.00
RUNOFF VOLUME     (mm)=     209.57        81.35         182.64
TOTAL RAINFALL    (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .39            .87


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0542) |   Area    (ha)=  25.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=        20.20          5.05
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=          .55           .55
Length            (m)=       350.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         42.97
            over (min)        10.00         25.00
Storage Coeff.  (min)=         8.37 (ii)    24.63 (ii)
Unit Hyd. Tpeak (min)=        10.00         25.00
Unit Hyd. peak  (cms)=          .12           .05
                                                        *TOTALS*
PEAK FLOW        (cms)=         2.92           .53        3.443 (iii)
TIME TO PEAK     (hrs)=        10.00         10.17        10.00
RUNOFF VOLUME     (mm)=       209.57         81.35       182.64
TOTAL RAINFALL    (mm)=       211.07        211.07       211.07
RUNOFF COEFFICIENT   =          .99           .39          .87


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0543) |   Area    (ha)=  14.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=        11.99          3.00
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=          .55           .55
Length            (m)=       200.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         42.97
            over (min)         5.00         25.00
Storage Coeff.  (min)=         5.98 (ii)    22.24 (ii)
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```
Unit Hyd. Tpeak (min)=       5.00        25.00
Unit Hyd. peak  (cms)=        .19          .05
                                                        *TOTALS*
PEAK FLOW       (cms)=       1.74          .32          2.054 (iii)
TIME TO PEAK    (hrs)=      10.00        10.08          10.00
RUNOFF VOLUME    (mm)=     209.57        81.35         182.64
TOTAL RAINFALL   (mm)=     211.07       211.07         211.07
RUNOFF COEFFICIENT   =        .99          .39            .87


  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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  (0544) |   Area    (ha)=   1.13
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
Surface Area     (ha)=          .90           .23
Dep. Storage     (mm)=         1.50          5.00
Average Slope     (%)=          .55           .55
Length            (m)=        50.00         40.00
Mannings n           =         .013          .300

Max.Eff.Inten.(mm/hr)=        52.83         42.97
            over (min)         5.00         20.00
Storage Coeff.  (min)=         2.60 (ii)    18.86 (ii)
Unit Hyd. Tpeak (min)=         5.00         20.00
Unit Hyd. peak  (cms)=          .29           .06
                                                        *TOTALS*
PEAK FLOW       (cms)=          .13           .03           .156 (iii)
TIME TO PEAK    (hrs)=         9.67         10.00          10.00
RUNOFF VOLUME    (mm)=       209.57        81.35         182.64
TOTAL RAINFALL   (mm)=       211.07       211.07         211.07
RUNOFF COEFFICIENT   =          .99           .39            .87

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

  (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
       Fo   (mm/hr)= 75.00           K  (1/hr)=  4.14
       Fc   (mm/hr)= 12.50     Cum.Inf.   (mm)=   .00
 (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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--------------------
| STORE HYD (0525) |   AREA       (ha)=    .00
| ID= 1 DT=****min |   QPEAK     (cms)=    .00
--------------------   TPEAK     (hrs)=    .00
                       VOLUME     (mm)=*******

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--------------------
| ADD HYD   (0420) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
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	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0415):	4.99	.626	10.00	128.70
+ ID2= 2 (0410):	24.20	2.975	10.00	128.70
ID = 3 (0420):	29.19	3.602	10.00	128.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0465)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0460):	36.00	4.413	10.00	128.70
+ ID2= 2 (0455):	12.70	1.564	10.00	128.70
ID = 3 (0465):	48.70	5.977	10.00	128.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0362)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
.00	.40	.0300	
5.50	.15	.0300 / .0150	Main Channel
5.51	.00	.0150	Main Channel
10.00	.09	.0150	Main Channel
14.49	.00	.0150	Main Channel
14.50	.15	.0150 / .0300	Main Channel
20.00	.40	.0300	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.02	.02	.176E+02	.0	.21	80.52
.04	.04	.702E+02	.0	.33	50.72
.06	.06	.158E+03	.1	.43	38.71
.08	.08	.281E+03	.1	.52	31.95
.09	.09	.438E+03	.3	.62	26.84
.11	.11	.607E+03	.5	.77	21.66
.13	.13	.776E+03	.7	.90	18.45
.15	.15	.944E+03	1.0	1.03	16.22
.17	.17	.116E+04	1.3	1.16	14.36
.20	.20	.140E+04	1.8	1.27	13.13
.22	.22	.166E+04	2.3	1.36	12.24
.24	.24	.194E+04	2.8	1.44	11.58
.26	.26	.225E+04	3.4	1.51	11.05
.29	.29	.258E+04	4.0	1.57	10.63
.31	.31	.293E+04	4.8	1.62	10.27
.33	.33	.331E+04	5.5	1.67	9.97
.35	.35	.371E+04	6.4	1.72	9.71
.38	.38	.413E+04	7.3	1.76	9.48
.40	.40	.457E+04	8.2	1.80	9.28

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0360)	30.00	3.62	10.00	122.28	.27	1.53

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OUTFLOW: ID= 1 (0362)   30.00     3.50   10.08 122.26       .27      1.52

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--------------------
| ROUTE CHN (0353) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00           .26         .0300
                   5.50           .15     .0300 / .0150  Main Channel
                   5.51           .00         .0150      Main Channel
                  10.00           .09         .0150      Main Channel
                  14.49           .00         .0150      Main Channel
                  14.50           .15     .0150 / .0300  Main Channel
                  20.00           .26         .0300

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        .01      .01    .929E+01       .0           .17       99.56
        .03      .03    .372E+02       .0           .27       62.72
        .04      .04    .836E+02       .0           .35       47.86
        .05      .05    .149E+03       .1           .42       39.51
        .07      .07    .232E+03       .1           .49       34.05
        .08      .08    .334E+03       .2           .55       30.15
        .10      .10    .454E+03       .3           .64       26.24
        .11      .11    .576E+03       .4           .74       22.41
        .12      .12    .699E+03       .6           .84       19.75
        .14      .14    .822E+03       .8           .94       17.76
        .15      .15    .944E+03      1.0          1.03       16.22
        .16      .16    .108E+04      1.2          1.11       15.07
        .18      .18    .123E+04      1.4          1.17       14.28
        .19      .19    .140E+04      1.7          1.21       13.72
        .20      .20    .159E+04      2.0          1.25       13.31
        .22      .22    .180E+04      2.3          1.28       13.01
        .23      .23    .203E+04      2.6          1.31       12.76
        .25      .25    .227E+04      3.0          1.33       12.57
        .26      .26    .254E+04      3.4          1.34       12.41

                                   <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
INFLOW : ID= 2 (0350)   16.30     1.97   10.00 128.70       .20      1.25
OUTFLOW: ID= 1 (0353)   16.30     1.87   10.08 128.66       .20      1.24

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--------------------
| ROUTE CHN (0358) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00           .26         .0300
                   5.50           .15     .0300 / .0150  Main Channel
                   5.51           .00         .0150      Main Channel
                  10.00           .09         .0150      Main Channel
                  14.49           .00         .0150      Main Channel
                  14.50           .15     .0150 / .0300  Main Channel
                  20.00           .26         .0300
```

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.01	.01	.102E+02	.0	.17	109.52
.03	.03	.409E+02	.0	.27	68.99
.04	.04	.920E+02	.0	.35	52.65
.05	.05	.163E+03	.1	.42	43.46
.07	.07	.255E+03	.1	.49	37.45
.08	.08	.368E+03	.2	.55	33.17
.10	.10	.499E+03	.3	.64	28.86
.11	.11	.634E+03	.4	.74	24.66
.12	.12	.769E+03	.6	.84	21.72
.14	.14	.904E+03	.8	.94	19.54
.15	.15	.104E+04	1.0	1.03	17.84
.16	.16	.119E+04	1.2	1.11	16.57
.18	.18	.135E+04	1.4	1.17	15.71
.19	.19	.154E+04	1.7	1.21	15.10
.20	.20	.175E+04	2.0	1.25	14.65
.22	.22	.198E+04	2.3	1.28	14.31
.23	.23	.223E+04	2.6	1.31	14.04
.25	.25	.250E+04	3.0	1.33	13.82
.26	.26	.279E+04	3.4	1.34	13.65

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0355)	12.30	1.51	10.00	128.70	.18	1.18
OUTFLOW: ID= 1 (0358)	12.30	1.44	10.08	128.64	.18	1.17

RESERVOIR (0106) IN= 2---> OUT= 1 DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.5000	.4000
	.0100	.0100	6.6000	.8000
	.0260	.2300	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0105)	51.320	6.260	10.00	128.70
OUTFLOW: ID= 1 (0106)	51.320	5.997	10.08	128.69

PEAK FLOW REDUCTION [Qout/Qin](%)= 95.79
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= .7608

ADD HYD (0103) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	14.32	1.780	10.00	128.70
+ ID2= 2 (0101):	16.32	2.027	10.00	128.70
ID = 3 (0103):	30.64	3.807	10.00	128.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0111) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   1.0000      1.0000
                           .0100      .0100    |  20.0000      1.1000
                           .0120      .1000    |    .0000       .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0110)      19.000      2.340       10.00      128.70
     OUTFLOW: ID= 1 (0111)      19.000      2.069       10.50      128.68

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 88.39
                    TIME SHIFT OF PEAK FLOW         (min)= 30.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  1.0100

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--------------------
| ADD HYD   (0602) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0600):     11.38    1.379    10.00   128.70
        + ID2= 2 (0601):      7.62     .936    10.00   133.59
          ==================================================
          ID = 3 (0602):     19.00    2.315    10.00   130.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| DUHYD     (0505) |
| Inlet Cap.=9.000 |
| #of Inlets=    1 |
| Total(cms)=  9.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1): 244.00      27.11     10.08  134.22
     ==================================================
     MAJOR SYS.(ID= 2):  78.53      18.11     10.08  134.22
     MINOR SYS.(ID= 3): 165.47       9.00      6.75  134.22

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0515) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0505):    165.47    9.000     6.75   134.22
        + ID2= 2 (0510):     16.00    2.134    10.00   182.64
          ==================================================
          ID = 3 (0515):    181.47   11.134    10.00   138.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| DUHYD     (0425) |
| Inlet Cap.=1.980 |
| #of Inlets=    1 |
```

```
          Hadati Creek Watershed - Post Development with Cityview Ridge
| Total(cms)=  2.0 |       AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  29.19      3.60     10.00  128.70
     ==================================================
     MAJOR SYS.(ID= 2):   4.95      1.62     10.00  128.70
     MINOR SYS.(ID= 3):  24.24      1.98      9.33  128.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0470) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0425):     4.95   1.622    10.00   128.70
        + ID2= 2 (0465):    48.70   5.977    10.00   128.70
          ==================================================
          ID = 3 (0470):    53.65   7.598    10.00   128.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0359) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0353):    16.30   1.875    10.08   128.66
        + ID2= 2 (0358):    12.30   1.436    10.08   128.64
          ==================================================
          ID = 3 (0359):    28.60   3.311    10.08   128.65

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |   1.0000      .5000
                            .0100      .0100    |  10.0000      .6000
                            .0150      .1332    |    .0000      .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0103)     30.640      3.807       10.00      128.70
     OUTFLOW: ID= 1 (0104)     30.640      3.797       10.00      128.69

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 99.73
                    TIME SHIFT OF PEAK FLOW         (min)=   .00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .5312

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

--------------------
| ADD HYD   (0114) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0104):    30.64   3.797    10.00   128.69
        + ID2= 2 (0111):    19.00   2.069    10.50   128.68
          ==================================================
```

Hadati Creek Watershed - Post Development with Cityview Ridge
ID = 3 (0114): 49.64 4.896 10.50 128.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN (0563) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

<------ DATA FOR SECTION (2.2) ------>

Distance	Elevation	Manning	
.00	1.00	.0350	
2.00	.50	.0350	
4.00	.00	.0350 / .0350	Main Channel
4.50	.00	.0350	Main Channel
5.00	.00	.0350 / .0350	Main Channel
7.00	.50	.0350	
9.00	1.00	.0350	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	.05	.745E+01	.0	.64	3.06
.11	.11	.175E+02	.1	.96	2.03
.16	.16	.301E+02	.3	1.21	1.61
.21	.21	.454E+02	.6	1.42	1.37
.26	.26	.632E+02	.9	1.61	1.21
.32	.32	.836E+02	1.3	1.77	1.10
.37	.37	.107E+03	1.8	1.93	1.01
.42	.42	.132E+03	2.3	2.08	.94
.47	.47	.160E+03	3.0	2.22	.88
.53	.53	.191E+03	3.8	2.35	.83
.58	.58	.225E+03	4.8	2.48	.79
.63	.63	.261E+03	5.8	2.60	.75
.68	.68	.299E+03	7.0	2.72	.72
.74	.74	.340E+03	8.2	2.84	.69
.79	.79	.384E+03	9.7	2.95	.66
.84	.84	.430E+03	11.3	3.06	.64
.89	.89	.479E+03	13.0	3.17	.62
.95	.95	.531E+03	14.8	3.27	.60
1.00	1.00	.585E+03	16.9	3.38	.58

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0602)	19.00	2.31	10.00	130.66	.42	2.07
OUTFLOW: ID= 1 (0563)	19.00	2.31	10.00	130.66	.42	2.07

```
| ROUTE CHN (0564) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

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

Distance	Elevation	Manning	
.00	101.50	.0500	
1.00	100.70	.0500	
1.50	100.55	.0500 / .0300	Main Channel
2.00	99.50	.0300	Main Channel
3.50	99.60	.0300	Main Channel
4.50	100.65	.0300 / .0500	Main Channel
6.00	101.45	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.10	99.60	.353E+02	.0	.19	43.69
.19	99.69	.112E+03	.1	.37	22.76
.29	99.79	.195E+03	.2	.49	17.03
.38	99.88	.285E+03	.3	.59	14.23
.48	99.98	.381E+03	.5	.67	12.51
.57	100.07	.484E+03	.7	.74	11.32
.67	100.17	.594E+03	.9	.80	10.43
.76	100.26	.710E+03	1.2	.86	9.74
.86	100.36	.832E+03	1.5	.91	9.18
.95	100.45	.961E+03	1.8	.96	8.72
1.05	100.55	.110E+04	2.2	1.00	8.32
1.16	100.66	.127E+04	2.7	1.07	7.80
1.28	100.78	.148E+04	3.4	1.14	7.31
1.39	100.89	.170E+04	4.1	1.20	6.94
1.50	101.00	.195E+04	4.9	1.25	6.65
1.61	101.11	.221E+04	5.8	1.30	6.41
1.72	101.22	.250E+04	6.7	1.34	6.22
1.84	101.34	.280E+04	7.7	1.38	6.04
1.95	101.45	.313E+04	8.8	1.41	5.90

**** WARNING: TRAVEL TIME TABLE EXCEEDED

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0505)	78.53	18.11	10.08	134.22	1.92	1.40
OUTFLOW:	ID= 1 (0564)	78.53	17.83	10.25	134.22	1.95	1.41

DUHYD (0520)
Inlet Cap.=3.050
#of Inlets= 1
Total(cms)= 3.0

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	181.47	11.13	10.00	138.49
MAJOR SYS.(ID= 2):	98.04	8.08	10.00	138.49
MINOR SYS.(ID= 3):	83.43	3.05	4.25	138.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN (0475)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

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

Distance	Elevation	Manning	
100.00	324.60	.0500	
115.00	321.60	.0500	
120.00	320.80	.0500 / .0300	Main Channel
122.00	320.80	.0300 / .0500	Main Channel
138.00	321.60	.0500	
148.00	322.30	.0500	
154.00	323.10	.0500	
164.00	324.60	.0500	

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

Hadati Creek Watershed - Post Development with Cityview Ridge

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.20	321.00	.398E+03	.8	.84	8.53
.40	321.20	.125E+04	3.3	1.13	6.33
.60	321.40	.255E+04	8.1	1.36	5.27
.80	321.60	.430E+04	15.6	1.56	4.59
1.00	321.80	.644E+04	26.8	1.79	4.01
1.20	322.00	.892E+04	41.2	1.99	3.61
1.40	322.20	.117E+05	59.3	2.17	3.30
1.60	322.40	.148E+05	81.9	2.37	3.02
1.80	322.60	.182E+05	109.1	2.58	2.78
2.00	322.80	.218E+05	140.2	2.77	2.59
2.20	323.00	.256E+05	175.3	2.95	2.43
2.40	323.20	.296E+05	214.7	3.12	2.29
2.60	323.40	.338E+05	258.6	3.29	2.18
2.80	323.60	.382E+05	306.7	3.46	2.07
3.00	323.80	.428E+05	359.1	3.61	1.98
3.20	324.00	.476E+05	416.0	3.76	1.91
3.40	324.20	.526E+05	477.5	3.91	1.83
3.60	324.40	.578E+05	543.5	4.05	1.77
3.80	324.60	.632E+05	614.3	4.18	1.71

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0470)	53.65	7.60	10.00	128.70	.58	1.33
OUTFLOW: ID= 1 (0475)	53.65	7.51	10.00	128.70	.58	1.33

ADD HYD (0363)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0362):	30.00	3.504	10.08	122.26
	+ ID2= 2 (0359):	28.60	3.311	10.08	128.65
	ID = 3 (0363):	58.60	6.814	10.08	125.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0115)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0106):	51.32	5.997	10.08	128.69
	+ ID2= 2 (0114):	49.64	4.896	10.50	128.69
	ID = 3 (0115):	100.96	10.540	10.08	128.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0492)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0563):	19.00	2.311	10.00	130.66
	+ ID2= 2 (0607):	5.97	.721	10.00	126.19

```
          ==================================================
          ID = 3 (0492):    24.97   3.032    10.00   129.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0526) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0525):       .00     .001      .00  *******
        + ID2= 2 (0520):     98.04    8.084    10.00   138.49
          ==================================================
          ID = 3 (0526):     98.04    8.084    10.00   138.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0380) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0363):     58.60    6.814    10.08   125.38
        + ID2= 2 (0365):    117.50   14.089    10.00   128.70
          ==================================================
          ID = 3 (0380):    176.10   20.834    10.00   127.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0482) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                            .0000      .0000    |    .2910      .3795
                            .2590      .0579    |    .2970      .4503
                            .2660      .1180    |   1.6320      .5232
                            .2720      .1802    |   4.1680      .5983
                            .2790      .2445    |   7.5660      .6756
                            .2850      .3109    |    .0000      .0000

                                  AREA      QPEAK       TPEAK       R.V.
                                  (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0492)      24.970      3.032       10.00      129.59
     OUTFLOW: ID= 1 (0482)      24.970      3.007       10.08      129.59

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 99.18
                    TIME SHIFT OF PEAK FLOW         (min)=  5.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .5640

-------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0527) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
                <------ DATA FOR SECTION (   1.1) ------>
                Distance      Elevation       Manning
                  100.00        313.20         .0500
                  140.00        312.40     .0500 / .0300  Main Channel
                  140.50        310.80         .0300      Main Channel
```

141.50	310.80	.0300	Main Channel
142.00	312.40	.0300 / .0500	Main Channel
160.00	313.20	.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.12	310.92	.575E+02	.1	.40	18.86
.25	311.05	.119E+03	.2	.57	13.13
.37	311.17	.185E+03	.3	.69	10.87
.49	311.29	.256E+03	.4	.78	9.61
.62	311.42	.330E+03	.6	.86	8.77
.74	311.54	.409E+03	.8	.92	8.17
.86	311.66	.492E+03	1.1	.97	7.70
.98	311.78	.579E+03	1.3	1.02	7.32
1.11	311.91	.671E+03	1.6	1.07	7.01
1.23	312.03	.767E+03	1.9	1.11	6.74
1.35	312.15	.867E+03	2.2	1.15	6.50
1.48	312.28	.971E+03	2.6	1.19	6.29
1.60	312.40	.108E+04	2.9	1.23	6.11
1.73	312.53	.149E+04	3.6	1.10	6.85
1.87	312.67	.248E+04	4.9	.88	8.52
2.00	312.80	.405E+04	6.9	.77	9.74
2.13	312.93	.620E+04	10.1	.73	10.21
2.27	313.07	.893E+04	14.6	.74	10.17
2.40	313.20	.122E+05	20.7	.76	9.85

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0526)	98.04	8.08	10.00	138.49	2.05	.76
OUTFLOW: ID= 1 (0527)	98.04	7.97	10.08	138.49	2.04	.76

RESERVOIR (0390)	
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.3100	1.6000
.7700	.2870	1.8600	23.2300
1.2600	.9680	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0380)	176.100	20.834	10.00	127.59
OUTFLOW: ID= 1 (0390)	176.100	1.714	12.33	127.59

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.23
TIME SHIFT OF PEAK FLOW (min)=140.00
MAXIMUM STORAGE USED (ha.m.)= 17.4981

ADD HYD (0400)	
1 + 2 = 3	

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0395):	51.20	5.388	10.08	88.29
+ ID2= 2 (0390):	176.10	1.714	12.33	127.59
ID = 3 (0400):	227.30	6.909	10.08	118.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------------------------------------------------------------------
--------------------
| ROUTE CHN (0403) |
| IN= 2---> OUT= 1 |      Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	338.30	.0500	
110.00	336.80	.0500	
135.00	336.00	.0300	Main Channel
142.00	335.30	.0500	
148.00	335.30	.0500	
156.00	336.00	.0500	
165.00	338.30	.0000	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	335.46	.231E+04	.9	.71	44.52
.32	335.62	.563E+04	3.2	1.09	29.11
.47	335.77	.997E+04	7.3	1.39	22.72
.63	335.93	.153E+05	13.4	1.66	19.04
.79	336.09	.218E+05	22.7	1.97	16.04
.95	336.25	.299E+05	35.3	2.25	14.10
1.11	336.41	.396E+05	51.2	2.46	12.89
1.26	336.56	.510E+05	70.7	2.63	12.02
1.42	336.72	.641E+05	94.1	2.79	11.35
1.58	336.88	.787E+05	122.4	2.96	10.71
1.74	337.04	.939E+05	155.6	3.15	10.06
1.89	337.19	.110E+06	192.8	3.34	9.48
2.05	337.35	.126E+06	233.9	3.53	8.97
2.21	337.51	.143E+06	278.9	3.71	8.53
2.37	337.67	.160E+06	327.7	3.89	8.13
2.53	337.83	.178E+06	380.3	4.07	7.79
2.68	337.98	.196E+06	436.7	4.23	7.48
2.84	338.14	.215E+06	496.9	4.40	7.20
3.00	338.30	.234E+06	561.0	4.56	6.95

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0400)	227.30	6.91	10.08	118.74	.46	1.36
OUTFLOW: ID= 1 (0403)	227.30	6.38	10.33	118.74	.44	1.30

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

--------------------
| ADD HYD   (0407) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0403):	227.30	6.377	10.33	118.74
+ ID2= 2 (0115):	100.96	10.540	10.08	128.69
ID = 3 (0407):	328.26	16.526	10.17	121.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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```

```
| RESERVOIR (0113) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |
--------------------
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	1.6000	6.4000
1.1000	2.9000	9.1000	10.0000
1.3000	4.3000	12.0000	20.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0407)	328.260	16.526	10.17	121.80
OUTFLOW: ID= 1 (0113)	328.260	9.456	11.50	121.80

```
PEAK   FLOW   REDUCTION [Qout/Qin](%)= 57.22
TIME SHIFT OF PEAK FLOW         (min)= 80.00
MAXIMUM  STORAGE   USED       (ha.m.)= 11.2348
```

```
--------------------
| ADD HYD   (0430) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0113):	328.26	9.456	11.50	121.80
+ ID2= 2 (0425):	24.24	1.980	9.33	128.70
ID = 3 (0430):	352.50	11.349	11.08	122.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN (0440) |
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
```

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

Distance	Elevation	Manning	
100.00	325.40	.0600	
120.00	324.60	.0600	
126.00	323.90	.0600	
130.00	323.00	.0600	
140.00	322.30	.0600 / .0300	Main Channel
142.00	322.30	.0300 / .0600	Main Channel
150.00	323.90	.0600	
155.00	324.60	.0600	
160.00	325.40	.0600	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.16	322.46	.233E+03	.6	.96	6.96
.33	322.63	.672E+03	2.1	1.26	5.27
.49	322.79	.132E+04	4.9	1.48	4.51
.65	322.95	.216E+04	9.0	1.66	4.03
.82	323.12	.319E+04	14.9	1.87	3.57
.98	323.28	.433E+04	22.5	2.08	3.21
1.14	323.44	.556E+04	31.6	2.27	2.93
1.31	323.61	.689E+04	42.3	2.45	2.72
1.47	323.77	.833E+04	54.6	2.62	2.54
1.63	323.93	.987E+04	68.3	2.77	2.41
1.79	324.09	.115E+05	82.8	2.87	2.33
1.96	324.26	.134E+05	99.2	2.96	2.25
2.12	324.42	.154E+05	117.9	3.06	2.18

2.28	324.58	.176E+05	138.8	3.15	2.11
2.45	324.75	.200E+05	157.4	3.14	2.12
2.61	324.91	.228E+05	179.6	3.15	2.11
2.77	325.07	.259E+05	205.8	3.18	2.09
2.94	325.24	.293E+05	236.1	3.23	2.07
3.10	325.40	.330E+05	270.6	3.28	2.03

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0430)	352.50	11.35	11.08	122.27	.72	1.73
OUTFLOW:	ID= 1 (0440)	352.50	11.32	11.08	122.27	.71	1.73

ADD HYD (0485)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0475):	53.65	7.511	10.00	128.70
	+ ID2= 2 (0440):	352.50	11.321	11.08	122.27
	ID = 3 (0485):	406.15	16.120	10.75	123.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0490)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0480):	43.10	5.222	10.00	128.70
	+ ID2= 2 (0485):	406.15	16.120	10.75	123.12
	ID = 3 (0490):	449.25	19.973	10.67	123.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0491)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0490):	449.25	19.973	10.67	123.66
	+ ID2= 2 (0482):	24.97	3.007	10.08	129.59
	ID = 3 (0491):	474.22	22.680	10.17	123.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0483)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	7.0800	2.4860
.2760	.0600	8.1000	3.3240
1.2000	.3400	9.7980	4.6420
2.0400	.6182	10.4940	7.4397

```
                    2.6400     1.1630   |  11.6850     10.3000
                    3.1200     1.7070   |  12.3480     11.4000

                              AREA      QPEAK       TPEAK       R.V.
                              (ha)      (cms)       (hrs)       (mm)
INFLOW : ID= 2 (0491)    474.220     22.680       10.17      123.97
OUTFLOW: ID= 1 (0483)    474.220     11.709       12.08      123.97

              PEAK   FLOW   REDUCTION [Qout/Qin](%)= 51.63
              TIME SHIFT OF PEAK FLOW         (min)=115.00
              MAXIMUM  STORAGE   USED       (ha.m.)= 10.3422

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

--------------------
| ADD HYD   (0530) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0483):   474.22  11.709    12.08   123.97
        + ID2= 2 (0540):     4.63    .636    10.00   182.64
          ====================================================
          ID = 3 (0530):   478.85  11.843    12.00   124.54

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0545) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0530):   478.85  11.843    12.00   124.54
        + ID2= 2 (0527):    98.04   7.968    10.08   138.49
          ====================================================
          ID = 3 (0545):   576.89  19.057    11.00   126.91

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0546) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0545):   576.89  19.057    11.00   126.91
        + ID2= 2 (0542):    25.25   3.443    10.00   182.64
          ====================================================
          ID = 3 (0546):   602.14  21.640    10.08   129.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0547) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0546):   602.14  21.640    10.08   129.24
        + ID2= 2 (0543):    14.99   2.054    10.00   182.64
          ====================================================
          ID = 3 (0547):   617.13  23.544    10.00   130.54

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

Hadati Creek Watershed - Post Development with Cityview Ridge

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--------------------
| ADD HYD   (0548) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0547):    617.13  23.544    10.00   130.54
        + ID2= 2 (0544):      1.13    .156    10.00   182.64
          ====================================================
          ID = 3 (0548):    618.26  23.700    10.00   130.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH
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Cityview Ridge Subdivision (Formerely P.T. Valeriote Property)
City of Guelph
Our File: 105-172
December 2020

Catchment 201 - Proposed Stormwater Management Facility

STORAGE VOLUME CALCULATIONS

Elevation (m)	Depth (m)	Surface Area (m^2)	Permanent Pool Volume (m^3)	Accumulated Perm. Pool Volume (m^3)	Incremental Storage Volume (m^3)	Accum. Inc. Storage Volume (m^3)	
339.35	0.00	1,561.9	0.0	0.0			Bottom of Pond
339.45	0.10	1,673.9	161.8	161.8			
339.55	0.20	1,785.0	172.9	334.7			
339.65	0.30	1,900.7	184.3	519.0			
339.75	0.40	2,023.2	196.2	715.2	0.0	0.0	Top of Permanent Pool
339.85	0.50	2,152.1			208.8	208.8	
339.95	0.60	2,285.1			221.9	430.6	
340.05	0.70	2,421.5			235.3	666.0	
340.15	0.80	2,560.7			249.1	915.1	
340.25	0.90	2,700.9			263.1	1,178.1	CB Lip Elevation
340.35	1.00	2,842.9			277.2	1,455.3	
340.45	1.10	2,987.2			291.5	1,746.8	
340.55	1.20	3,133.4			306.0	2,052.9	
340.65	1.30	3,281.7			320.8	2,373.6	
340.75	1.40	3,432.1			335.7	2,709.3	
340.85	1.50	3,584.5			350.8	3,060.1	
340.95	1.60	3,735.8			366.0	3,426.2	Weir Elevation
341.05	1.70	3,888.2			381.2	3,807.4	
341.15	1.80	4,042.1			396.5	4,203.9	
341.25	1.90	4,196.2			411.9	4,615.8	
341.35	2.00	4,357.2			427.7	5,043.5	
341.45	2.10	4529.4			444.3	5,487.8	Top of Bank

Cityview Ridge Subdivision (Formerely P.T. Valeriote Property)
City of Guelph
Our File: 105-172
December 2020

Catchment 201 - Proposed Stormwater Management Facility (continued)

WEIR CALCULATIONS

d1 =	2.10	m
h =	1.60	m
H =	0.50	m
2g =	19.62	
L =	10	m
Q =	5.1086	cu m/s

ORIFICE CALCULATIONS

375 mm Diameter Outlet Pipe
Invert Elevation = 338.20 m

Q =	0.470	m^3/s
Cd =	0.6	
H =	2.763	m
2g =	19.62	
A =	0.110	m^2
D =	0.375	m
D/2	0.188	

ORIFICE CALCULATIONS

90 mm Diameter Knockout
Invert Elevation = 339.75 m

Q =	0.011	m^3/s
Cd =	0.6	
H =	0.455	m
2g =	19.62	
A =	0.006	m^2
D =	0.090	m
D/2	0.045	m

STAGE/STORAGE/DISCHARGE TABLE

Elevation (m)	Stage (m)	Storage (m^3)	Orifice Control 90 mm	Orifice Control 375 mm	Weir	Discharge (m^3/s)	
339.75	0.00	0.0	0.000	0.00	0.00	0.000	Top of Permanent Pool
339.85	0.10	208.8	0.004	0.00	0.00	0.004	
339.95	0.20	430.6	0.007	0.00	0.00	0.007	
340.05	0.30	666.0	0.009	0.00	0.00	0.009	
340.15	0.40	915.1	0.010	0.00	0.00	0.010	
340.25	0.50	1,178.1	0.011	0.00	0.00	0.011	CB Lip Elevation
340.35	0.60	1,455.3	0.000	0.411	0.00	0.411	
340.45	0.70	1,746.8	0.000	0.422	0.00	0.422	
340.55	0.80	2,052.9	0.000	0.432	0.00	0.432	
340.65	0.90	2,373.6	0.000	0.442	0.00	0.442	
340.75	1.00	2,709.3	0.000	0.451	0.00	0.451	
340.85	1.10	3,060.1	0.000	0.461	0.00	0.461	
340.95	1.20	3,426.2	0.000	0.470	0.00	0.470	Weir Elevation
341.05	1.30	3,807.4	0.000	0.479	0.4353	0.914	
341.15	1.40	4,203.9	0.000	0.488	1.2482	1.736	
341.25	1.50	4,615.8	0.000	0.497	2.3220	2.819	
341.35	1.60	5,043.5	0.000	0.505	3.6165	4.122	
341.45	1.70	5,487.8	0.000	0.514	5.1086	5.622	Top of Bank

Cityview Ridge Subdivision (Formerely P.T. Valeriote Property)
City of Guelph
Our File: 105-172
December 2020

Catchment 202 - Energy Dissipation/Dispersion Structure

STORAGE VOLUME TABLE

Elevation (m)	Depth (m)	Surface Area - Stone (m^2)	Surface Area - Pipe (m^2)	Increm. Storage (m^3)	Total Storage (m^3)	
337.05	0.00	0.00	0.00	0.00	0.00	Bottom of Stone
337.15	0.10	16.67	0.00	1.67	1.67	
337.25	0.20	16.67	0.00	1.67	3.33	Bottom of Dispersion Pipe
337.35	0.30	16.63	0.03	2.46	5.79	
337.45	0.40	16.63	0.03	2.46	8.25	
337.55	0.50	16.63	0.03	2.46	10.71	
337.65	0.60	16.63	0.03	2.46	13.17	
337.70	0.65	16.63	0.03	1.63	14.80	Overflow Pipe/Top of Dispersion Pipe
337.75	0.70	16.67	0.00	0.83	15.63	
337.85	0.80	16.67	0.00	1.67	17.30	
337.95	0.90	16.67	0.00	1.67	18.96	
338.05	1.00	16.67	0.00	1.67	20.63	Top of Stone

Cityview Ridge Subdivision (Formerely P.T. Valeriote Property)
City of Guelph
Our File: 105-172
December 2020

Catchment 202 - Energy Dissipation/Dispersion Structure (continued)

BOTTOM			SIDES		
L(dw) =	25.00	m	L(dw) =	25.00	m
W(dw) =	2.00	m			
D(dw) =	1.00	m	D(dw) =	1.00	m
A(c) =	49.4	m^2	A(c) =	50.0	sq m
VOL(dw)=	49.4	m^3			
VOL(st)=	16.5	m^3			
K =	1.00E-04	cm/s	K =	1.00E-04	cm/s

STORAGE VOLUME TABLE

Elevation (m)	Stage (m)	Storage (m^3)	Infiltration Discharge (m^3/s)	Overflow Pipe Discharge (m^3/s)	Total Discharge (m^3/s)	
337.05	0.00	0.0	0.00000	0.000	0.00000	Bottom of Stone
337.15	0.10	1.7	0.00005	0.000	0.00005	
337.25	0.20	3.3	0.00005	0.000	0.00005	Bottom of Dispersion Pipe
337.35	0.30	5.8	0.00005	0.000	0.00005	
337.45	0.40	8.3	0.00005	0.000	0.00005	
337.55	0.50	10.7	0.00005	0.000	0.00005	
337.65	0.60	13.2	0.00005	0.000	0.00005	
337.70	0.65	14.8	0.00005	0.000	0.00005	Overflow Pipe/Top of Dispersion Pipe
337.75	0.70	15.6	0.00005	0.421	0.42105	
337.85	0.80	17.3	0.00005	0.421	0.42105	
337.95	0.90	19.0	0.00005	0.421	0.42105	
338.05	1.00	20.6	0.00005	0.421	0.42105	Top of Stone

Cityview Ridge Subdivision (Formerely P.T. Valeriote Property)
City of Guelph
Our File: 105-172
December 2020

Catchment B2a: Existing Stormwater Quality Pond No. 2

Stage Storage Discharge Calculations

Elevation (m)	Stage (m)	Surface Area (m^2)	Incremental Storage Volume (m^3)	Accumulated Storage Volume (m^3)	
321.50	0.00	5,688.0	0.00	0.00	Pond Bottom
321.60	0.10	5,900.0	579.40	579.40	
321.70	0.20	6,110.0	600.50	1,179.90	
321.80	0.30	6,323.0	621.65	1,801.55	
321.90	0.40	6,537.0	643.00	2,444.55	
322.00	0.50	6,752.0	664.45	3,109.00	
322.10	0.60	6,967.0	685.95	3,794.95	
322.20	0.70	7,184.0	707.55	4,502.50	Weir
322.30	0.80	7,401.0	729.25	5,231.75	
322.40	0.90	7,619.0	751.00	5,982.75	
322.50	1.00	7,839.0	772.90	6,755.65	Overflow

Cityview Ridge Subdivision (Formerely P.T. Valeriote Property)
City of Guelph
Our File: 105-172
December 2020

Catchment B2a: Existing Stormwater Quality Pond No. 2 (continued)

OUTLET #1
300 mm diameter orifice (pipe inv. = 319.55)

Q =	0.303	m^3/s
Cd =	0.6	
H =	2.60	m
2g =	19.62	
A =	0.071	m^2
D =	0.300	m
D/2	0.150	

OVERFLOW WEIR

d1 =	1.00	m
h =	0.70	m
H =	0.30	m
2g =	19.62	
L =	30.00	m
Q =	7.251	m^3/s

Stage/Storage/Discharge Table

Elevation (m)	Stage (m)	Storage (m^3)	Outlet #1 1050 mm dia. pipe (m^3/s)	Overflow Weir (m^3/s)	Total Discharge (m^3/s)	
321.50	0.00	0.00	0.000	0.000	0.000	Pond Bottom
321.60	0.10	579.40	0.259	0.000	0.259	
321.70	0.20	1,179.90	0.266	0.000	0.266	
321.80	0.30	1,801.55	0.272	0.000	0.272	
321.90	0.40	2,444.55	0.279	0.000	0.279	
322.00	0.50	3,109.00	0.285	0.000	0.285	
322.10	0.60	3,794.95	0.291	0.000	0.291	
322.20	0.70	4,502.50	0.297	0.000	0.297	Weir
322.30	0.80	5,231.75	0.303	1.329	1.632	
322.40	0.90	5,982.75	0.309	3.860	4.168	
322.50	1.00	6,755.65	0.314	7.251	7.566	Overflow

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                          Version 2.25  rev. 473"
"                MIDUSS created                       Sunday, February 07, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:             C:\Users\pgrier\Documents\Work\105172\"
"                                                                    2021-07-28"
"                Output filename:                           105172_POST_2yr.out"
"                Licensee name:                                            gmbp"
"                Company                                                      "
"                Date & Time last used:                  7/28/2021 at 3:40:08 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      210.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      743.000   Coefficient A"
"        6.000   Constant B"
"        0.799   Exponent C"
"        0.400   Fraction R"
"      170.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           105.606    mm/hr"
"             Total depth                  33.816    mm"
"            6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          201   Catchment 201 - To Clythe Creeek"
"       65.000   % Impervious"
"        3.440   Total Area"
"       30.000   Flow length"
"        2.000   Overland Slope"
"        1.204   Pervious Area"
"       30.000   Pervious length"
"        2.000   Pervious slope"
"        2.236   Impervious Area"
"       30.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.500     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           1.204      2.236      3.440      hectare"
"             Time of concentration  22.189     2.170      2.858      minutes"
"             Time to Centroid       93.436     84.151     84.470     minutes"
"             Rainfall depth         33.816     33.816     33.816     mm"
"             Rainfall volume        407.14     756.13     1163.27    c.m"
"             Rainfall losses        31.713     1.985      12.390     mm"
"             Runoff depth           2.103      31.830     21.426     mm"
"             Runoff volume          25.32      711.73     737.05     c.m"
"             Runoff coefficient     0.062      0.941      0.634      "
"             Maximum flow           0.017      0.500      0.500      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.500     0.500     0.000     0.000"
" 54          POND DESIGN"
"        0.500   Current peak flow    c.m/sec"
"        0.171   Target outflow    c.m/sec"
"        737.1   Hydrograph volume    c.m"
"          18.   Number of stages"
"        0.000   Minimum water level    metre"
"        3.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                339.750     0.000     0.000"
"                339.850   0.02500   208.800"
"                339.950   0.03200   430.600"
"                340.050   0.04700   666.000"
"                340.150   0.05900   915.100"
"                340.250   0.06900  1178.100"
"                340.350    0.4110  1455.300"
"                340.450    0.4220  1746.800"
"                340.550    0.4320  2052.900"
"                340.650    0.4420  2373.600"
"                340.750    0.4510  2709.300"
"                340.850    0.4610  3060.100"
"                340.950    0.4700  3426.200"
"                341.050    0.9140  3807.400"
"                341.150     1.736  4203.900"
"                341.250     2.819  4615.800"
"                341.350     4.122  5043.500"
"                341.450     5.622  5487.800"
"             Peak outflow                  0.039    c.m/sec"
"             Maximum level               339.994    metre"
"             Maximum storage             535.209    c.m"
"             Centroidal lag                4.536   hours"
"                  0.500     0.500     0.039     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
```

```
"                    0.500     0.039     0.039     0.000"
" 51          PIPE DESIGN"
"        0.039   Current peak flow    c.m/sec"
"        0.013   Manning 'n'"
"        0.450   Diameter    metre"
"        2.000   Gradient   %"
"             Depth of flow                 0.094    metre"
"             Velocity                      1.601    m/sec"
"             Pipe capacity                 0.403    c.m/sec"
"             Critical depth                0.134    metre"
" 53          ROUTE    Pipe Route 17"
"        16.50      Pipe Route 17 Reach length   ( metre)"
"        0.428   X-factor <= 0.5"
"        7.728   K-lag   ( seconds)"
"        0.000   Default(0) or user spec.(1) values used"
"        0.500   X-factor <= 0.5"
"       30.000   K-lag   ( seconds)"
"        0.500   Beta weighting factor"
"        8.824   Routing time step   ( seconds)"
"            1   No. of sub-reaches"
"             Peak outflow                  0.039    c.m/sec"
"                    0.500     0.039     0.039     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.500     0.039     0.039     0.000"
" 54          POND DESIGN"
"        0.039   Current peak flow    c.m/sec"
"        0.171   Target outflow    c.m/sec"
"        737.1   Hydrograph volume    c.m"
"          12.   Number of stages"
"        0.000   Minimum water level    metre"
"        3.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"               337.050     0.000     0.000"
"               337.150  4.94E-05     1.670"
"               337.250  4.94E-05     3.330"
"               337.350  4.94E-05     5.790"
"               337.450  4.94E-05     8.250"
"               337.550  4.94E-05    10.710"
"               337.650  4.94E-05    13.170"
"               337.700  4.94E-05    14.800"
"               337.750    0.4210    15.630"
"               337.850    0.4210    17.300"
"               337.950    0.4210    18.960"
"               338.050    0.4210    20.630"
"             Peak outflow                  0.039    c.m/sec"
"             Maximum level               337.705    metre"
"             Maximum storage              14.876    c.m"
```

```
"             Centroidal lag                6.244   hours"
"                  0.500     0.039     0.039     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.500     0.039     0.039     0.000"
" 52          CHANNEL DESIGN"
"        0.039   Current peak flow    c.m/sec"
"        0.065   Manning 'n'"
"           0.   Cross-section type: 0=trapezoidal; 1=general"
"        2.000   Basewidth    metre"
"        0.000   Left bank slope"
"        0.000   Right bank slope"
"        1.000   Channel depth    metre"
"        0.500   Gradient   %"
"             Depth of flow                 0.093    metre"
"             Velocity                      0.210    m/sec"
"             Channel capacity              1.371    c.m/sec"
"             Critical depth                0.034    metre"
" 53          ROUTE    Channel Route 25"
"        25.00      Channel Route 25 Reach length   ( metre)"
"        0.269   X-factor <= 0.5"
"       89.219   K-lag   ( seconds)"
"        0.000   Default(0) or user spec.(1) values used"
"        0.500   X-factor <= 0.5"
"       30.000   K-lag   ( seconds)"
"        0.500   Beta weighting factor"
"      100.000   Routing time step   ( seconds)"
"            1   No. of sub-reaches"
"             Peak outflow                  0.039    c.m/sec"
"                     0.500     0.039     0.039     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.500     0.039     0.039     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          202   Catchment 202"
"       25.000   % Impervious"
"        0.980   Total Area"
"       30.000   Flow length"
"        2.000   Overland Slope"
"        0.735   Pervious Area"
"       30.000   Pervious length"
"        2.000   Pervious slope"
"        0.245   Impervious Area"
"       30.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
```

```
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.055     0.039     0.039     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.735      0.245      0.980      hectare"
"             Time of concentration  22.189     2.170      5.482      minutes"
"             Time to Centroid       93.436     84.151     85.688     minutes"
"             Rainfall depth         33.816     33.816     33.816     mm"
"             Rainfall volume        248.55     82.85      331.40     c.m"
"             Rainfall losses        31.713     1.985      24.281     mm"
"             Runoff depth           2.103      31.830     9.535      mm"
"             Runoff volume          15.46      77.98      93.44      c.m"
"             Runoff coefficient     0.062      0.941      0.282      "
"             Maximum flow           0.011      0.055      0.055      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.055     0.071     0.039     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300 - To Clythe Creek"
"        0.000   % Impervious"
"        6.480   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        6.480   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.073     0.071     0.039     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
```

```
"             Surface Area           6.480      0.000      6.480      hectare"
"             Time of concentration  28.300     2.768      28.300     minutes"
"             Time to Centroid       98.613     85.041     98.613     minutes"
"             Rainfall depth         33.816     33.816     33.816     mm"
"             Rainfall volume        2191.27    0.00       2191.27    c.m"
"             Rainfall losses        31.709     2.082      31.709     mm"
"             Runoff depth           2.107      31.734     2.107      mm"
"             Runoff volume          136.54     0.00       136.55     c.m"
"             Runoff coefficient     0.062      0.000      0.062      "
"             Maximum flow           0.073      0.000      0.073      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.073     0.126     0.039     0.000"
" 38          START/RE-START TOTALS 300"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      32.700    hectare"
"             Total Impervious area                      7.443    hectare"
"             Total % impervious                        22.762"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                          Version 2.25  rev. 473"
"                MIDUSS created                       Sunday, February 07, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:             C:\Users\pgrier\Documents\Work\105172\"
"                                                                    2021-07-28"
"                Output filename:                           105172_POST_5yr.out"
"                Licensee name:                                             gmbp"
"                Company                                                      "
"                Date & Time last used:                  7/28/2021 at 3:43:47 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      210.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1593.000   Coefficient A"
"       11.000   Constant B"
"        0.879   Exponent C"
"        0.400   Fraction R"
"      170.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           134.894    mm/hr"
"             Total depth                  46.775    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          201   Catchment 201 - To Clythe Creeek"
"       65.000   % Impervious"
"        3.440   Total Area"
"       30.000   Flow length"
"        2.000   Overland Slope"
"        1.204   Pervious Area"
"       30.000   Pervious length"
"        2.000   Pervious slope"
"        2.236   Impervious Area"
"       30.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.681     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           1.204      2.236      3.440      hectare"
"             Time of concentration  15.360     1.968      3.517      minutes"
"             Time to Centroid       88.710     82.363     83.097     minutes"
"             Rainfall depth         46.775     46.775     46.775     mm"
"             Rainfall volume        563.17     1045.89    1609.06    c.m"
"             Rainfall losses        35.929     2.131      13.960     mm"
"             Runoff depth           10.846     44.644     32.815     mm"
"             Runoff volume          130.59     998.25     1128.83    c.m"
"             Runoff coefficient     0.232      0.954      0.702      "
"             Maximum flow           0.099      0.671      0.681      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.681     0.681     0.000     0.000"
" 54          POND DESIGN"
"        0.681   Current peak flow    c.m/sec"
"        0.171   Target outflow    c.m/sec"
"       1128.8   Hydrograph volume    c.m"
"          18.   Number of stages"
"        0.000   Minimum water level    metre"
"        3.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"               339.750     0.000     0.000"
"               339.850   0.02500   208.800"
"               339.950   0.03200   430.600"
"               340.050   0.04700   666.000"
"               340.150   0.05900   915.100"
"               340.250   0.06900  1178.100"
"               340.350    0.4110  1455.300"
"               340.450    0.4220  1746.800"
"               340.550    0.4320  2052.900"
"               340.650    0.4420  2373.600"
"               340.750    0.4510  2709.300"
"               340.850    0.4610  3060.100"
"               340.950    0.4700  3426.200"
"               341.050    0.9140  3807.400"
"               341.150     1.736  4203.900"
"               341.250     2.819  4615.800"
"               341.350     4.122  5043.500"
"               341.450     5.622  5487.800"
"             Peak outflow                  0.056    c.m/sec"
"             Maximum level               340.129    metre"
"             Maximum storage             861.751    c.m"
"             Centroidal lag                4.884   hours"
"                  0.681     0.681     0.056     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
```

```
"                    0.681     0.056     0.056     0.000"
" 51          PIPE DESIGN"
"        0.056   Current peak flow    c.m/sec"
"        0.013   Manning 'n'"
"        0.450   Diameter    metre"
"        2.000   Gradient   %"
"             Depth of flow                 0.114    metre"
"             Velocity                      1.787    m/sec"
"             Pipe capacity                 0.403    c.m/sec"
"             Critical depth                0.163    metre"
" 53          ROUTE    Pipe Route 17"
"        16.50      Pipe Route 17 Reach length   ( metre)"
"        0.410   X-factor <= 0.5"
"        6.924   K-lag   ( seconds)"
"        0.000   Default(0) or user spec.(1) values used"
"        0.500   X-factor <= 0.5"
"       30.000   K-lag   ( seconds)"
"        0.500   Beta weighting factor"
"        8.108   Routing time step   ( seconds)"
"            1   No. of sub-reaches"
"             Peak outflow                  0.056    c.m/sec"
"                    0.681     0.056     0.056     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.681     0.056     0.056     0.000"
" 54          POND DESIGN"
"        0.056   Current peak flow    c.m/sec"
"        0.171   Target outflow    c.m/sec"
"       1128.6   Hydrograph volume    c.m"
"          12.   Number of stages"
"        0.000   Minimum water level    metre"
"        3.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"               337.050     0.000     0.000"
"               337.150  4.94E-05     1.670"
"               337.250  4.94E-05     3.330"
"               337.350  4.94E-05     5.790"
"               337.450  4.94E-05     8.250"
"               337.550  4.94E-05    10.710"
"               337.650  4.94E-05    13.170"
"               337.700  4.94E-05    14.800"
"               337.750    0.4210    15.630"
"               337.850    0.4210    17.300"
"               337.950    0.4210    18.960"
"               338.050    0.4210    20.630"
"             Peak outflow                  0.056    c.m/sec"
"             Maximum level               337.707    metre"
"             Maximum storage              14.911    c.m"
```

```
"            Centroidal lag                4.939   hours"
"                 0.681     0.056     0.056     0.000 c.m/sec"
" 40         HYDROGRAPH Next link "
"           5   Next link "
"                    0.681     0.056     0.056     0.000"
" 52         CHANNEL DESIGN"
"        0.056   Current peak flow    c.m/sec"
"        0.065   Manning 'n'"
"           0.   Cross-section type: 0=trapezoidal; 1=general"
"        2.000   Basewidth    metre"
"        0.000   Left bank slope"
"        0.000   Right bank slope"
"        1.000   Channel depth    metre"
"        0.500   Gradient   %"
"            Depth of flow                 0.116    metre"
"            Velocity                      0.241    m/sec"
"            Channel capacity              1.371    c.m/sec"
"            Critical depth                0.043    metre"
" 53         ROUTE    Channel Route 25"
"        25.00      Channel Route 25 Reach length   ( metre)"
"        0.209   X-factor <= 0.5"
"       77.858   K-lag   ( seconds)"
"        0.000   Default(0) or user spec.(1) values used"
"        0.500   X-factor <= 0.5"
"       30.000   K-lag   ( seconds)"
"        0.500   Beta weighting factor"
"      100.000   Routing time step   ( seconds)"
"           1   No. of sub-reaches"
"            Peak outflow                  0.056    c.m/sec"
"                    0.681     0.056     0.056     0.000 c.m/sec"
" 40         HYDROGRAPH Next link "
"           5   Next link "
"                    0.681     0.056     0.056     0.000"
" 33         CATCHMENT 202"
"           1   Triangular SCS"
"           1   Equal length"
"           2   Horton equation"
"         202   Catchment 202"
"       25.000   % Impervious"
"        0.980   Total Area"
"       30.000   Flow length"
"        2.000   Overland Slope"
"        0.735   Pervious Area"
"       30.000   Pervious length"
"        2.000   Pervious slope"
"        0.245   Impervious Area"
"       30.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
```

```
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.091     0.056     0.056     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.735      0.245      0.980      hectare"
"             Time of concentration  15.360     1.968      7.614      minutes"
"             Time to Centroid       88.710     82.363     85.039     minutes"
"             Rainfall depth         46.775     46.775     46.775     mm"
"             Rainfall volume        343.80     114.60     458.40     c.m"
"             Rainfall losses        35.929     2.131      27.479     mm"
"             Runoff depth           10.846     44.644     19.296     mm"
"             Runoff volume          79.72      109.38     189.10     c.m"
"             Runoff coefficient     0.232      0.954      0.413      "
"             Maximum flow           0.061      0.073      0.091      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.091     0.132     0.056     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300 - To Clythe Creek"
"        0.000   % Impervious"
"        6.480   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        6.480   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.444     0.132     0.056     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
```

```
"             Surface Area           6.480      0.000      6.480      hectare"
"             Time of concentration  19.590     2.510      19.590     minutes"
"             Time to Centroid       92.382     83.161     92.382     minutes"
"             Rainfall depth         46.775     46.775     46.775     mm"
"             Rainfall volume        3031.02    0.00       3031.02    c.m"
"             Rainfall losses        35.903     2.312      35.903     mm"
"             Runoff depth           10.872     44.463     10.872     mm"
"             Runoff volume          704.50     0.00       704.50     c.m"
"             Runoff coefficient     0.232      0.000      0.232      "
"             Maximum flow           0.444      0.000      0.444      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.444     0.575     0.056     0.000"
" 38          START/RE-START TOTALS 300"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      10.900    hectare"
"             Total Impervious area                      2.481    hectare"
"             Total % impervious                        22.762"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                          Version 2.25  rev. 473"
"                MIDUSS created                       Sunday, February 07, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:             C:\Users\pgrier\Documents\Work\105172\"
"                                                                   2021-07-28"
"                Output filename:                          105172_POST_25yr.out"
"                Licensee name:                                            gmbp"
"                Company                                                      "
"                Date & Time last used:                 7/28/2021 at 3:46:56 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      210.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     3158.000   Coefficient A"
"       15.000   Constant B"
"        0.936   Exponent C"
"        0.400   Fraction R"
"      210.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           169.546    mm/hr"
"             Total depth                  69.476    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          201   Catchment 201 - To Clythe Creeek"
"       65.000   % Impervious"
"        3.440   Total Area"
"       30.000   Flow length"
"        2.000   Overland Slope"
"        1.204   Pervious Area"
"       30.000   Pervious length"
"        2.000   Pervious slope"
"        2.236   Impervious Area"
"       30.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    1.084     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           1.204      2.236      3.440      hectare"
"             Time of concentration  11.267     1.796      3.566      minutes"
"             Time to Centroid       102.758    98.258     99.099     minutes"
"             Rainfall depth         69.476     69.476     69.476     mm"
"             Rainfall volume        836.50     1553.49    2389.99    c.m"
"             Rainfall losses        40.822     2.348      15.814     mm"
"             Runoff depth           28.654     67.128     53.662     mm"
"             Runoff volume          345.00     1500.99    1845.99    c.m"
"             Runoff coefficient     0.412      0.966      0.772      "
"             Maximum flow           0.261      0.920      1.084      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.084     1.084     0.000     0.000"
" 54          POND DESIGN"
"        1.084   Current peak flow    c.m/sec"
"        0.171   Target outflow    c.m/sec"
"       1846.0   Hydrograph volume    c.m"
"          18.   Number of stages"
"        0.000   Minimum water level    metre"
"        3.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"               339.750     0.000     0.000"
"               339.850   0.02500   208.800"
"               339.950   0.03200   430.600"
"               340.050   0.04700   666.000"
"               340.150   0.05900   915.100"
"               340.250   0.06900  1178.100"
"               340.350    0.4110  1455.300"
"               340.450    0.4220  1746.800"
"               340.550    0.4320  2052.900"
"               340.650    0.4420  2373.600"
"               340.750    0.4510  2709.300"
"               340.850    0.4610  3060.100"
"               340.950    0.4700  3426.200"
"               341.050    0.9140  3807.400"
"               341.150     1.736  4203.900"
"               341.250     2.819  4615.800"
"               341.350     4.122  5043.500"
"               341.450     5.622  5487.800"
"             Peak outflow                  0.222    c.m/sec"
"             Maximum level               340.295    metre"
"             Maximum storage            1303.930    c.m"
"             Centroidal lag                4.987   hours"
"                  1.084     1.084     0.222     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
```

```
"                    1.084     0.222     0.222     0.000"
" 51          PIPE DESIGN"
"        0.222   Current peak flow    c.m/sec"
"        0.013   Manning 'n'"
"        0.450   Diameter    metre"
"        2.000   Gradient   %"
"             Depth of flow                 0.238    metre"
"             Velocity                      2.596    m/sec"
"             Pipe capacity                 0.403    c.m/sec"
"             Critical depth                0.332    metre"
" 53          ROUTE    Pipe Route 17"
"        16.50      Pipe Route 17 Reach length   ( metre)"
"        0.283   X-factor <= 0.5"
"        4.767   K-lag   ( seconds)"
"        0.000   Default(0) or user spec.(1) values used"
"        0.500   X-factor <= 0.5"
"       30.000   K-lag   ( seconds)"
"        0.500   Beta weighting factor"
"        6.818   Routing time step   ( seconds)"
"            1   No. of sub-reaches"
"             Peak outflow                  0.221    c.m/sec"
"                    1.084     0.222     0.221     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    1.084     0.221     0.221     0.000"
" 54          POND DESIGN"
"        0.221   Current peak flow    c.m/sec"
"        0.171   Target outflow    c.m/sec"
"       1844.4   Hydrograph volume    c.m"
"          12.   Number of stages"
"        0.000   Minimum water level    metre"
"        3.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"               337.050     0.000     0.000"
"               337.150  4.94E-05     1.670"
"               337.250  4.94E-05     3.330"
"               337.350  4.94E-05     5.790"
"               337.450  4.94E-05     8.250"
"               337.550  4.94E-05    10.710"
"               337.650  4.94E-05    13.170"
"               337.700  4.94E-05    14.800"
"               337.750    0.4210    15.630"
"               337.850    0.4210    17.300"
"               337.950    0.4210    18.960"
"               338.050    0.4210    20.630"
"             Peak outflow                  0.221    c.m/sec"
"             Maximum level               337.726    metre"
"             Maximum storage              15.236    c.m"
```

```
"             Centroidal lag                5.026   hours"
"                  1.084     0.221     0.221     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     1.084     0.221     0.221     0.000"
" 52          CHANNEL DESIGN"
"        0.221   Current peak flow    c.m/sec"
"        0.065   Manning 'n'"
"           0.   Cross-section type: 0=trapezoidal; 1=general"
"        2.000   Basewidth    metre"
"        0.000   Left bank slope"
"        0.000   Right bank slope"
"        1.000   Channel depth    metre"
"        0.500   Gradient   %"
"             Depth of flow                 0.280    metre"
"             Velocity                      0.395    m/sec"
"             Channel capacity              1.371    c.m/sec"
"             Critical depth                0.108    metre"
" 53          ROUTE    Channel Route 25"
"        25.00      Channel Route 25 Reach length   ( metre)"
"        0.000   X-factor <= 0.5"
"       47.487   K-lag   ( seconds)"
"        0.000   Default(0) or user spec.(1) values used"
"        0.500   X-factor <= 0.5"
"       30.000   K-lag   ( seconds)"
"        0.612   Beta weighting factor"
"      100.000   Routing time step   ( seconds)"
"            1   No. of sub-reaches"
"             Peak outflow                  0.220    c.m/sec"
"                     1.084     0.221     0.220     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     1.084     0.220     0.220     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          202   Catchment 202"
"       25.000   % Impervious"
"        0.980   Total Area"
"       30.000   Flow length"
"        2.000   Overland Slope"
"        0.735   Pervious Area"
"       30.000   Pervious length"
"        2.000   Pervious slope"
"        0.245   Impervious Area"
"       30.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
```

```
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.223     0.220     0.220     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.735      0.245      0.980      hectare"
"             Time of concentration  11.267     1.796      7.114      minutes"
"             Time to Centroid       102.758    98.258     100.785    minutes"
"             Rainfall depth         69.476     69.476     69.476     mm"
"             Rainfall volume        510.65     170.22     680.87     c.m"
"             Rainfall losses        40.822     2.348      31.204     mm"
"             Runoff depth           28.654     67.128     38.273     mm"
"             Runoff volume          210.61     164.46     375.07     c.m"
"             Runoff coefficient     0.412      0.966      0.551      "
"             Maximum flow           0.159      0.101      0.223      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.223     0.287     0.220     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300 - To Clythe Creek"
"        0.000   % Impervious"
"        6.480   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        6.480   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.261     0.287     0.220     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
```

```
"             Surface Area           6.480      0.000      6.480      hectare"
"             Time of concentration  14.371     2.291      14.371     minutes"
"             Time to Centroid       105.688    98.958     105.688    minutes"
"             Rainfall depth         69.476     69.476     69.476     mm"
"             Rainfall volume        4502.07    0.00       4502.07    c.m"
"             Rainfall losses        40.830     2.498      40.830     mm"
"             Runoff depth           28.647     66.978     28.647     mm"
"             Runoff volume          1856.30    0.00       1856.30    c.m"
"             Runoff coefficient     0.412      0.000      0.412      "
"             Maximum flow           1.261      0.000      1.261      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.261     1.511     0.220     0.000"
" 38          START/RE-START TOTALS 300"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      10.900    hectare"
"             Total Impervious area                      2.481    hectare"
"             Total % impervious                        22.762"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                          Version 2.25  rev. 473"
"                MIDUSS created                       Sunday, February 07, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:             C:\Users\pgrier\Documents\Work\105172\"
"                                                                    2021-07-28"
"                Output filename:                        105172_POST_100yr.out"
"                Licensee name:                                            gmbp"
"                Company                                                      "
"                Date & Time last used:                 7/28/2021 at 3:58:18 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      210.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     4688.000   Coefficient A"
"       17.000   Constant B"
"        0.962   Exponent C"
"        0.400   Fraction R"
"      210.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           213.574    mm/hr"
"             Total depth                  88.830    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          201   Catchment 201 - To Clythe Creeek"
"       65.000   % Impervious"
"        3.440   Total Area"
"       30.000   Flow length"
"        2.000   Overland Slope"
"        1.204   Pervious Area"
"       30.000   Pervious length"
"        2.000   Pervious slope"
"        2.236   Impervious Area"
"       30.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    1.482     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           1.204      2.236      3.440      hectare"
"             Time of concentration  9.306      1.638      3.326      minutes"
"             Time to Centroid       102.153    97.460     98.493     minutes"
"             Rainfall depth         88.830     88.830     88.830     mm"
"             Rainfall volume        1069.51    1986.23    3055.75    c.m"
"             Rainfall losses        43.655     2.647      17.000     mm"
"             Runoff depth           45.175     86.183     71.830     mm"
"             Runoff volume          543.91     1927.04    2470.95    c.m"
"             Runoff coefficient     0.509      0.970      0.809      "
"             Maximum flow           0.422      1.159      1.482      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.482     1.482     0.000     0.000"
" 54          POND DESIGN"
"        1.482   Current peak flow    c.m/sec"
"        0.171   Target outflow    c.m/sec"
"       2471.0   Hydrograph volume    c.m"
"          18.   Number of stages"
"        0.000   Minimum water level    metre"
"        3.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"               339.750     0.000     0.000"
"               339.850   0.02500   208.800"
"               339.950   0.03200   430.600"
"               340.050   0.04700   666.000"
"               340.150   0.05900   915.100"
"               340.250   0.06900  1178.100"
"               340.350    0.4110  1455.300"
"               340.450    0.4220  1746.800"
"               340.550    0.4320  2052.900"
"               340.650    0.4420  2373.600"
"               340.750    0.4510  2709.300"
"               340.850    0.4610  3060.100"
"               340.950    0.4700  3426.200"
"               341.050    0.9140  3807.400"
"               341.150     1.736  4203.900"
"               341.250     2.819  4615.800"
"               341.350     4.122  5043.500"
"               341.450     5.622  5487.800"
"             Peak outflow                  0.415    c.m/sec"
"             Maximum level               340.387    metre"
"             Maximum storage            1564.560    c.m"
"             Centroidal lag                4.285   hours"
"                  1.482     1.482     0.415     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
```

```
"                    1.482     0.415     0.415     0.000"
" 51          PIPE DESIGN"
"        0.415   Current peak flow    c.m/sec"
"        0.013   Manning 'n'"
"        0.450   Diameter    metre"
"        2.000   Gradient   %"
"             Surcharged HGL                2.118    %"
"             Velocity                      2.609    m/sec"
"             Pipe capacity                 0.403    c.m/sec"
"             Critical depth                0.000    metre"
" 53          ROUTE    Pipe Route 17"
"        16.50      Pipe Route 17 Reach length   ( metre)"
"        0.255   X-factor <= 0.5"
"        4.631   K-lag   ( seconds)"
"        0.000   Default(0) or user spec.(1) values used"
"        0.500   X-factor <= 0.5"
"       30.000   K-lag   ( seconds)"
"        0.000   Beta weighting factor"
"        0.000   Routing time step   ( seconds)"
"            0   No. of sub-reaches"
"             Peak outflow                  0.415    c.m/sec"
"                    1.482     0.415     0.415     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    1.482     0.415     0.415     0.000"
" 54          POND DESIGN"
"        0.415   Current peak flow    c.m/sec"
"        0.171   Target outflow    c.m/sec"
"       2474.7   Hydrograph volume    c.m"
"          12.   Number of stages"
"        0.000   Minimum water level    metre"
"        3.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"               337.050     0.000     0.000"
"               337.150  4.94E-05     1.670"
"               337.250  4.94E-05     3.330"
"               337.350  4.94E-05     5.790"
"               337.450  4.94E-05     8.250"
"               337.550  4.94E-05    10.710"
"               337.650  4.94E-05    13.170"
"               337.700  4.94E-05    14.800"
"               337.750    0.4210    15.630"
"               337.850    0.4210    17.300"
"               337.950    0.4210    18.960"
"               338.050    0.4210    20.630"
"             Peak outflow                  0.415    c.m/sec"
"             Maximum level               337.749    metre"
"             Maximum storage              15.618    c.m"
```

```
"             Centroidal lag                4.307   hours"
"                  1.482     0.415     0.415     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     1.482     0.415     0.415     0.000"
" 52          CHANNEL DESIGN"
"        0.415   Current peak flow    c.m/sec"
"        0.065   Manning 'n'"
"           0.   Cross-section type: 0=trapezoidal; 1=general"
"        2.000   Basewidth    metre"
"        0.000   Left bank slope"
"        0.000   Right bank slope"
"        1.000   Channel depth    metre"
"        0.500   Gradient   %"
"             Depth of flow                 0.427    metre"
"             Velocity                      0.486    m/sec"
"             Channel capacity              1.371    c.m/sec"
"             Critical depth                0.164    metre"
" 53          ROUTE    Channel Route 25"
"        25.00      Channel Route 25 Reach length   ( metre)"
"        0.000   X-factor <= 0.5"
"       38.545   K-lag   ( seconds)"
"        0.000   Default(0) or user spec.(1) values used"
"        0.500   X-factor <= 0.5"
"       30.000   K-lag   ( seconds)"
"        0.755   Beta weighting factor"
"      100.000   Routing time step   ( seconds)"
"            1   No. of sub-reaches"
"             Peak outflow                  0.415    c.m/sec"
"                     1.482     0.415     0.415     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     1.482     0.415     0.415     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          202   Catchment 202"
"       25.000   % Impervious"
"        0.980   Total Area"
"       30.000   Flow length"
"        2.000   Overland Slope"
"        0.735   Pervious Area"
"       30.000   Pervious length"
"        2.000   Pervious slope"
"        0.245   Impervious Area"
"       30.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
```

```
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.340     0.415     0.415     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.735      0.245      0.980      hectare"
"             Time of concentration  9.306      1.638      6.325      minutes"
"             Time to Centroid       102.153    97.460     100.328    minutes"
"             Rainfall depth         88.830     88.830     88.830     mm"
"             Rainfall volume        652.90     217.63     870.53     c.m"
"             Rainfall losses        43.655     2.647      33.403     mm"
"             Runoff depth           45.175     86.183     55.427     mm"
"             Runoff volume          332.04     211.15     543.19     c.m"
"             Runoff coefficient     0.509      0.970      0.624      "
"             Maximum flow           0.258      0.127      0.340      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.340     0.642     0.415     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300 - To Clythe Creek"
"        0.000   % Impervious"
"        6.480   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        6.480   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     1.971     0.642     0.415     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
```

```
"             Surface Area           6.480      0.000      6.480      hectare"
"             Time of concentration  11.869     2.089      11.869     minutes"
"             Time to Centroid       104.828    98.071     104.828    minutes"
"             Rainfall depth         88.830     88.830     88.830     mm"
"             Rainfall volume        5756.17    0.01       5756.17    c.m"
"             Rainfall losses        43.360     2.670      43.360     mm"
"             Runoff depth           45.470     86.160     45.470     mm"
"             Runoff volume          2946.46    0.01       2946.46    c.m"
"             Runoff coefficient     0.512      0.000      0.512      "
"             Maximum flow           1.971      0.000      1.971      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.971     2.535     0.415     0.000"
" 38          START/RE-START TOTALS 300"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      10.900    hectare"
"             Total Impervious area                      2.481    hectare"
"             Total % impervious                        22.762"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                          Version 2.25  rev. 473"
"                MIDUSS created                       Sunday, February 07, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:             C:\Users\pgrier\Documents\Work\105172\"
"                                                                    2021-07-28"
"                Output filename:                           105172_POST_REG.out"
"                Licensee name:                                             gmbp"
"                Company                                                      "
"                Date & Time last used:                 7/28/2021 at 3:51:10 PM"
" 31          TIME PARAMETERS"
"       60.000   Time Step"
"     2880.000   Max. Storm length"
"     3600.000   Max. Hydrograph"
" 32          STORM Historic"
"            5   Historic"
"     2880.000   Duration"
"       48.000   Rainfall intensity values"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.028     2.028     2.028     2.028"
"                  2.028     2.026     2.026     2.026     2.028"
"                  2.026     6.000     4.000     6.000    13.000"
"                 17.000    13.000    23.000    13.000    13.000"
"                 53.000    38.000    13.000"
"             Maximum intensity            53.000    mm/hr"
"             Total depth                 285.000    mm"
"            6   250hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          201   Catchment 201 - To Clythe Creeek"
"       65.000   % Impervious"
"        3.440   Total Area"
"       30.000   Flow length"
"        2.000   Overland Slope"
"        1.204   Pervious Area"
"       30.000   Pervious length"
"        2.000   Pervious slope"
"        2.236   Impervious Area"
"       30.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
```

```
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.379     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           1.204      2.236      3.440      hectare"
"             Time of concentration  17.225     2.860      4.946      minutes"
"             Time to Centroid       2775.198   2251.465   2327.522   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        3431.40    6372.60    9804.00    c.m"
"             Rainfall losses        207.571    39.596     98.387     mm"
"             Runoff depth           77.429     245.404    186.613    mm"
"             Runoff volume          932.25     5487.23    6419.48    c.m"
"             Runoff coefficient     0.272      0.861      0.655      "
"             Maximum flow           0.095      0.285      0.379      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.379     0.379     0.000     0.000"
" 54          POND DESIGN"
"        0.379   Current peak flow    c.m/sec"
"        0.171   Target outflow    c.m/sec"
"       6419.5   Hydrograph volume    c.m"
"          18.   Number of stages"
"        0.000   Minimum water level    metre"
"        3.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"               339.750     0.000     0.000"
"               339.850   0.02500   208.800"
"               339.950   0.03200   430.600"
"               340.050   0.04700   666.000"
"               340.150   0.05900   915.100"
"               340.250   0.06900  1178.100"
"               340.350    0.4110  1455.300"
"               340.450    0.4220  1746.800"
"               340.550    0.4320  2052.900"
"               340.650    0.4420  2373.600"
"               340.750    0.4510  2709.300"
"               340.850    0.4610  3060.100"
"               340.950    0.4700  3426.200"
"               341.050    0.9140  3807.400"
"               341.150     1.736  4203.900"
"               341.250     2.819  4615.800"
"               341.350     4.122  5043.500"
"               341.450     5.622  5487.800"
"             Peak outflow                  0.315    c.m/sec"
```

```
"             Maximum level               340.332    metre"
"             Maximum storage            1405.283    c.m"
"             Centroidal lag               41.163   hours"
"                  0.379     0.379     0.315     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.379     0.315     0.315     0.000"
" 51          PIPE DESIGN"
"        0.315   Current peak flow    c.m/sec"
"        0.013   Manning 'n'"
"        0.450   Diameter    metre"
"        2.200   Gradient   %"
"             Depth of flow                 0.290    metre"
"             Velocity                      2.915    m/sec"
"             Pipe capacity                 0.423    c.m/sec"
"             Critical depth                0.389    metre"
" 53          ROUTE    Pipe Route 17"
"        16.50      Pipe Route 17 Reach length   ( metre)"
"        0.220   X-factor <= 0.5"
"        4.245   K-lag   ( seconds)"
"        0.000   Default(0) or user spec.(1) values used"
"        0.500   X-factor <= 0.5"
"       30.000   K-lag   ( seconds)"
"        0.500   Beta weighting factor"
"        6.618   Routing time step   ( seconds)"
"            1   No. of sub-reaches"
"             Peak outflow                  0.315    c.m/sec"
"                     0.379     0.315     0.315     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.379     0.315     0.315     0.000"
" 54          POND DESIGN"
"        0.315   Current peak flow    c.m/sec"
"        0.171   Target outflow    c.m/sec"
"       6514.7   Hydrograph volume    c.m"
"          12.   Number of stages"
"        0.000   Minimum water level    metre"
"        3.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"               337.050     0.000     0.000"
"               337.150  4.94E-05     1.670"
"               337.250  4.94E-05     3.330"
"               337.350  4.94E-05     5.790"
"               337.450  4.94E-05     8.250"
"               337.550  4.94E-05    10.710"
"               337.650  4.94E-05    13.170"
"               337.700  4.94E-05    14.800"
"               337.750    0.4210    15.630"
```

```
"                337.850    0.4210    17.300"
"                337.950    0.4210    18.960"
"                338.050    0.4210    20.630"
"             Peak outflow                  0.315    c.m/sec"
"             Maximum level               337.737    metre"
"             Maximum storage              15.422    c.m"
"             Centroidal lag               41.448   hours"
"                  0.379     0.315     0.315     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.379     0.315     0.315     0.000"
" 52          CHANNEL DESIGN"
"        0.315   Current peak flow    c.m/sec"
"        0.065   Manning 'n'"
"           0.   Cross-section type: 0=trapezoidal; 1=general"
"        2.000   Basewidth    metre"
"        0.000   Left bank slope"
"        0.000   Right bank slope"
"        1.000   Channel depth    metre"
"        0.500   Gradient   %"
"             Depth of flow                 0.354    metre"
"             Velocity                      0.445    m/sec"
"             Channel capacity              1.371    c.m/sec"
"             Critical depth                0.136    metre"
" 53          ROUTE    Channel Route 25"
"        25.00      Channel Route 25 Reach length   ( metre)"
"        0.000   X-factor <= 0.5"
"       42.150   K-lag   ( seconds)"
"        0.000   Default(0) or user spec.(1) values used"
"        0.500   X-factor <= 0.5"
"       30.000   K-lag   ( seconds)"
"        0.658   Beta weighting factor"
"      120.000   Routing time step   ( seconds)"
"            1   No. of sub-reaches"
"             Peak outflow                  0.315    c.m/sec"
"                     0.379     0.315     0.315     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.379     0.315     0.315     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          202   Catchment 202"
"       25.000   % Impervious"
"        0.980   Total Area"
"       30.000   Flow length"
"        2.000   Overland Slope"
"        0.735   Pervious Area"
"       30.000   Pervious length"
```

```
"        2.000   Pervious slope"
"        0.245   Impervious Area"
"       30.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.089     0.315     0.315     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.735      0.245      0.980      hectare"
"             Time of concentration  17.225     2.860      9.845      minutes"
"             Time to Centroid       2775.197   2251.465   2506.141   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        2094.75    698.25     2793.00    c.m"
"             Rainfall losses        207.571    39.596     165.577    mm"
"             Runoff depth           77.429     245.404    119.423    mm"
"             Runoff volume          569.10     601.24     1170.34    c.m"
"             Runoff coefficient     0.272      0.861      0.419      "
"             Maximum flow           0.058      0.031      0.089      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.089     0.396     0.315     0.000"
" 33          CATCHMENT 300"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          300   Catchment 300 - To Clythe Creek"
"        0.000   % Impervious"
"        6.480   Total Area"
"       45.000   Flow length"
"        2.000   Overland Slope"
"        6.480   Pervious Area"
"       45.000   Pervious length"
"        2.000   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious Max.infiltration"
"       12.500   Pervious Min.infiltration"
"        0.250   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
```

```
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.050   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.538     0.396     0.315     0.000 c.m/sec"
"             Catchment 300          Pervious   Impervious Total Area "
"             Surface Area           6.480      0.000      6.480      hectare"
"             Time of concentration  21.969     3.647      21.969     minutes"
"             Time to Centroid       2780.244   2236.986   2780.242   minutes"
"             Rainfall depth         285.000    285.000    285.000    mm"
"             Rainfall volume        1.8468     0.0000     1.8468     ha-m"
"             Rainfall losses        206.992    38.537     206.992    mm"
"             Runoff depth           78.008     246.463    78.008     mm"
"             Runoff volume          5054.92    0.02       5054.94    c.m"
"             Runoff coefficient     0.274      0.000      0.274      "
"             Maximum flow           0.538      0.000      0.538      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.538     0.934     0.315     0.000"
" 38          START/RE-START TOTALS 300"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      10.900    hectare"
"             Total Impervious area                      2.481    hectare"
"             Total % impervious                        22.762"
" 19          EXIT"
```

105172 - Cityview Ridge Subdivision
Cooling Trench Sizing Calculations (Energy Dissipation/Dispersion Structure)
Catchment 201

Knowns:

Q 2yr =	0.009	m^3/s
Q 5yr =	0.010	m^3/s
Q 25yr =	0.176	m^3/s
Q 100yr =	0.412	m^3/s
Q Regional =	0.307	m^3/s
ν=	8.01E-07	
Pr =	5.42	
k=	0.615	
Cross Sectional Void Space	0.43	m^2
Rho =	996	kg/m^3
Cp =	810	J/kg·K

Assumptions:

Tin =	36	°C
=	309	K
Tout =	24	°C
=	297	K
Tavg =	30	°C
=	303	K
Tstone =	21	°C
=	294	K
L =	10	m
W =	2	m
D =	1	m
Diam. =	0.02	m

Storm	V (m/s)	Re	Nu	h_s $J/m^2 \cdot K \cdot s$	As m^2	qr (J/s)	qa (J/s)	SF (%)
2	0.021	523	22.2	681.71	3,142	87,130	19,274,919	22022%
5	0.023	581	23.3	716.02	3,142	96,811	20,244,896	20812%
25	0.409	10,220	25.0	769.96	3,142	1,703,877	21,770,132	1178%
100	0.958	23,924	37.2	1144.46	3,142	3,988,621	32,358,939	711%
Regional	0.714	17,827	32.5	997.85	3,142	2,972,104	28,213,609	849%

105172 - Cityview Ridge Subdivision
Cooling Trench Sizing Calculations (Energy Dissipation/Dispersion Structure)
Catchment 202

Knowns:

Q 2yr =	0.041	m^3/s
Q 5yr =	0.069	m^3/s
Q 25yr =	0.169	m^3/s
Q 100yr =	0.256	m^3/s
Q Regional =	0.067	m^3/s
ν=	8.01E-07	
Pr =	5.42	
k=	0.615	
Cross Sectional Void Space	0.43	m^2
Rho =	996	kg/m^3
Cp =	810	J/kg·K

Assumptions:

Tin =	36	°C
=	309	K
Tout =	24	°C
=	297	K
Tavg =	30	°C
=	303	K
Tstone =	21	°C
=	294	K
L =	15	m
W =	2	m
D =	1	m
Diam. =	0.02	m

Storm	V (m/s)	Re	Nu	h_s $J/m^2 \cdot K \cdot s$	As m^2	qr (J/s)	qa (J/s)	SF (%)
2	0.095	2,381	44.9	1381.91	4,712	396,926	58,608,971	14666%
5	0.160	4,007	57.3	1761.27	4,712	667,997	74,698,262	11082%
25	0.393	9,813	87.0	2673.74	4,712	1,636,109	113,397,120	6831%
100	0.595	14,865	105.5	3244.61	4,712	2,478,367	137,608,938	5452%
Regional	0.156	3,890	56.5	1737.30	4,712	648,635	73,681,367	11259%

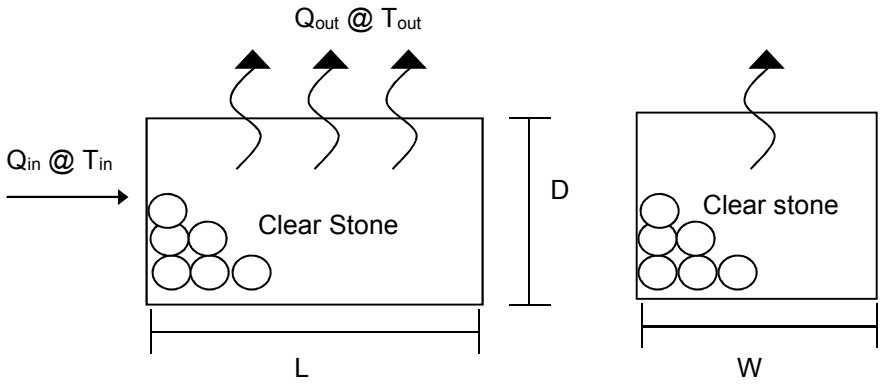
Cityview Ridge Subdivision
City of Guelph
File No.: 105172

Cooling Trench Sample Calculations

Assumptions:

- Cooling trench is treated as a “black box”, therefore the specific design of the trench is ignored.
- Solid media (clear stone) in trench is isothermal (ie. at a constant temperature).
- Temperature of fluid moving through trench is assumed to be constant.
- Temperature of fluid moving through trench is approximated as the average inlet and outlet temperature.
- Each trench section is rectangular with spherical particles.
- Thermal conductivity of granite is approximate to the thermal conductivity of clear stone.

Schematic:



Design Variables:

Q = flowrate through trench (m^3/s)
= 0.009m^3/s for 2 year design storm event.

T_{in} = temperature of fluid at inlet (K)
= 36°C
= 309 K

T_{out} = temperature of fluid at outlet (K)
= 24°C
= 297 K

T_{avg} = average temperature of inflow and outflow (K)
= 30°C
= 303 K

T_{stone} = average temperature of clear stone (K)
= 21°C
= 294 K

L = length of trench (m)
= 10 m

W = width of trench (m)
= 2.0 m

D = depth of trench (m)
= 1.0 m

Dia. = diameter of clear stone (m)
= 0.020 m

Physical Properties:

μ = dynamic viscosity
= 0.798 $x10^{-3}$ kg/m s water @ 303 K
(Table A-9, p. 918, Çengal, Ghajar, 5th Edition)

ρ = fluid density
= 996.0 kg/m^3 for water at 303K
(Table A-9, p. 918, Çengal, Ghajar, 5th Edition)

P_r = Prandtl number
= 5.42 for water @ 303K
(Table A-9, p. 918, Çengal, Ghajar, 5th Edition)

k = Thermal Conductivity of Water
= 0.615 W/m K for water at 303K
(Table A-9, p. 918, Çengal, Ghajar, 5th Edition)

C_p = Specific Heat (J/kg K) of limestone
= 810 J/kg K
(Table A.3, p. 838, Incropera, DeWitt, 4th Edition)

Analysis:

Calculate the Reynolds number using the following equation:

$$Re = \frac{VD}{\nu} \qquad \text{Eq. 1}$$

Where:

V = velocity of water (m/s)

D = stone diameter (m)

ν = kinematic viscosity (m^2/s)

$$V = \frac{Q}{Av} \qquad \text{Eq. 2}$$

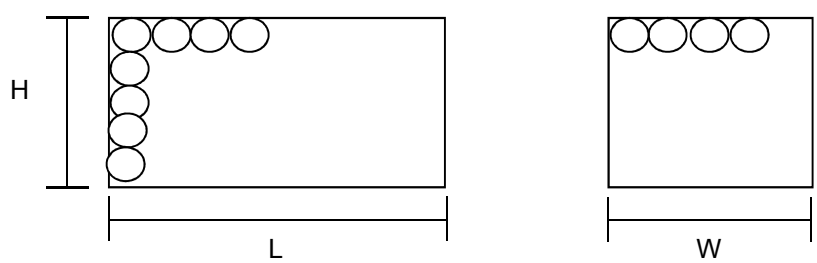
Where:

Q = Flow rate (m^3/s)

Av = Void area in the cross section of the cooling trench (m^2)

Step 1: Estimate the total cross sectional area of the clear stone particles using the following equation:

$$As = (\pi \; x \; r^2) \; x \; \left(\frac{H}{D} \; x \; \frac{W}{D}\right) \qquad \text{Eq. 3}$$



$$As = (\pi \; x \; 0.1^2) \; x \; \left(\frac{2}{0.02} \; x \; \frac{1}{0.02}\right)$$
$$A = 1.57m^2$$

Step 2: Estimate the void space by subtracting the cross sectional area of the stone from the total cross sectional area.

$$Av = (H \; x \; W) - \text{As}$$
$$Av = (2 \; x \; 1) - 1.57$$
$$Av = 0.43m^2$$

Step 3: Calculate the velocity using equation 2.

$$V = \frac{0.009}{0.43}$$
$$V = 0.021m/s$$

Step 4: Calculate the kinematic viscosity using the following formula:

$$\nu = \frac{\mu}{\rho} \qquad \text{Eq. 4}$$

$$\nu = \frac{0.798\ \text{x}10^{-3}}{996.0}$$

$$\nu = 8.01\text{x}10^{-7} m^2/s$$

Step 5: Calculate the Reynolds number using Equation 1:

$$Re = \frac{VD}{\nu}$$

$$Re = \frac{0.021\ x\ 0.02}{8.01\text{x}10^{-7}}$$

$$Re = 523$$

Step 6: Calculate the Nusselt number

For 40<Re<4,000 $\quad Nu = 0.683Re^{0.466}Pr^{1/3}$ Eq. 5

For 4,000<Re<40,000 $\quad Nu = 0.193Re^{0.466}Pr^{1/3}$ Eq. 6

Note: The above formulas have been taken from Heat and Mass Transfer Fundamentals, 5th Edition, Çengal, Ghajar, p.441 Table 7-1.

As Re = 523, use Equation 5.

$$Nu = 0.683Re^{0.466}Pr^{1/3}$$

$$Nu = 0.683(523)^{0.466}(5.42)^{1/3}$$

$$Nu = 22.2$$

Step 7: Calculate the heat transfer coefficient.

$$hs = \frac{k}{D}Nu$$

Where:

k = Thermal Conductivity of water at 303K (W/m K)

D = stone diameter (m)

Nu = Nusselt Number

$$hs = \frac{0.615}{0.02}(22.2)$$

$$hs = 681.71\ W/m^2K$$

Step 8: Calculate the required heat transfer rate (qr) using the following equation:

$$q_r = Q\rho C_p(T_{in} - T_{out}) \qquad \text{Eq. 7}$$

$$q_r = 0.009(996)(810)(309 - 297)$$

$$q_r = 87{,}130\ \text{W}$$

Step 9: Calculate the available heat transfer rate (q_a) using the following equation:

$$q_a = h_s A_s(T_{avg} - T_{stone}) \qquad \text{Eq. 8}$$

Where:

h_s = Heat transfer coefficient (W/m K)

A = Surface area of clear stone particles (m^2)

$$A = (\pi\ x\ D^2)\ x\ \left(\frac{L}{D}\ x\ \frac{H}{D}\ x\ \frac{W}{D}\right)$$

$$A = \pi\ x\ \left(\frac{LHW}{D}\right)$$
$$A = \pi\ x\ \left(\frac{10\ x\ 2\ x\ 1}{0.02}\right)$$
$$A = 3{,}142m^2$$
$$q_a = h_s A_s \left(T_{avg} - T_{stone}\right)$$
$$q_a = (681.71)(3{,}142)(303 - 294)$$
$$q_a = 19{,}274{,}919\ W$$

Therefore, the available heat transfer rate to reduce the temperature of water to 297 K (24°C) from 309K (36°C) is 19,274,919 W.

Step 10: Calculate the Safety Factor (SF) using the following equation:

$$SF = \frac{qa - qr}{qr} \qquad \text{Eq. 9}$$
$$SF = \frac{19{,}274{,}919 - 87{,}130}{87{,}130}$$
$$SF = 22{,}022\%$$

Therefore the Safety Factor for the cooling trench is 22,022% based on the assumptions used in the calculations.

Therefore, since the available heat transfer rate (q_a) of 19,620,857 W is greater than the required heat transfer rate (q_r) of 87,130 W, we conclude that a cooling trench 10m long by 2m wide by 1m deep, constructed with 0.020m diameter clear stone, has the ability to reduce the temperature of the inflow from 309 K (36°C) to 297 K (24°C).

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	3/27/2015
Project Name	Cityview Ridge Subdivision
Project Number	105172
Location	City of Guelph

Designer Information

Company	N/A
Contact	N/A

Notes

N/A

Drainage Area

Total Area (ha)	7.62
Imperviousness (%)	65

The Stormceptor System model STC 14000 removes 78% TSS for a Fine (organics, silts and sand) particle size distribution and 92% runoff volume.

Rainfall

Name	TORONTO CENTRAL
State	ON
ID	100
Years of Records	1982 to 1999
Latitude	45°30'N
Longitude	90°30'W

Water Quality Objective

TSS Removal (%)	80
Runoff Volume (%)	90

Upstream Storage

Storage (ha-m)	Discharge (L/s)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %	Runoff Volume %
STC 300	36	30
STC 750	48	50
STC 1000	49	50
STC 1500	50	50
STC 2000	57	64
STC 3000	58	64
STC 4000	65	77
STC 5000	65	77
STC 6000	70	83
STC 9000	74	88
STC 10000	74	88
STC 14000	78	92

Stormceptor®

Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s
20	20	1.3	0.0004					
60	20	1.8	0.0016					
150	20	2.2	0.0108					
400	20	2.65	0.0647					
2000	20	2.65	0.2870					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor version 1.0
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 300 is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 750 to STC 6000 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

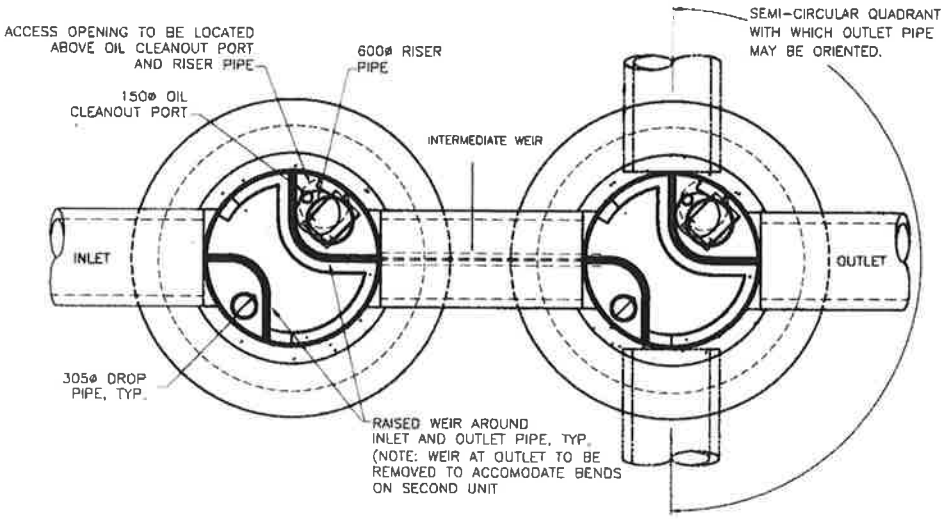
Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 300	STC 750 to STC 6000	STC 9000 to STC 14000
Single inlet pipe	75 mm	25 mm	75 mm
Multiple inlet pipes	75 mm	75 mm	Only one inlet pipe.

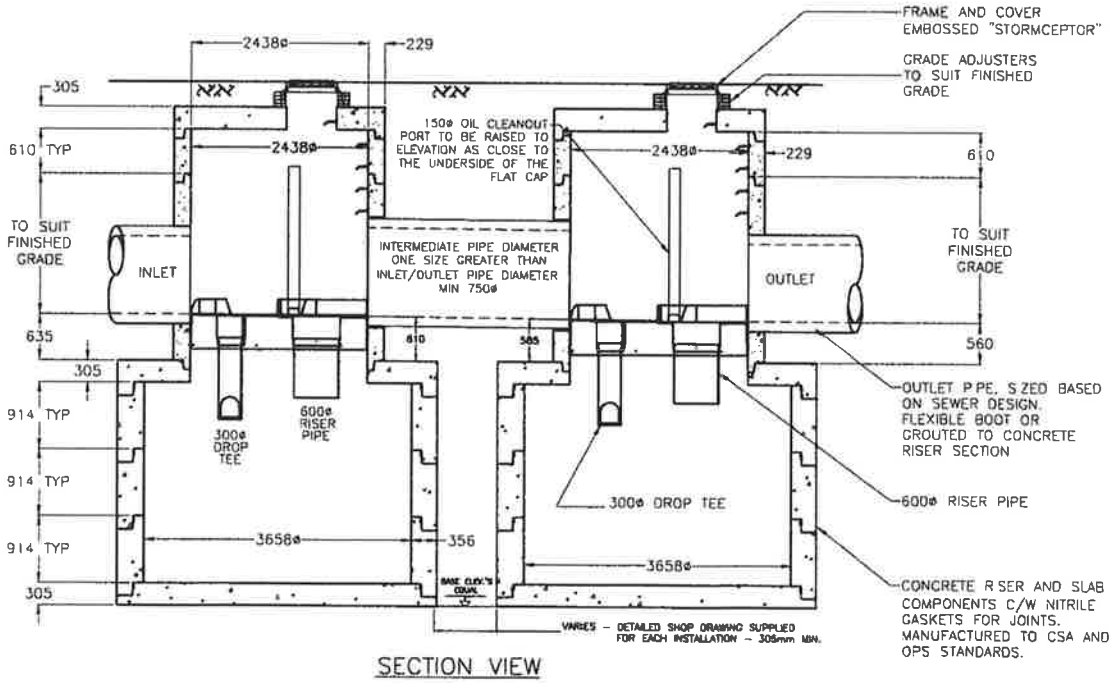
- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Imbrium Systems Inc., 1-800-565-4801.

DRAWING NOT TO BE USED FOR CONSTRUCTION

THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS:
United States Patent No. 5,753,115 • 5,849,181 • 6,068,765 • 6,371,690 • 7,582,216 • 7,666,303 | Australia Patent No. 693,164 • 707,133 • 729,096 • 779,401 • 289,647 • 2008,279 378 • 2008,288 900 |
Canadian Patent No. 2,009,280 • 2,137,942 • 2,175,277 • 2,180,305 • 2,180,363 • 2,206,338 • 2,327,768 | Indonesian Patent No. 007058 | Japan Patent No. 3581233 • 9-11476 |
Korea Patent No. 10-1451593 • 0519212 | Malaysia Patent No. 118987 | New Zealand Patent No. 314,646 • 583,583 • 583,008 | South African Patent No. 2010/00683 • 2010/01796 |



PLAN VIEW



SECTION VIEW

Stormceptor•

imbrium
WWW.IMBRIUMSYSTEMS.COM
605 GLOBAL WAY, SUITE 113, LINTHICUM, MD 21231
USA 888-279-8826 CA 800-565-4801 INTL +1-416-960-9900

STC 14000
STANDARD MODEL

####

REV #	DATE	REVISION DESCRIPTION	BY

SHEET NUMBER 1 OF 1

DATE: ######## | SCALE: 100 | PROJECT No.: ##### | DRAWN: ### | CHECKED: ###

L:\IMBRIUM\PRIVATE\CAD\STANDARD PRODUCT LINES\STORMCEPTOR STC\STC - NEW IMBRIUM METRIC TEMPLATES\STC 14000.DWG 1/6/2015 11:34 AM

APPENDIX F:

FLOODPLAIN ANALYSIS
COMPARISON OF PRE AND POST DEVELOPMENT FLOOD LEVELS

Cityview Ridge Subdivision (Formerly th P.T. Valeriote Property)
City of Guelph
Our File: 105-172
July 17, 2012

Comparison of Pre and Post-Development Flood Levels

Sec No.	Design Storm	Flow (cu m/s)			W.S. Elevation (m)			Tope Width (m)		
		POST	PRE	Difference	POST	PRE	Difference	POST	PRE	Difference
1	5 Year	3.99	3.99	0	316.29	316.29	0	34.52	34.52	0
1	25 Year	19.70	19.70	0	316.51	316.51	0	41.05	41.05	0
1	100 Year	34.10	34.10	0	316.66	316.66	0	45.22	45.22	0
1	Regional	38.60	38.60	0	316.70	316.70	0	46.40	46.40	0
2	5 Year	3.99	3.99	0	316.77	316.77	0	9.22	9.22	0
2	25 Year	19.70	19.70	0	317.84	317.84	0	28.11	28.11	0
2	100 Year	34.10	34.10	0	318.56	318.56	0	43.67	43.67	0
2	Regional	38.60	38.60	0	318.76	318.76	0	52.31	52.31	0
3	5 Year	3.99	3.99	0	317.26	317.26	0	21.89	21.89	0
3	25 Year	19.70	19.70	0	319.16	319.16	0	69.40	69.40	0
3	100 Year	34.10	34.10	0	319.74	319.74	0	141.61	141.61	0
3	Regional	38.60	38.60	0	320.43	320.43	0	154.38	154.38	0
4	5 Year	3.99	3.99	0	317.51	317.51	0	28.81	28.81	0
4	25 Year	19.70	19.70	0	319.16	319.16	0	69.44	69.44	0
4	100 Year	34.10	34.10	0	319.74	319.74	0	141.74	141.74	0
4	Regional	38.60	38.60	0	320.43	320.43	0	154.39	154.39	0
5	5 Year	3.99	3.99	0	317.51	317.51	0	28.83	28.83	0
5	25 Year	19.70	19.70	0	319.16	319.16	0	69.45	69.45	0
5	100 Year	34.10	34.10	0	319.74	319.74	0	141.75	141.75	0
5	Regional	38.60	38.60	0	320.43	320.43	0	154.39	154.39	0
6	5 Year	3.99	3.99	0	317.61	317.61	0	2.70	2.70	0
6	25 Year	19.70	19.70	0	319.15	319.15	0	47.90	47.90	0
6	100 Year	34.10	34.10	0	319.73	319.73	0	70.63	70.63	0
6	Regional	38.60	38.60	0	320.43	320.43	0	111.99	111.99	0
7	5 Year	3.99	3.99	0	317.92	317.92	0	2.70	2.70	0
7	25 Year	19.70	19.70	0	321.90	321.90	0	217.71	217.71	0
7	100 Year	34.10	34.10	0	322.84	322.84	0	256.71	256.71	0
7	Regional	38.60	38.60	0	322.92	322.92	0	257.16	257.16	0
7.1	5 Year	3.88	3.88	0	318.29	318.29	0	9.93	9.93	0
7.1	25 Year	19.10	19.10	0	321.90	321.90	0	87.25	87.25	0
7.1	100 Year	33.20	33.20	0	322.84	322.84	0	108.01	108.01	0
7.1	Regional	37.50	37.50	0	322.92	322.92	0	108.76	108.76	0

Sec No.	Design Storm	Flow (cu m/s)			W.S. Elevation (m)			Tope Width (m)		
		POST	PRE	Difference	POST	PRE	Difference	POST	PRE	Difference
7.2	5 Year	3.88	3.88	0	318.46	318.46	0	17.77	17.77	0
7.2	25 Year	19.10	19.10	0	321.90	321.90	0	102.47	102.47	0
7.2	100 Year	33.20	33.20	0	322.84	322.84	0	143.19	143.19	0
7.2	Regional	37.50	37.50	0	322.92	322.92	0	147.12	147.12	0
7.4	5 Year	3.88	3.88	0	318.49	318.49	0	20.75	20.75	0
7.4	25 Year	19.10	19.10	0	321.90	321.90	0	115.51	115.51	0
7.4	100 Year	33.20	33.20	0	322.84	322.84	0	164.21	164.21	0
7.4	Regional	37.50	37.50	0	322.92	322.92	0	167.36	167.36	0
7.6	5 Year	3.88	3.88	0	318.50	318.50	0	23.07	23.07	0
7.6	25 Year	19.10	19.10	0	321.90	321.90	0	135.91	135.91	0
7.6	100 Year	33.20	33.20	0	322.84	322.84	0	171.13	171.13	0
7.6	Regional	37.50	37.50	0	322.92	322.92	0	173.49	173.49	0
7.8	5 Year	3.88	3.88	0	318.52	318.52	0	24.59	24.59	0
7.8	25 Year	19.10	19.10	0	321.90	321.90	0	86.10	86.10	0
7.8	100 Year	33.20	33.20	0	322.84	322.84	0	167.67	167.67	0
7.8	Regional	37.50	37.50	0	322.92	322.92	0	172.11	172.11	0
8	5 Year	3.88	3.88	0	318.53	318.53	0	27.37	27.37	0
8	25 Year	19.10	19.10	0	321.90	321.90	0	71.51	71.51	0
8	100 Year	33.20	33.20	0	322.84	322.84	0	124.61	124.61	0
8	Regional	37.50	37.50	0	322.92	322.92	0	148.81	148.81	0
8.2	5 Year	3.88	3.88	0	318.54	318.54	0	25.89	25.89	0
8.2	25 Year	19.10	19.10	0	321.90	321.90	0	68.91	68.91	0
8.2	100 Year	33.20	33.20	0	322.84	322.84	0	80.54	80.54	0
8.2	Regional	37.50	37.50	0	322.92	322.92	0	81.53	81.53	0
8.4	5 Year	3.88	3.88	0	318.56	318.56	0	26.08	26.08	0
8.4	25 Year	19.10	19.10	0	321.90	321.90	0	67.40	67.40	0
8.4	100 Year	33.20	33.20	0	322.84	322.84	0	79.88	79.88	0
8.4	Regional	37.50	37.50	0	322.92	322.92	0	81.30	81.30	0
8.6	5 Year	3.88	3.88	0	318.68	318.68	0	18.51	18.51	0
8.6	25 Year	19.10	19.10	0	321.90	321.90	0	72.10	72.10	0
8.6	100 Year	33.20	33.20	0	322.84	322.84	0	83.91	83.91	0
8.6	Regional	37.50	37.50	0	322.92	322.92	0	85.08	85.08	0
8.8	5 Year	3.88	3.88	0	318.85	318.85	0	29.43	29.43	0
8.8	25 Year	19.10	19.10	0	321.91	321.91	0	76.87	76.87	0
8.8	100 Year	33.20	33.20	0	322.84	322.84	0	94.39	94.39	0
8.8	Regional	37.50	37.50	0	322.92	322.92	0	96.47	96.47	0
9	5 Year	3.88	3.88	0	318.89	318.89	0	19.97	19.97	0
9	25 Year	19.10	19.10	0	321.91	321.91	0	79.78	79.78	0
9	100 Year	33.20	33.20	0	322.84	322.84	0	93.77	93.77	0
9	Regional	37.50	37.50	0	322.92	322.92	0	95.54	95.54	0

Sec No.	Design Storm	Flow (cu m/s)			W.S. Elevation (m)			Tope Width (m)		
		POST	PRE	Difference	POST	PRE	Difference	POST	PRE	Difference
9.2	5 Year	3.88	3.88	0	319.17	319.17	0	27.90	27.90	0
9.2	25 Year	19.10	19.10	0	321.91	321.91	0	80.39	80.39	0
9.2	100 Year	33.20	33.20	0	322.84	322.84	0	98.70	98.70	0
9.2	Regional	37.50	37.50	0	322.92	322.92	0	102.83	102.83	0
9.4	5 Year	3.88	3.88	0	319.29	319.29	0	26.48	26.48	0
9.4	25 Year	19.10	19.10	0	321.91	321.91	0	90.30	90.30	0
9.4	100 Year	33.20	33.20	0	322.84	322.84	0	114.82	114.82	0
9.4	Regional	37.50	37.50	0	322.92	322.92	0	116.91	116.91	0
9.6	5 Year	3.88	3.88	0	319.33	319.33	0	22.08	22.08	0
9.6	25 Year	19.10	19.10	0	321.91	321.91	0	99.68	99.68	0
9.6	100 Year	33.20	33.20	0	322.84	322.84	0	117.49	117.49	0
9.6	Regional	37.50	37.50	0	322.92	322.92	0	119.01	119.01	0
9.7	5 Year	3.88	3.88	0	319.57	319.57	0	23.64	23.64	0
9.7	25 Year	19.10	19.10	0	321.91	321.91	0	101.41	101.41	0
9.7	100 Year	33.20	33.20	0	322.84	322.84	0	126.95	126.95	0
9.7	Regional	37.50	37.50	0	322.92	322.92	0	128.23	128.23	0
9.8	5 Year	3.88	3.88	0	319.77	319.77	0	25.74	25.74	0
9.8	25 Year	19.10	19.10	0	321.91	321.91	0	92.21	92.21	0
9.8	100 Year	33.20	33.20	0	322.84	322.84	0	127.80	136.09	8.29
9.8	Regional	37.50	37.50	0	322.92	322.92	0	128.37	139.38	11.01
9.9	5 Year	3.88	3.88	0	320.09	320.09	0	30.93	30.93	0
9.9	25 Year	19.10	19.10	0	321.90	321.90	0	81.14	81.14	0
9.9	100 Year	33.20	33.20	0	322.84	322.84	0	99.50	99.50	0
9.9	Regional	37.50	37.50	0	322.92	322.92	0	101.27	101.27	0
10	5 Year	3.88	3.88	0	320.14	320.14	0	44.86	44.86	0
10	25 Year	19.10	19.10	0	321.91	321.91	0	83.79	83.79	0
10	100 Year	33.20	33.20	0	322.84	322.84	0	102.95	102.95	0
10	Regional	37.50	37.50	0	322.92	322.92	0	104.59	104.59	0
11	5 Year	3.88	3.88	0	321.11	321.11	0	40.43	40.43	0
11	25 Year	19.10	19.10	0	322.72	322.72	0	87.53	87.53	0
11	100 Year	33.20	33.20	0	323.08	323.08	0	97.09	97.09	0
11	Regional	37.50	37.50	0	323.15	323.15	0	98.83	98.83	0
12	5 Year	3.88	3.88	0	321.14	321.14	0	47.28	47.28	0
12	25 Year	19.10	19.10	0	322.72	322.72	0	116.46	116.46	0
12	100 Year	33.20	33.20	0	323.09	323.09	0	125.46	125.46	0
12	Regional	37.50	37.50	0	323.15	323.15	0	127.11	127.11	0
13	5 Year	3.88	3.88	0	321.21	321.21	0	22.30	22.30	0
13	25 Year	19.10	19.10	0	322.73	322.73	0	58.71	58.71	0
13	100 Year	33.20	33.20	0	323.09	323.09	0	110.98	110.98	0
13	Regional	37.50	37.50	0	323.16	323.16	0	114.67	114.67	0

Sec No.	Design Storm	Flow (cu m/s)			W.S. Elevation (m)			Tope Width (m)		
		POST	PRE	Difference	POST	PRE	Difference	POST	PRE	Difference
14	5 Year	3.88	3.88	0	321.80	321.80	0	10.32	10.32	0
14	25 Year	19.10	19.10	0	322.72	322.72	0	64.91	64.91	0
14	100 Year	33.20	33.20	0	323.14	323.14	0	117.03	117.03	0
14	Regional	37.50	37.50	0	323.22	323.22	0	118.73	118.73	0
15	5 Year	3.69	3.69	0	322.84	322.84	0	26.55	26.55	0
15	25 Year	18.20	18.20	0	323.37	323.37	0	53.68	53.68	0
15	100 Year	31.60	31.60	0	323.65	323.65	0	76.40	76.40	0
15	Regional	35.80	35.80	0	323.72	323.72	0	84.70	84.70	0
16	5 Year	3.69	3.69	0	322.92	322.92	0	28.44	28.44	0
16	25 Year	18.20	18.20	0	323.43	323.43	0	41.85	41.85	0
16	100 Year	31.60	31.60	0	323.70	323.70	0	75.16	75.16	0
16	Regional	35.80	35.80	0	323.78	323.78	0	86.70	86.70	0
17	5 Year	3.69	3.69	0	324.97	324.97	0	328.35	328.35	0
17	25 Year	18.20	18.20	0	325.82	325.82	0	383.09	383.09	0
17	100 Year	31.60	31.60	0	325.90	325.90	0	387.87	387.87	0
17	Regional	35.80	35.80	0	325.92	325.92	0	389.45	389.45	0
18	5 Year	6.09	6.09	0	325.06	325.06	0	229.43	229.43	0
18	25 Year	19.30	19.30	0	325.82	325.82	0	279.50	279.50	0
18	100 Year	32.10	32.10	0	325.90	325.90	0	284.38	284.38	0
18	Regional	35.80	35.80	0	325.92	325.92	0	285.99	285.99	0
19	5 Year	6.09	6.09	0	325.06	325.06	0	206.06	206.06	0
19	25 Year	19.30	19.30	0	325.82	325.82	0	224.41	224.41	0
19	100 Year	32.10	32.10	0	325.90	325.90	0	225.63	225.63	0
19	Regional	35.80	35.80	0	325.92	325.92	0	226.04	226.04	0
20	5 Year	5.78	5.78	0	325.06	325.06	0	97.36	97.36	0
20	25 Year	18.30	18.30	0	325.82	325.82	0	108.08	108.08	0
20	100 Year	30.10	30.10	0	325.90	325.90	0	109.14	109.14	0
20	Regional	33.10	33.10	0	325.92	325.92	0	109.49	109.49	0
21	5 Year	5.78	5.78	0	325.06	325.06	0	122.56	122.56	0
21	25 Year	18.30	18.30	0	325.83	325.83	0	140.66	140.66	0
21	100 Year	30.10	30.10	0	325.90	325.90	0	142.72	142.72	0
21	Regional	33.10	33.10	0	325.93	325.93	0	143.40	143.40	0

APPENDIX G:

INSITU PERMEAMETER TESTING (CMT ENGINEERING INC., OCTOBER 23, 2020)
MONTHLY WATER BALANCE
MONTHLY ENHANCED INFILTRATION

CMT Engineering Inc.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
Tel: 519-699-5775
Fax: 519-699-4664
www.cmtinc.net

October 23, 2020 20-513.R01

GM BluePlan Engineering Limited
330 Trillium Drive, Unit D
Kitchener, Ontario
N2E 3J2

Attention: Mr. Patrick Grier, P.Eng.

Dear Sir:

Re: Insitu Permeability Testing
Cityview Ridge Subdivision
Cityview Drive North
Guelph, Ontario

The services of CMT Engineering Inc. (CMT Inc.) were retained by Mr. Patrick Grier, P.Eng. of GM BluePlan Engineering Limited to conduct insitu permeability testing for infiltration galleries for the proposed residential development to be constructed at a site near Cityview Drive North in Guelph, Ontario. The location of the site is shown on Drawing 1.

It is understood that the owner is proposing to construct a new residential subdivision. Currently, infiltration of individual lot stormwater is proposed through the installation of on-site infiltration galleries. As such, CMT Engineering Inc. conducted insitu permeability testing at the locations of the proposed infiltration galleries using the Guelph Permeameter Testing method conducted as per Appendix C of the Low Impact Development Stormwater Management Planning and Design Guide (LIDSWMP).

The subject site is currently vacant. It is apparent that the site has been utilized as a borrow pit since the topographic survey was completed in 2009 (based on the date on the Preliminary Grading and Drainage Plan). A review of historical aerial photography indicates that the earth borrow took place sometime between 2009 and 2013. There is currently a berm throughout the site. There are various areas of undisturbed soils with large trees throughout the site as well as areas of ponded water and cattails. A geotechnical investigation was completed at this site in 2006 by Naylor Engineering Associates Ltd. (NEAL). The information provided in the geotechnical report indicates that the site of the proposed development comprises predominantly

compact to very dense silt till overlying presumed bedrock. The silt till was evident in the exposed slopes throughout the borrow areas of the site.

Field Work

CMT Engineering Inc. conducted a field investigation to determine the estimated infiltration rates at the proposed infiltration gallery locations. The investigation was conducted on September 30 and October 1, 2020 and was comprised of eighteen (18) insitu Guelph Permeameter Constant Head borehole infiltration tests (in accordance with ASTM D5126 Section 4.1.6) conducted by employees of CMT Engineering Inc. A minimum of two (2) boreholes were advanced at the test locations to allow for one exploration borehole and lower test and one borehole for the upper permeameter testing, utilizing a Geoprobe 7822DT drillrig operated by CMT Drilling Inc. staff. Three (3) boreholes were advanced at the Permeameter test location #2 due to saturated soils being encountered at an elevation higher than the second test elevation. The boreholes were advanced utilizing the macro core (MC5) direct push continuous soil sampling methodology. At Permeameter test location #9, the 6.1 m (20.0 ft) borehole was advanced utilizing hollow stem augers to achieve the required testing depth.

The layout of the testing locations and ground surface elevations at the test locations was completed by others prior to the field investigation. The locations and ground surface elevations of the permeameter tests are shown on Drawing 2.

Appendix C of the LIDSWMP recommends that at least one infiltration test should be conducted at the bottom elevation of the proposed infiltration gallery, plus one additional test at every soil horizon encountered within 1.5 m below the bottom elevation (a minimum of two tests per infiltration gallery). The infiltration galleries require a minimum of 1.2 m depth of cover for frost protection and it is understood that the infiltration galleries are not to exceed 0.6 m (2.0 ft) in thickness; therefore, one insitu permeability test will be required at a depth of approximately 1.8 m (6.0 ft) below the design finished grade elevation and a second insitu permeability test will be required at a depth of approximately 3.3 m (10.8 ft) below the design finished grade elevation.

Appendix C of the LIDSWMP also recommends that one test pit should be advanced for an infiltration gallery with a footprint of less than 50 m^2, two test pits for infiltration galleries with footprints between 50 m^2 and 900 m^2, a minimum of one additional test pit for each additional 450 m^2 of infiltration gallery footprint, and two soil borings may be conducted for every test pit. The additional borings/test pits are to ensure the same soil units that were tested in the infiltration testing extend to the extents of the infiltration gallery.

Subsoil Conditions

The soils encountered in the boreholes are described briefly below and a more detailed stratigraphic description is provided on the borehole logs attached. The following paragraphs have been simplified into terms of major soil strata. The soil boundaries indicated have been inferred from non-continuous samples and observations of sampling and drilling resistance and typically represent transitions from one soil type to another rather than exact planes of geological change. Further, the subsurface conditions are anticipated to vary between and beyond the borehole locations.

Topsoil

Loose, dark brown topsoil was encountered at the ground surface in all boreholes with the exception of Borehole 6. The thickness of the topsoil at the borehole locations was observed to range from approximately 150 mm to 910 mm (average 265 mm). The topsoil was generally considered to be in a moist state. Materials designated as topsoil in this report were classified based solely on visual and textural evidence. Testing of organic content or for other nutrients was not carried out.

Peat

Very loose, dark brown peat was encountered at the surface of Borehole 6. The peat was observed to be approximately 50 mm in thickness and was considered to be in a moist state. Materials designated as topsoil in this report were classified based solely on visual and textural evidence.

Silty Sand

Loose, brown silty sand, was encountered underlying the topsoil in Borehole 1. The silty sand was observed to be approximately 310 mm in thickness and was considered to be in a moist state.

Silt Till

Loose to dense, brown to grey silt till with occasional large gravel was encountered underlying the silty sand in Borehole 1; underlying the topsoil in Boreholes 2, 3, 4, 5, 7, 8 and 9; and underlying the peat in Borehole 6. The silt till was considered to be moist to wet, with moisture contents ranging from about 3.1% to 9.5% (average 7.5%).

Groundwater

No accumulated groundwater was encountered upon completion of the boreholes. Groundwater conditions are generally dependent on the weather conditions, amount of precipitation, site grading and other measures in place to control surface water drainage, as well as the time of year, and can fluctuate significantly in elevation over time.

Testing and Results

The test holes varied in diameter from between approximately 5.7 cm (2.25 in, used at 17 test locations) to approximately 8.3 cm (3.25 in, used at 1 test location) and extended to depths between 0.46 m (1.5 ft) to 6.1 m (20.0 ft) below the existing ground surface elevations at the test

locations. Constant head permeability testing was conducted using a constant head setting of 10 cm.

Based on information gathered from the permeameter testing and borehole data, the following table presents the estimated field saturated hydraulic conductivity, estimated infiltration rates with no safety factors applied, test locations, permeameter test location number, and approximate elevations of the tests:

Test Location	Permeameter Test Location Number	Approximate Elevation of Upper Test [m]	Approximate Elevation of Lower Test [m]	Top Test Estimated Field Saturated Hydraulic Conductivity Kfs [cm/sec]	Bottom Test Estimated Field Saturated Hydraulic Conductivity Kfs [cm/sec]	Top Test Estimated Infiltration Rate - No Safety Factor Applied [mm/hour]	Bottom Test Estimated Infiltration Rate - No Safety Factor Applied [mm/hour]
Lot 20	1	331.01	329.49	8.1×10^{-06}	4.0×10^{-06}	26	18
Lot 6	2	336.49**	335.27**	1.0×10^{-04}	2.8×10^{-07}	50	2
Lot 36, 44, 45	3	331.59	330.06	2.8×10^{-06}	8.1×10^{-06}	15	26
Lot 109,110	4	337.01	335.41	1.3×10^{-05}	6.9×10^{-06}	30	23
Lot 105	5	341.91	340.34	$<1.3 \times 10^{-07}$	1.2×10^{-05}	<0.5	30
Lot 85,86,95,96	6	342.54	340.86	$<1.6 \times 10^{-07}$	3.2×10^{-06}	<0.8	16
Lot 78	7	338.68*	337.31*	8.1×10^{-06}	1.6×10^{-06}	26	13
Lot 66	8	343.30*	341.93*	7.3×10^{-06}	1.6×10^{-06}	24	13
Lot 54	9	337.76	336.18	7.8×10^{-06}	4.6×10^{-05}	25	38

***Note: Testing elevations lowered due to the bottom of infiltration gallery being above the existing ground surface elevations.**
****Note: Testing elevations raised due to wet and/or swelling or caving soil conditions encountered in the borehole.**

In order to determine the design infiltration rate, the ratio of the infiltration rates at the proposed bottom of the infiltration gallery and the infiltration rate of the least permeable soil horizon within 1.5 m below the proposed bottom elevation of the BMP is calculated. As per LIDSWMP, the applicable safety factor from Table C2 is applied to the infiltration rate at the proposed base of the infiltration gallery.

The following table provides the ratio of infiltration rates, safety correction factor, and design infiltration rate for each proposed infiltration gallery location:

Test Location	Permeameter Number	Ratio of Top/Bottom Test Infiltration Rates	Safety Factor	Design Infiltration Rate [mm/hour]
Lot 20	1	1.44	3.5	7
Lot 6	2	20.83	8.5	5
Lot 36, 44, 45	3	0.60	2.5	6
Lot 109,110	4	1.28	3.5	8
Lot 105	5	<0.02	2.5	<0.2

Test Location	Permeameter Number	Ratio of Top/Bottom Test Infiltration Rates	Safety Factor	Design Infiltration Rate [mm/hour]
Lots 85, 86, 95, 96	6	<0.05	2.5	<0.3
Lot 78	7	1.96	3.5	7
Lot 66	8	1.85	3.5	7
Lot 54	9	0.67	2.5	10

It is required that inspections of the infiltration gallery bases be conducted prior to backfilling to confirm that the soils encountered within the excavation are consistent with the soils encountered in the boreholes.

CMT Inc. recommends that each infiltration gallery be designed with an overflow that has positive drainage to a storm sewer or other suitable outlet and that each downspout entering the infiltration gallery have a strainer/leaf deflector as well as a rainwater leader overflow outlet just above grade that is equipped with a splash pad to direct water away from the foundation. Regular maintenance of the downspout strainer/leaf deflector is required to ensure continuous operation and reduce the potential for the accumulation of sediment that can impede the functionality of the infiltration gallery.

It is important to emphasize that a soil investigation is, in fact, a random sampling of a site and the comments are based on the results obtained at the test locations only. It is therefore assumed that these results are representative of the subsoil conditions across the site. Should any conditions at the site be encountered which differ from those found at the test locations, we request that we be notified immediately in order to permit a reassessment of our recommendations.

We trust that this information meets your present requirements and we thank you for allowing us to undertake this project for you. Should you have any questions, please do not hesitate to contact our office at your convenience.

Yours truly,

LICENSED PROFESSIONAL ENGINEER
2020/10/27
N. J. CHORTOS
100210851
PROVINCE OF ONTARIO

Weston Morlock, M.Eng., EIT

Nathan Chortos, P.Eng.

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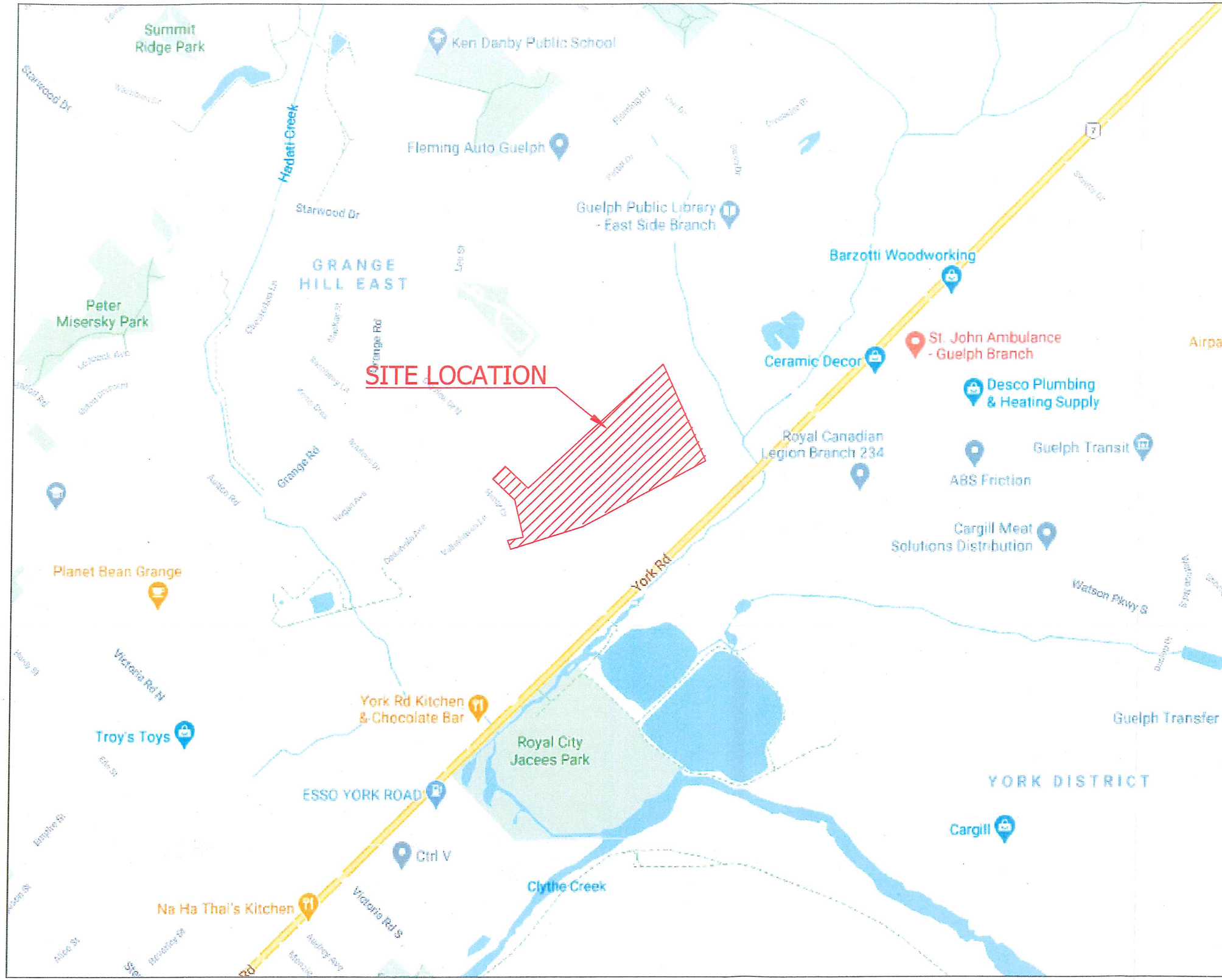
Attachments: Drawing 1 - Site Location Map
Drawing 2 - Site Plan Showing Permeameter Test Locations
Borehole Logs



NOTES:

1. BASE MAP PROVIDED BY GOOGLE MAPS

N

NO.	DESCRIPTION	DATE

REVISIONS

CMT ENGINEERING INC.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
Tel.: 519-699-5775
Fax: 519-699-4664
www.cmtinc.net

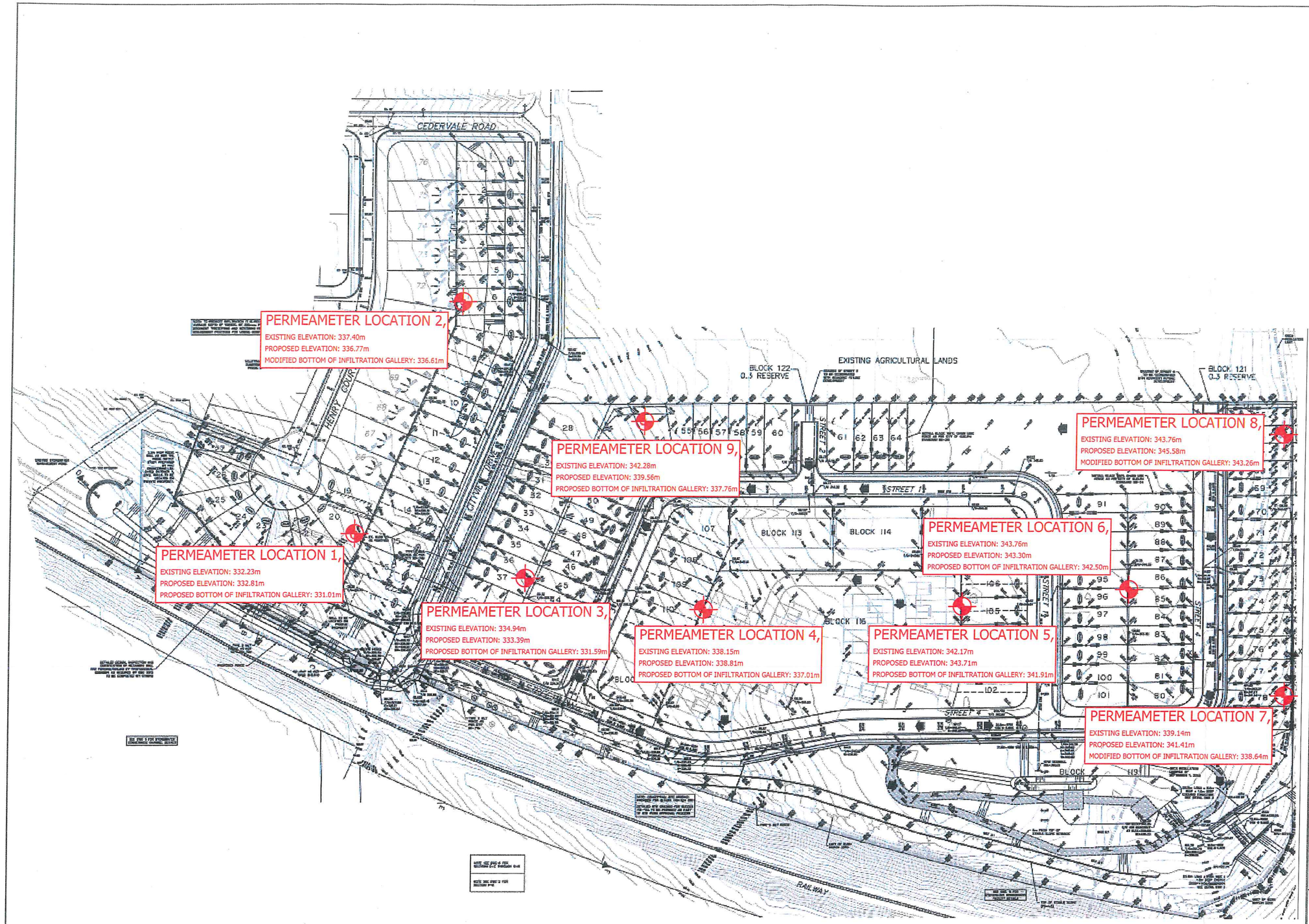
PROJECT:

INSITU PERMEABILITY TESTING
Cityview Ridge Subdivision
Guelph, Ontario

DRAWING TITLE:

SITE LOCATION MAP

PROJECT NO.:	DATE:
20-513	October 23, 2020
SCALE:	DRAWING NO.
N.T.S.	1



NOTES:

1. This drawing is for information purposes only. Locations and sizes of existing and proposed features are approximate only, and should not be used for construction.

LEGEND

CMT PERMEAMETER TEST LOCATION

NO.	DESCRIPTION	DATE

REVISIONS

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PROJECT:

INSITU PERMEABILITY TESTING
Cityview Ridge Subdivision
Guelph, Ontario

DRAWING TITLE:

PLAN VIEW SHOWING
PERMEAMETER TEST LOCATIONS

PROJECT NO.:	DATE:
20-513	October 23, 2020
SCALE:	DRAWING NO.
N.T.S	2

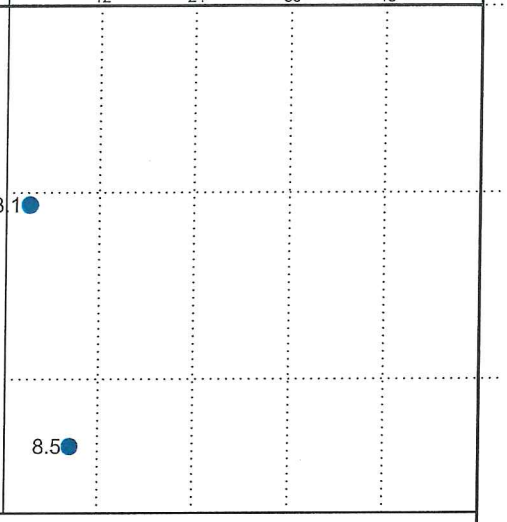
CMT Engineering Inc.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario, N0B 2M0
Telephone: 519 699 5775
Fax: 519 699 4664

BOREHOLE NUMBER PERMEAMETER 1

PROJECT: Insitu Permeability Testing
PROJECT ADDRESS: Cityview Ridge Subdivision
PROJECT NUMBER: 20-513
PROJECT LOCATION: Guelph, Ontario
DRILLING DATE: 20-10-1
GROUND ELEVATION: 332.23 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: W. Morlock
DRILLING EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)
		Loose, dark brown, gravelly topsoil, moist	0.00, 332.23			
		Loose, brown, silty sand, moist	0.15, 332.08			
		Compact, brown, silt till, moist	0.46, 331.77	MC5 1	100	
1		Approximate proposed bottom of infiltration gallery elevation	1.22, 331.01			
2				MC5 2	100	

SPT N VALUE (10, 20, 30, 40); POCKET PENETROMETER (kPa) (90, 180, 270, 360); MOISTURE CONTENT (%) (12, 24, 36, 48)



Bottom of borehole at 2.72 m, Elevation 329.51 m.

No accumulated groundwater or caving encountered upon borehole completion.

CMT Engineering Inc.
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St. Clements, Ontario, N0B 2M0
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BOREHOLE NUMBER PERMEAMETER 2

PROJECT: Insitu Permeability Testing
PROJECT ADDRESS: Cityview Ridge Subdivision
PROJECT NUMBER: 20-513
PROJECT LOCATION: Guelph, Ontario
DRILLING DATE: 20-10-1
GROUND ELEVATION: 337.40 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: W. Morlock
DRILLING EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	SPT N VALUE (10, 20, 30, 40) / POCKET PENETROMETER (kPa) (90, 180, 270, 360) / MOISTURE CONTENT (%) (12, 24, 36, 48)
		Loose, dark brown, topsoil, moist	0.00, 337.40				
				MC5 1	100		
1		Approximate modified proposed bottom of infiltration gallery elevation	0.79, 336.61				
		Loose, brown, silt till, moist	0.91, 336.49				8.6
2							
		becoming wet	2.43, 334.97				
				MC5 2	100		
3							9

Bottom of borehole at 3.93 m, Elevation 333.47 m.

Dry cave encountered at about 2.44 m (8 ft.) below the ground surface (approximate elevation 334.96 m).

CMT Engineering Inc.
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BOREHOLE NUMBER PERMEAMETER 3

PROJECT: Insitu Permeability Testing
PROJECT ADDRESS: Cityview Ridge Subdivision
PROJECT NUMBER: 20-513
PROJECT LOCATION: Guelph, Ontario
DRILLING DATE: 20-10-1
GROUND ELEVATION: 334.94 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: W. Morlock
DRILLING EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	SPT N VALUE (10, 20, 30, 40) / POCKET PENETROMETER (kPa) (90, 180, 270, 360) / MOISTURE CONTENT (%) (12, 24, 36, 48)
		Loose, dark brown, topsoil, moist	0.00, 334.94				
		Compact, brown, silt till, moist	0.15, 334.79				
1				MC5 1	100		8.4
2				MC5 2	100		8.5
3							
		Approximate proposed bottom of infiltration gallery elevation	3.35, 331.59				
4				MC5 3	100		9.5

Bottom of borehole at 4.88 m, Elevation 330.06 m.

No accumulated groundwater or caving encountered upon borehole completion.

CMT Engineering Inc.
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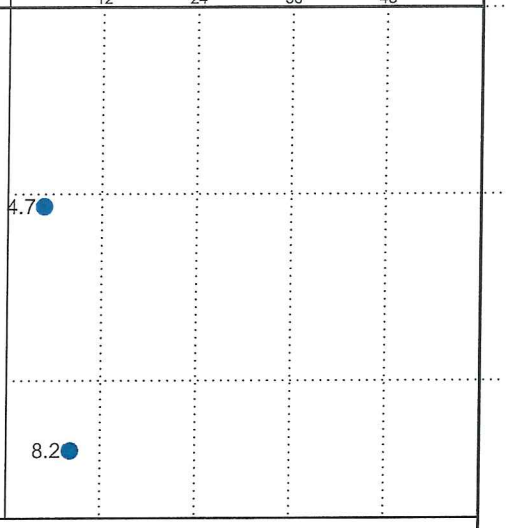
BOREHOLE NUMBER PERMEAMETER 4

PROJECT: Insitu Permeability Testing
PROJECT ADDRESS: Cityview Ridge Subdivision
PROJECT NUMBER: 20-513
PROJECT LOCATION: Guelph, Ontario
DRILLING DATE: 20-9-30
GROUND ELEVATION: 338.15 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: W. Morlock
DRILLING EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)
		Loose, dark brown, topsoil, moist	0.00, 338.15			
		Dense, brown, silt till with some large gravel, moist	0.15, 338.00	MC5 1	100	
1		Approximate proposed bottom of infiltration gallery elevation	1.14, 337.01			
2				MC5 2	100	

SPT N VALUE: 10, 20, 30, 40
POCKET PENETROMETER (kPa): 90, 180, 270, 360
MOISTURE CONTENT (%): 12, 24, 36, 48



Bottom of borehole at 2.74 m, Elevation 335.41 m.

No accumulated groundwater or caving encountered upon borehole completion.

CMT Engineering Inc.
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St. Clements, Ontario, N0B 2M0
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BOREHOLE NUMBER PERMEAMETER 5

PROJECT: Insitu Permeability Testing
PROJECT ADDRESS: Cityview Ridge Subdivision
PROJECT LOCATION: Guelph, Ontario
PROJECT NUMBER: 20-513
GROUND ELEVATION: 342.17 m
DRILLING DATE: 20-9-30
LOGGED BY: W. Morlock
DRILLING CONTRACTOR: CMT Drilling Inc.
SAMPLING METHOD: MC5
DRILLING EQUIPMENT: Geoprobe 7822DT

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	SPT N VALUE (10, 20, 30, 40) / POCKET PENETROMETER (kPa) (90, 180, 270, 360) / MOISTURE CONTENT (%) (12, 24, 36, 48)
		Loose, dark brown, topsoil, moist	0.00, 342.17				
		Dense, brown, silt till, moist	0.15, 342.02				
		Approximate proposed bottom of infiltration gallery elevation	0.26, 341.91	MC5 1	100		5.7
1		becoming grey with some larger gravel	1.52, 340.65	MC5 2	100		8.4

Bottom of borehole at 1.83 m, Elevation 340.34 m.

No accumulated groundwater or caving encountered upon borehole completion.

CMT Engineering Inc.
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Fax: 519 699 4664

BOREHOLE NUMBER PERMEAMETER 6

PROJECT: Insitu Permeability Testing
PROJECT ADDRESS: Cityview Ridge Subdivision
PROJECT NUMBER: 20-513
PROJECT LOCATION: Guelph, Ontario
DRILLING DATE: 20-9-30
GROUND ELEVATION: 343.76 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: W. Morlock
DRILLING EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	SPT N VALUE (10, 20, 30, 40) / POCKET PENETROMETER (kPa) (90, 180, 270, 360) / MOISTURE CONTENT (%) (12, 24, 36, 48)
		Very loose, dark brown, peat, moist	0.00, 343.76				
		Compact, brown, silt till, wet	0.05, 343.71				
		becoming moist with occasional large gravels encountered	0.46, 343.30	MC5 1	100		
1							7.5
		Approximate proposed bottom of infiltration gallery elevation	1.26, 342.50				
		becoming very dense	1.52, 342.24				
2				MC5 1	100		6.2
		becoming grey	2.77, 340.99				

Bottom of borehole at 2.90 m, Elevation 340.86 m.

No accumulated groundwater or caving encountered upon borehole completion.

CMT Engineering Inc.
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BOREHOLE NUMBER PERMEAMETER 7

PROJECT: Insitu Permeability Testing
PROJECT ADDRESS: Cityview Ridge Subdivision
PROJECT NUMBER: 20-513
PROJECT LOCATION: Guelph, Ontario
DRILLING DATE: 20-9-30
GROUND ELEVATION: 339.14 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: W. Morlock
DRILLING EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	SPT N VALUE (10, 20, 30, 40) / POCKET PENETROMETER (kPa) (90, 180, 270, 360) / MOISTURE CONTENT (%) (12, 24, 36, 48)
		Loose, dark brown, topsoil, moist	0.00, 339.14				
		Compact, brown, silt till with occasional large gravel, moist	0.20, 338.94				
		Approximate modified proposed bottom of infiltration gallery elevation	0.50, 338.64	MC5 1	66		8.6
1				MC5 2	100		8.9

Bottom of borehole at 1.83 m, Elevation 337.31 m.

No accumulated groundwater or caving encountered upon borehole completion.

CMT Engineering Inc.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario, N0B 2M0
Telephone: 519 699 5775
Fax: 519 699 4664

BOREHOLE NUMBER PERMEAMETER 8

PROJECT: Insitu Permeability Testing
PROJECT ADDRESS: Cityview Ridge Subdivision
PROJECT LOCATION: Guelph, Ontario
PROJECT NUMBER: 20-513
GROUND ELEVATION: 343.76 m
DRILLING DATE: 20-9-30
LOGGED BY: W. Morlock
DRILLING CONTRACTOR: CMT Drilling Inc.
SAMPLING METHOD: MC5
DRILLING EQUIPMENT: Geoprobe 7822DT

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	SPT N VALUE (10, 20, 30, 40) / POCKET PENETROMETER (kPa) (90, 180, 270, 360) / MOISTURE CONTENT (%) (12, 24, 36, 48)
		Loose, dark brown, gravelly topsoil, moist	0.00, 343.76				
		Compact, brown, silt till with some large gravel, moist	0.23, 343.53				
		Approximate modified proposed bottom of infiltration gallery elevation	0.50, 343.26	MC5 1	85		7.1
1				MC5 2	100		9

Bottom of borehole at 1.83 m, Elevation 341.93 m.

No accumulated groundwater or caving encountered upon borehole completion.

CMT Engineering Inc.
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St. Clements, Ontario, N0B 2M0
Telephone: 519 699 5775
Fax: 519 699 4664

BOREHOLE NUMBER PERMEAMETER 9

PROJECT: Insitu Permeability Testing
PROJECT ADDRESS: Cityview Ridge Subdivision
PROJECT NUMBER: 20-513
PROJECT LOCATION: Guelph, Ontario
DRILLING DATE: 20-10-1
GROUND ELEVATION: 342.28 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: W. Morlock
DRILLING EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: Auger/MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	SPT N VALUE (10, 20, 30, 40) / POCKET PENETROMETER (kPa) (90, 180, 270, 360) / MOISTURE CONTENT (%) (12, 24, 36, 48)
		Loose, dark brown, topsoil, moist	0.00, 342.28				
		Compact, brown, silt till, moist	0.18, 342.10				
1				MC5 1	100		5.4
2				MC5 2	49		9.4
3							
4				MC5 3	100		7.5
		Approximate proposed bottom of infiltration gallery elevation	4.52, 337.76				
5				MC5 4	100		5.9
6							

Bottom of borehole at 6.10 m, Elevation 336.18 m.

No accumulated groundwater or caving encountered upon borehole completion.

Cityview Ridge Subdivision
City of Guelph
Monthly Water Balance (Thornthwaite and Mather Method)
Date: December 15, 2020

EXISTING CONDITIONS

						Percent of Total Area		
Contributing Catchments:	10, 20 & 30	Soil Type: Guelph Loam - 76% Till; 24% Sand and Gravel	Impervous Area =	0.56	ha	3%	Runoff Factor =	0.43
Contributing Area =	18.28 ha	Vegetation: Shallow-rooted unkept vegetation	Pervious Till Area =	13.34	ha	73%	Evapotranspiration	
Percent Impervious =	3.0%	Root Zone Depth = 0.50m	Pervious S&G Area =	4.38	ha	24%	Factor for Impervious	
		Soil Moisture Retention Capacity = 75mm	Total Area =	18.28	ha	100%	Surfaces =	0.36

Month	Daily Average Temperature	Monthly Heat Index (I)	Unadjusted Daily Potential Evapotranspiration	Correction Factors	Adjusted Potential Evapotranspiration (PE)	Average Precipitation (P)	P-PE	Accum. Pot. Water Loss	Storage (ST)	ΔS	Pervious ET	Actual Evapotrans-piration (AE)	Pervious ET - Actual ET	Moisture Deficit (D)	Moisture Surplus (S)	Water Runoff (RO)	Snow Melt Runoff	Total Recharge and Runoff	Actual Runoff	Runoff Volume	Recharge Volume
	(°C)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(m^3)	(m^3)
Jan	-6.0	0.0	0.0	24.3	0.0	66.5	66.5		211.2	0.0		0.0	0.0	0.0	0.0	10.5	0.0	10.5	4.6	834	1,085
Feb	-5.0	0.0	0.0	24.6	0.0	57.6	57.6		268.8	0.0		0.0	0.0	0.0	0.0	5.2	0.0	5.2	2.3	417	542
Mar	-0.5	0.0	0.0	30.6	0.0	61.1	61.1		329.9	0.0		0.0	0.0	0.0	0.0	2.6	0.0	2.6	1.1	208	271
Apr	6.5	1.3	0.9	33.6	30.2	76.6	46.4		75.0	0.0	30.2	29.7	0.6	0.6	46.9	24.7	25.5	50.2	21.8	3,985	5,184
May	12.9	3.9	2.0	37.8	75.6	85.8	10.2		75.0	0.0	75.6	74.1	1.5	1.5	11.7	18.2	114.7	132.9	57.7	10,556	13,732
Jun	18.2	6.3	2.8	38.4	107.5	78.0	-29.5	-29.5	48.0	-27.0	105.0	103.0	2.0	4.5	2.0	10.1	57.4	67.4	29.3	5,358	6,970
Jul	20.8	8.0	3.3	38.7	127.7	89.8	-37.9	-67.4	28.0	-20.0	109.8	107.7	2.1	20.0	2.1	6.1	28.7	34.8	15.1	2,763	3,594
Aug	19.8	7.3	3.1	36.0	111.6	86.7	-24.9	-92.3	23.0	-5.0	91.7	89.9	1.8	21.7	1.8	3.9	14.3	18.3	7.9	1,451	1,888
Sep	15.4	4.8	2.3	31.2	71.8	87.5	15.7		38.7	15.7	71.8	70.4	1.4	1.4	1.4	2.7	7.5	10.2	4.4	807	1,049
Oct	9.0	2.0	1.3	28.5	37.1	74.3	37.3		75.0	36.3	37.1	36.3	0.7	0.7	1.7	2.2	3.9	6.1	2.6	483	628
Nov	3.1	0.3	0.4	24.3	9.7	91.3	81.6		75.0	0.0	9.7	9.5	0.2	0.2	81.8	42.0	2.0	44.0	19.1	3,493	4,545
Dec	-2.7	0.0	0.0	23.1	0.0	69.7	69.7		144.7	0.0		0.0	0.0	0.0	0.0	21.0	1.1	22.1	9.6	1,755	2,283
Total		**33.9**				**924.9**	**353.7**					**520.7**	**10.2**	**50.5**	**149.3**	**149.1**	**255.1**	**404.2**	**175.6**	**32,109**	**41,772**

POST-DEVELOPMENT CONDITIONS

						Percent of Total Area		
Contributing Catchments:	B2c, 201, 202 & 300	Soil Type: Guelph Loam - 76% Till; 24% Sand and Gravel	Impervous Area =	5.91	ha	34%	Runoff Factor =	0.71
Contributing Area =	17.60 ha	Vegetation: Urban lawns	Pervious Till Area =	7.99	ha	45%	Evapotranspiration	
Percent Impervious =	32.0%	Root Zone Depth = 0.5m	Pervious S&G Area =	3.7	ha	21%	Factor for Impervious	
		Soil Moisture Retention Capacity = 75mm	Total Area =	17.6	ha	100%	Surfaces =	0.36

Month	Daily Average Temperature	Monthly Heat Index	Unadjusted Daily Potential Evapotranspiration	Correction Factors	Adjusted Potential Evapotranspiration	Average Precipitation	P-PE	Accum. Pot. Water Loss	Storage	ΔS	Pervious ET	Actual Evapotrans-piration	Pervious ET - Actual ET	Moisture Deficit	Moisture Surplus	Water Runoff	Snow Melt Runoff	Total Recharge & Runoff	Actual Runoff	Runoff Volume	Recharge Volume	Enhanced Recharge Volume
	(°C)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(m^3)	(m^3)	(m^3)
Jan	-6.0	0.0	0.0	24.3	0.0	66.5	66.5		211.2	0.0		0.0	0.0	0.0	0.0	12.2	0.0	12.2	8.7	1,586	624	302
Feb	-5.0	0.0	0.0	24.6	0.0	57.6	57.6		268.8	0.0		0.0	0.0	0.0	0.0	6.1	0.0	6.1	4.3	793	312	151
Mar	-0.5	0.0	0.0	30.6	0.0	61.1	61.1		329.9	0.0		0.0	0.0	0.0	0.0	3.1	0.0	3.1	2.2	396	156	75
Apr	6.5	1.3	0.9	33.6	30.2	76.6	46.4		75.0	0.0	30.2	20.9	9.4	9.4	55.7	29.3	25.5	54.8	38.9	7,112	2,797	1,208
May	12.9	3.9	2.0	37.8	75.6	85.8	10.2		75.0	0.0	75.6	52.2	23.4	23.4	33.6	31.4	114.7	146.1	103.8	18,968	7,459	2,884
Jun	18.2	6.3	2.8	38.4	107.5	78.0	-29.5	-29.5	48.0	-27.0	105.0	103.0	2.0	4.5	2.0	16.7	57.4	74.1	52.6	9,615	3,781	1,661
Jul	20.8	8.0	3.3	38.7	127.7	89.8	-37.9	-67.4	28.0	-20.0	109.8	107.7	2.1	20.0	2.1	9.4	28.7	38.1	27.0	4,944	1,944	850
Aug	19.8	7.3	3.1	36.0	111.6	86.7	-24.9	-92.3	23.0	-5.0	91.7	89.9	1.8	21.7	1.8	5.6	14.3	19.9	14.1	2,586	1,017	441
Sep	15.4	4.8	2.3	31.2	71.8	87.5	15.7		38.7	15.7	71.8	49.6	22.2	22.2	22.2	13.9	7.5	21.4	15.2	2,776	1,092	885
Oct	9.0	2.0	1.3	28.5	37.1	74.3	37.3		75.0	36.3	37.1	25.6	11.5	11.5	12.4	13.2	3.9	17.1	12.1	2,215	871	795
Nov	3.1	0.3	0.4	24.3	9.7	91.3	81.6		75.0	0.0	9.7	6.7	3.0	3.0	84.6	48.9	2.0	50.9	36.1	6,603	2,597	1,244
Dec	-2.7	0.0	0.0	23.1	0.0	69.7	69.7		144.7	0.0		0.0	0.0	0.0	0.0	24.4	1.1	25.5	18.1	3,315	1,303	624
Total		**33.9**				**924.9**	**353.7**					**455.6**	**75.3**	**115.6**	**214.4**	**214.2**	**255.1**	**469.3**	**333.2**	**60,909**	**23,953**	**11,121**
																						35,074
																						-16%

Notes: Precipitation and Temperature data from Environment Canada Climate Normals 1971-200 for the Guelph Arboretum
Monthly water balance strategy as outlined in the document *Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance (Thornthwaite and Mather, 1957)*
Evaporation Factor for Impervious Surfaces = Average Annual Evapotranspiration for Impervious Surfaces (200mm/year) / Average Annual Evapotranspiration for Pervious Till Surfaces (555mm/year) = 0.36
Runoff Factor = [(Impervious Percentage of Site x Average Annual Runoff for Impervious Surfaces (725mm/year)) + (Pervious Till Percentage of Site x Average Annual Runoff for Pervious Till Surfaces (190 mm/year)) + (Pervious Sand & Gravel Percentage of Site x Average Annual Runoff for Pervious S & G Surfaces (50 mm/year)] / Total Annual Recharge & Runoff

Cityview Ridge Subdivision
City of Guelph
Monthly Enhanced Infiltration at Rear yards

Enhanced Infiltration Structures - Lots 1-11

Structure Length =	125.00	m
Structure Width =	2.00	
Structure Depth =	0.50	

Area of Stone =	1.00	sq m	Volume of Stone =	125.00	cu m
			Stone Porosity =	0.33333	
			Storage Volume of Stone =	**41.67**	**cu m**

A = contact area of structure =	250.00	sq m
V = runoff volume to be infiltrated =	41.67	cu m
P = percolation rate of native soils =	5	mm/hr
n = porosity of storage media (weighted) =	0.33	
T = retention time =	Solve for T	

T = (1000 x V) / (P x n x A) = 101.01 hours or 4.2 day draindown period

Contributing Area	0.270	ha	(Area to Infiltration Gallery)		
Recharge Time	101.01	hours	/	4.21	days
Recharge Volume Potential	41.67	m^3			

Month	Total Recharge & Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Available Recharge (m^3)	Enhanced Recharge (m^3)
Jan	16.3	31	307	44	44
Feb	8.1	28	277	22	22
Mar	4.1	31	307	11	11
Apr	65.1	30	297	175	175
May	177.0	31	307	477	307
Jun	89.5	30	297	241	241
Jul	45.8	31	307	123	123
Aug	23.8	31	307	64	64
Sep	47.7	30	297	129	129
Oct	42.8	31	307	115	115
Nov	67.1	30	297	181	181
Dec	33.6	31	307	91	91
Total	**620.9**	**365**	**3,614**	**1,674**	**1,504**

Cityview Ridge Subdivision
City of Guelph
Monthly Enhanced Infiltration at Rear yards

Enhanced Infiltration Structures - Lots 12-26

Structure Length =	168.00	m
Structure Width =	2.00	
Structure Depth =	0.50	

Area of Stone =	1.00	sq m	Volume of Stone =	168.00	cu m
			Stone Porosity =	0.33333	
			Storage Volume of Stone =	**56.00**	**cu m**

A = contact area of structure =	336.00	sq m
V = runoff volume to be infiltrated =	56.00	cu m
P = percolation rate of native soils =	7	mm/hr
n = porosity of storage media (weighted) =	0.33	
T = retention time =	Solve for T	

T = (1000 x V) / (P x n x A) = 72.15 hours or 3.0 day draindown period

Contributing Area	0.386	ha	(Area to Infiltration Gallery)	
Recharge Time	72.15	hours	/	3.01 days
Recharge Volume Potential	56.00	m^3		

Month	Total Recharge & Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Available Recharge (m^3)	Enhanced Recharge (m^3)
Jan	16.3	31	577	63	63
Feb	8.1	28	522	31	31
Mar	4.1	31	577	16	16
Apr	65.1	30	559	251	251
May	177.0	31	577	682	577
Jun	89.5	30	559	345	345
Jul	45.8	31	577	177	177
Aug	23.8	31	577	92	92
Sep	47.7	30	559	184	184
Oct	42.8	31	577	165	165
Nov	67.1	30	559	259	259
Dec	33.6	31	577	130	130
Total	**620.9**	**365**	**6,799**	**2,394**	**2,289**

Cityview Ridge Subdivision
City of Guelph
Monthly Enhanced Infiltration at Rear yards

Enhanced Infiltration Structures - Lots 28-32, 49-64

Structure Length =	123.00	m
Structure Width =	2.00	
Structure Depth =	0.50	

Area of Stone =	1.00	sq m	Volume of Stone =	123.00	cu m
			Stone Porosity =	0.33333	
			Storage Volume of Stone =	**41.00**	**cu m**

A = contact area of structure =	246.00	sq m		
V = runoff volume to be infiltrated =	41.00	cu m		
P = percolation rate of native soils =	10	mm/hr		
n = porosity of storage media (weighted) =	0.33			
T = retention time =	Solve for T			
T = (1000 x V) / (P x n x A) =	50.51	hours or	2.1	day draindown period

Contributing Area	0.335	ha	(Area to Infiltration Gallery)	
Recharge Time	50.51	hours /	2.10	days
Recharge Volume Potential	41.00	m^3		

Month	Total Recharge & Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Available Recharge (m^3)	Enhanced Recharge (m^3)
Jan	16.3	31	604	55	55
Feb	8.1	28	546	27	27
Mar	4.1	31	604	14	14
Apr	65.1	30	584	218	218
May	177.0	31	604	593	593
Jun	89.5	30	584	300	300
Jul	45.8	31	604	154	154
Aug	23.8	31	604	80	80
Sep	47.7	30	584	160	160
Oct	42.8	31	604	144	144
Nov	67.1	30	584	225	225
Dec	33.6	31	604	113	113
Total	**620.9**	**365**	**7,111**	**2,081**	**2,081**

Cityview Ridge Subdivision
City of Guelph
Monthly Enhanced Infiltration at Rear yards

Enhanced Infiltration Structures - Lots 33-48

Structure Length =	116.00	m
Structure Width =	2.00	
Structure Depth =	0.50	

Area of Stone =	1.00	sq m	Volume of Stone =	116.00	cu m	
			Stone Porosity =	0.33333		
			Storage Volume of Stone =			**38.67 cu m**

A = contact area of structure =	232.00	sq m
V = runoff volume to be infiltrated =	38.67	cu m
P = percolation rate of native soils =	6	mm/hr
n = porosity of storage media (weighted) =	0.33	
T = retention time =	Solve for T	

T = (1000 x V) / (P x n x A) = 84.18 hours or 3.5 day draindown period

Contributing Area	0.250	ha	(Area to Infiltration Gallery)		
Recharge Time	84.18	hours	/	3.51	days
Recharge Volume Potential	38.67	m^3			

Month	Total Recharge & Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Available Recharge (m^3)	Enhanced Recharge (m^3)
Jan	16.3	31	342	41	41
Feb	8.1	28	309	20	20
Mar	4.1	31	342	10	10
Apr	65.1	30	331	162	162
May	177.0	31	342	442	342
Jun	89.5	30	331	223	223
Jul	45.8	31	342	114	114
Aug	23.8	31	342	59	59
Sep	47.7	30	331	119	119
Oct	42.8	31	342	107	107
Nov	67.1	30	331	167	167
Dec	33.6	31	342	84	84
Total	**620.9**	**365**	**4,024**	**1,550**	**1,450**

Cityview Ridge Subdivision
City of Guelph
Monthly Enhanced Infiltration at Rear yards

Enhanced Infiltration Structures - Lots 65-79

Structure Length =	135.00	m
Structure Width =	2.00	
Structure Depth =	0.50	

Area of Stone =	1.00	sq m	Volume of Stone =	135.00	cu m
			Stone Porosity =	0.33333	
			Storage Volume of Stone =	**45.00**	**cu m**

A = contact area of structure =	270.00	sq m
V = runoff volume to be infiltrated =	45.00	cu m
P = percolation rate of native soils =	7	mm/hr
n = porosity of storage media (weighted) =	0.33	
T = retention time =	Solve for T	

T = (1000 x V) / (P x n x A) = 72.15 hours or 3.0 day draindown period

Contributing Area	0.276	ha	(Area to Infiltration Gallery)	
Recharge Time	72.15	hours	/	3.01 days
Recharge Volume Potential	45.00	m^3		

Month	Total Recharge & Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Available Recharge (m^3)	Enhanced Recharge (m^3)
Jan	16.3	31	464	45	45
Feb	8.1	28	419	22	22
Mar	4.1	31	464	11	11
Apr	65.1	30	449	180	180
May	177.0	31	464	488	464
Jun	89.5	30	449	247	247
Jul	45.8	31	464	126	126
Aug	23.8	31	464	66	66
Sep	47.7	30	449	132	132
Oct	42.8	31	464	118	118
Nov	67.1	30	449	185	185
Dec	33.6	31	464	93	93
Total	**620.9**	**365**	**5,464**	**1,714**	**1,689**

Cityview Ridge Subdivision
City of Guelph
Monthly Enhanced Infiltration at Rear yards

Enhanced Infiltration Structures - Lots 102-106, Blocks 114 and 115

Structure Length =	0.00	m					
Structure Width =	2.00						
Structure Depth =	0.50						
Area of Stone =	1.00	sq m	Volume of Stone =	0.00	cu m		
			Stone Porosity =	0.33333			
			Storage Volume of Stone =			**0.00**	**cu m**

A = contact area of structure =	0.00	sq m
V = runoff volume to be infiltrated =	0.00	cu m
P = percolation rate of native soils =	0.2	mm/hr
n = porosity of storage media (weighted) =	0.33	
T = retention time =	Solve for T	

T = (1000 x V) / (P x n x A) = #DIV/0! hours or #DIV/0! day draindown period

Contributing Area	0.256	ha	(Area to Infiltration Gallery)		
Recharge Time	#DIV/0!	hours	/	#DIV/0!	days
Recharge Volume Potential	0.00	m^3			

Month	Total Recharge & Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Available Recharge (m^3)	Enhanced Recharge (m^3)
Jan	16.3	31	#DIV/0!	42	#DIV/0!
Feb	8.1	28	#DIV/0!	21	#DIV/0!
Mar	4.1	31	#DIV/0!	10	#DIV/0!
Apr	65.1	30	#DIV/0!	167	#DIV/0!
May	177.0	31	#DIV/0!	454	#DIV/0!
Jun	89.5	30	#DIV/0!	229	#DIV/0!
Jul	45.8	31	#DIV/0!	117	#DIV/0!
Aug	23.8	31	#DIV/0!	61	#DIV/0!
Sep	47.7	30	#DIV/0!	122	#DIV/0!
Oct	42.8	31	#DIV/0!	110	#DIV/0!
Nov	67.1	30	#DIV/0!	172	#DIV/0!
Dec	33.6	31	#DIV/0!	86	#DIV/0!
Total	**620.9**	**365**	**#DIV/0!**	**1,592**	**#DIV/0!**

Cityview Ridge Subdivision
City of Guelph
Monthly Enhanced Infiltration at Rear yards

Enhanced Infiltration Structures - Lots 107 - 112, Block 113

Structure Length =	105.00	m
Structure Width =	2.00	
Structure Depth =	0.50	

Area of Stone =	1.00	sq m	Volume of Stone =	105.00	cu m
			Stone Porosity =	0.33333	
			Storage Volume of Stone =	**35.00**	**cu m**

A = contact area of structure =	210.00	sq m			
V = runoff volume to be infiltrated =	35.00	cu m			
P = percolation rate of native soils =	8	mm/hr			
n = porosity of storage media (weighted) =	0.33				
T = retention time =	Solve for T				
T = (1000 x V) / (P x n x A) =	63.13	hours	or	2.6	day draindown period

Contributing Area	0.230	ha	(Area to Infiltration Gallery)		
Recharge Time	63.13	hours	/	2.63	days
Recharge Volume Potential	35.00	m^3			

Month	Total Recharge & Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Available Recharge (m^3)	Enhanced Recharge (m^3)
Jan	16.3	31	412	37	37
Feb	8.1	28	373	19	19
Mar	4.1	31	412	9	9
Apr	65.1	30	399	149	149
May	177.0	31	412	406	406
Jun	89.5	30	399	205	205
Jul	45.8	31	412	105	105
Aug	23.8	31	412	55	55
Sep	47.7	30	399	110	110
Oct	42.8	31	412	98	98
Nov	67.1	30	399	154	154
Dec	33.6	31	412	77	77
Total	**620.9**	**365**	**4,857**	**1,425**	**1,425**

Cityview Ridge Subdivision
City of Guelph
Monthly Enhanced Infiltration at Rear yards

Enhanced Infiltration Structures - Block 116

Structure Length =	51.00	m
Structure Width =	2.00	
Structure Depth =	0.50	

Area of Stone =	1.00	sq m	Volume of Stone =	51.00	cu m
			Stone Porosity =	0.33333	
			Storage Volume of Stone =	**17.00**	**cu m**

A = contact area of structure =	102.00	sq m
V = runoff volume to be infiltrated =	17.00	cu m
P = percolation rate of native soils =	8.0	mm/hr
n = porosity of storage media (weighted) =	0.33	
T = retention time =	Solve for T	

T = (1000 x V) / (P x n x A) = 63.13 hours or 2.6 day draindown period

Contributing Area	0.110	ha	(Area to Infiltration Gallery)	
Recharge Time	63.13	hours	/	2.63 days
Recharge Volume Potential	17.00	m^3		

Month	Total Recharge & Runoff (mm)	No. of days	Max Potential Recharge (m^3)	Available Recharge (m^3)	Enhanced Recharge (m^3)
Jan	16.3	31	200	18	18
Feb	8.1	28	181	9	9
Mar	4.1	31	200	4	4
Apr	65.1	30	194	72	72
May	177.0	31	200	195	195
Jun	89.5	30	194	98	98
Jul	45.8	31	200	50	50
Aug	23.8	31	200	26	26
Sep	47.7	30	194	52	52
Oct	42.8	31	200	47	47
Nov	67.1	30	194	74	74
Dec	33.6	31	200	37	37
Total	**620.9**	**365**	**2,359**	**683**	**683**

Cityview Ridge - 105172
Date December 15, 2020

Lot Infiltration Criteria

Lot/Block	Rooftop Area (m^2)	Infiltration Gallery Size		
		L (m)	W (m)	D (m)
1	356	15.0	2.0	0.5
2	234	11.0	2.0	0.5
3	234	11.0	2.0	0.5
4	234	11.0	2.0	0.5
5	234	11.0	2.0	0.5
6	234	11.0	2.0	0.5
7	234	11.0	2.0	0.5
8	234	11.0	2.0	0.5
9	234	11.0	2.0	0.5
10	234	11.0	2.0	0.5
11	234	11.0	2.0	0.5
12	264	12.0	2.0	0.5
13	264	12.0	2.0	0.5
14	264	12.0	2.0	0.5
15	264	12.0	2.0	0.5
16	264	12.0	2.0	0.5
17	264	12.0	2.0	0.5
19	284	12.0	2.0	0.5
20	284	12.0	2.0	0.5
21	284	12.0	2.0	0.5
22	284	12.0	2.0	0.5
23	284	12.0	2.0	0.5
24	284	12.0	2.0	0.5
25	284	12.0	2.0	0.5
26	284	12.0	2.0	0.5
28	284	12.0	2.0	0.5
29	144	5.0	2.0	0.5
30	144	5.0	2.0	0.5
31	144	5.0	2.0	0.5
32	144	5.0	2.0	0.5
33	144	7.0	2.0	0.5
34	144	7.0	2.0	0.5
35	144	7.0	2.0	0.5
36	144	7.0	2.0	0.5
37	144	7.0	2.0	0.5
38	240	9.0	2.0	0.5
39	144	7.0	2.0	0.5
40	144	7.0	2.0	0.5
41	144	7.0	2.0	0.5
42	144	7.0	2.0	0.5
43	240	9.0	2.0	0.5
44	144	7.0	2.0	0.5
45	144	7.0	2.0	0.5
46	144	7.0	2.0	0.5
47	144	7.0	2.0	0.5
48	144	7.0	2.0	0.5

Lot/Block	Rooftop Area (m^2)	Infiltration Gallery Size		
		L (m)	W (m)	D (m)
49	144	5.0	2.0	0.5
50	144	5.0	2.0	0.5
51	144	7.0	2.0	0.5
52	151	8.0	2.0	0.5
53	158	8.0	2.0	0.5
54	158	8.0	2.0	0.5
55	144	5.0	2.0	0.5
56	144	5.0	2.0	0.5
57	144	5.0	2.0	0.5
58	144	5.0	2.0	0.5
59	144	5.0	2.0	0.5
60	220	5.0	2.0	0.5
61	220	5.0	2.0	0.5
62	144	5.0	2.0	0.5
63	144	5.0	2.0	0.5
64	144	5.0	2.0	0.5
65	144	7.0	2.0	0.5
66	144	7.0	2.0	0.5
67	144	7.0	2.0	0.5
68	144	7.0	2.0	0.5
69	144	7.0	2.0	0.5
70	204	10.0	2.0	0.5
71	204	10.0	2.0	0.5
72	204	10.0	2.0	0.5
73	204	10.0	2.0	0.5
74	204	10.0	2.0	0.5
75	204	10.0	2.0	0.5
76	204	10.0	2.0	0.5
77	204	10.0	2.0	0.5
78	204	10.0	2.0	0.5
79	204	10.0	2.0	0.5
107	280	13.0	2.0	0.5
108	234	11.0	2.0	0.5
109	234	11.0	2.0	0.5
110	234	11.0	2.0	0.5
111	234	11.0	2.0	0.5
112	360	15.0	2.0	0.5
113	720	33.0	2.0	0.5
Block 116	413	19.0	2.0	0.5
Block 116	413	19.0	2.0	0.5
Block 116	275	13.0	2.0	0.5