

Meaford A2A Developments Inc.

Functional Servicing Report

Meaford Highlands Resort
Municipality of Meaford

Project No. L10-512

May 2012



EXECUTIVE SUMMARY

Meaford A2A Development Inc. proposes to develop approximately 154 ha of vacant rural land easterly of 3rd Line and southerly of Highway 26. The lands were previously draft approved for subdivision development by the former Township of St. Vincent but the approval has lapsed. Initial servicing of roadways and watercourse crossings had commenced.

The proposal anticipates 1071 units plus golf course, commercial and retail. The ultimate build-out will be phased in five (5) phases.

Meaford A2A Development Inc. envisions a resource based recreational resort with a full range of recreational, commercial and residential uses. The development can be supported on full municipal water and waste water services. The servicing design will identify and integrate the natural and environmental characteristics of the site and utilize best management practices measures for sustainability.

The development can be serviced by municipal water and wastewater treatment. The Water Treatment Plant located in the Municipality of Meaford has surplus capacity for the proposal. It will be necessary to extend the distribution system from the St. Vincent booster station to the site. A storage facility, either an in-ground reservoir or elevated tank with another booster station will be constructed. The details of the expansion and the location of the facilities will be determined through the review of alternatives and selection of a preferred alternative.

The Water Pollution Control Plant, also located in the Municipality of Meaford, has some uncommitted reserve capacity for the initial phase of the development. The Municipality has identified options and costs for the expansion of the facility to provide capacity for additional growth. The ultimate build-out can be serviced by the recommended plant expansion. The site can be internally serviced by gravity sanitary sewers and two (2) pumping stations. The unit flows used in the calculation of the uncommitted reserve capacity are very conservative compared to actual flows resulting from the water conservation measures required by the Ontario Building Code. The actual design unit flows should be discussed further with the Municipality and sustainable design and water re-use opportunities explored.

The road design will include roadside ditches and swales which will provide conveyance capacity and stormwater treatment capability to maintain the pre-development infiltration amounts. In areas subject to excessive erosion curb and gutter with storm sewers will be constructed. Three (3) 600mm culverts are proposed for the roadway watercourse crossings. The preliminary analysis concludes that the post-development flows can be controlled to pre-development levels by constructing one (1) wet pond and three (3) dry ponds. Quality treatment will be provided by the wet pond and oil / grit separators.

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1.0 Introduction

1.1. Scope of Functional Servicing Report

Cole Engineering Group Ltd. (Cole Engineering) has been retained by Meaford A2A Developments Inc. to prepare a Functional Servicing Report (FSR) in support of Official Plan Amendment, Re-Zoning and subsequent Draft Plan of Subdivision applications for a proposed resource based recreational resort development located on the easterly side of 3rd Line, southerly of Highway 26, in the Municipality of Meaford, Grey County, Ontario. The proposal is to provide full municipal water and wastewater services for the development.

This Report has been prepared to review the sanitary servicing, water distribution network, storm drainage systems, preliminary site grading and storm water management features and to provide recommendations for the services required to accommodate site development based on the proposed Concept Plan C10 revised April 11, 2012, prepared by Weston Consulting Group Inc. The Concept Plan is attached as **Figure C10**. This FSR also includes the preliminary road grading design for the proposed development areas covered by the proposed Concept Plan.

The Concept Plan has been forwarded to all utility companies and Canada Post for input.

1.2. Background Review

The following background studies and information were referenced while preparing this report:

- Municipality of Meaford Wastewater Treatment , Municipal Class Environmental Assessment, Earth Tech, November 2007;
- Alternatives for Upgrading of Meaford Wastewater Treatment Plant, GENIVAR Consultants LP, May,2010;
- Municipality of Meaford Southeast Meaford Service Area St. Vincent Street Booster Station, Design Brief, The Ainley Group, September, 2009;
- Municipality of Meaford Ultimate Water Supply and Distribution System Model Update, Ainley and Associates Limited, January, 2011;
- Market Demand Analysis, Phase 1, Watson and Associates, May 9, 2012;
- Municipality of Meaford Staff Report OPS-2012-001, January 8, 2012; and
- Draft Geotechnical Investigation, Terraprobe Inc., May 3, 2012.

1.3. Existing Conditions

The subject site is 153.90 hectares in size. It is generally vacant rural / agricultural land. The site was granted draft plan of subdivision approval by the Ontario Ministry of Municipal Affairs and Housing in 1979 (42T-23746) but this approval has lapsed. There is evidence that the previous developer had commenced some roadway construction.

The Draft Geotechnical Investigation Report indicates that the soil stratigraphy consists of 0 to 250mm of topsoil and / or organic stained silt, upper red clayey silt graded into weathered shale bedrock below depths of 2 to 5.3m below existing grade. Water levels were recorded and ranged in depth from .7 to 9m below grade. These levels will continue to be monitored through the ongoing hydrogeological study.

2.0 Proposed Development

The proposal consists of a fully integrated mix of resort, residential and commercial / recreational uses which will incorporate best practices for sustainable development which will utilize approximately one half of the area. The balance of the development area will be golf course, parkland and environmental area.

The Market Demand Analysis projects an ultimate population of permanent and seasonal of 3256. This population projection is based on a calculated 2.92 persons per dwelling unit.

Table 2.1 summarizes the proposed land uses and corresponding development areas:

Table 2.1 – Proposed Land Uses and Areas

Land Use	Units	Areas (hectares)
Single Family Residential	505	21.57
Semi-detached and Townhouse Residential	254	24.26
Meaford Highlands Resort Villas, Golf Course and Commercial	312	35.87
Parkland		5.14
Roads and Open Space/Trails		20.55
Environmental Area		40.40
Storm Water Management		6.06
TOTAL	1071	153.85

2.1. Phasing of Development

The development is proposed to be built in five (5) phases. **Figure P1** shows the phasing of the development. The phasing sequence is based on the most cost effective and orderly extension of the sanitary and water services, utilities, stormwater management facilities and road network.

The phasing will also permit the utilization of the capacity of the Water Pollution Control Plant as capacity becomes available through expansion, reduction of inflow and infiltration or negotiation of reduced unit flows due to sustainability measures. The proposed development can be accommodated with the proposed plant expansion.

3.0 Area Grading

3.1. Existing Topography

The development site generally consists of open table land which slopes from north to south towards Georgian Bay. The land falls approximately 30 metres to the edge of a steep and densely wooded bluff which abuts Highway 26. Beacon Environmental has identified seven (7) watercourses that are wholly or partially on the site.

3.2. Proposed Grading

A preliminary grading plan has been prepared for the proposed roads and lots within the subject lands. Perimeter grades along the existing lots and along the existing abutting municipal right-of-ways will generally be maintained. Street C from 3rd Line easterly into the site requires significant cutting to achieve the maximum 8% road slope and a retaining wall is required. **Drawing GR-1** shows the approximate location and limits of the retaining wall. Detailed retaining wall structural design is necessary to generate final alternatives.

The preliminary grading scheme is developed based on the current Municipality of Meaford Engineering Design Standards and Criteria and defines the major system drainage divides to conform to the proposed storm water management strategy described within **Section 7.0** of this report.

The proposed public roads are generally graded in the range of 1% to 2.5% with only limited sections graded in the 5-8 % range.

The proposed development will utilize conventional lot type drainage patterns such as Front and Split Draining, where possible. In areas where the grading becomes constricted due to significant grade differences at the existing perimeter grades, the use of Walk-Out and Walk-Up lot types utilizing 3:1 sloping will be specified and require additional attention at the detail design stage.

The preliminary road and lot grading design is illustrated on **Drawing GR-1**.

4.0 Water Supply Requirements

4.1. Domestic Demand

The total area to be occupied by residential units and commercial uses is 60.73 ha. It is assumed that a total of 1071 residential units plus a residential unit equivalent of 50 for the commercial/ recreational facilities will require servicing on this site based on Weston Consulting Group Inc.'s Preliminary Development Concept for the site. Domestic water supply for the golf course club house will be provided from the proposed distribution system. Golf course irrigation is not included but will be addressed under separate analysis at a later date. The domestic demands were calculated and summarized in **Table 4.1** as follows:

Table 4.1 – Domestic Demand

Demand Description	Demand Flow
Average Day Demand	22 L/s
Maximum Day Demand	42 L/s
Peak Hourly Demand	64 L/s

4.2. Fire Flow Requirements

Fire flow requirements are generally estimated using the guidelines by the Fire Underwriters Survey, "Water Supply for Public Fire Protection 1999." Fire flow requirements are calculated based on floor areas, construction methods and sprinkler protection. In the absence of this detailed information, a conservatively high fire flow demand of 200 L/s was assumed for the residential units.

4.3. Water Supply

The construction of a new trunk watermain from the Municipality of Meaford's proposed St. Vincent booster pumping station to the proposed Whitelaws storage facility, including a new booster pumping station, is necessary to service the resort development. The modelling update for the ultimate water system by Ainsley included demands for 845 residential units on the Meaford Highlands Resort development and additional modelling and design will need to be completed to confirm the ultimate required water system details. The updated modelling will be required to generate the alternatives and provide the basis for the selection of a preferred alternative under the Municipal Class Environmental Assessment process.

The existing Water Treatment Plant has a rated capacity of 26,848 m³ per day. The Ultimate Water Supply and Distribution System Model Update, dated January 2011, confirms that there is adequate Water Treatment Plant capacity for the ultimate development.

4.4. Proposed Water Servicing

Local watermains with service connections for each unit will be constructed within the proposed roadway alignments. The proposed layout is shown on **Drawing WM**. The final sizing of the watermains and available pressures for supply and fire flow will be confirmed with the Municipality through the final detailed design process. Since the water supply will be connected to the proposed extension from the St. Vincent booster station, the final design needs to integrate with the new booster station and Whitelaws reservoir modelling and design. An alternative for the water supply external to the development is shown on **Figure 1**.

5.0 Sanitary Servicing

5.1. Existing Sanitary Treatment

The Municipality of Meaford Water Pollution Control Plant is located on Grant Street within the existing settlement boundary of the Town.

Wastewater is collected through a network of sanitary sewers and five (5) sewage pumping stations. The subject lands are located approximately 2.5 km from the Water Pollution Control Plant and an extension to the sanitary sewer collection system is necessary.

The treatment plant is rated for 3910 m³ per day but the actual capacity is limited by the aeration tank and secondary clarifier which have an actual capacity of 2600 m³ per day. The 2010 Uncommitted Reserve Capacity report indicates that the treatment plant is operating at 83.7% of the committed reserve capacity which means that 492 additional residential units can be connected. The report also indicates that there is a continuing problem with excessive extraneous flows. The Municipality's program to reduce the extraneous flows is successful to date and resulted in a reduction of the peaking factor from 4.5 to 3 between 2008 and 2010. However, there is still a significant amount of extraneous flow entering the existing sanitary sewer collection system.

The Municipality of Meaford has completed an Environmental Study Report to address the long term wastewater treatment plant requirements. The identified preferred alternative is to expand the existing plant on-site, purchase abutting property for buffer zones, optimize plant operation and continue with the program to reduce inflow and infiltration in the existing collection system to provide service for a population of 11,500 with a hydraulic loading of 6000 cubic metres per day. The estimated capital cost is \$18,425,000 with a lifecycle cost of \$24,500,000.

The Municipality did not proceed with the upgrading and expansion of the plant and retained Genivar Consultants to investigate options for treatment expansion. GENIVAR Consultants concluded that the plant can be expanded to increase the rated capacity by approximately 20% at an estimated cost of \$9.5 million. The recommended expansion to a revised rated capacity of 4692 m³ will permit an additional 604 equivalent residential units. The total available reserve capacity with the expansion is 1096 residential equivalent units. It is noted that the unit flow calculations used to generate the capacity available are based on 1.296 cubic metres per unit per day. This unit flow is extremely conservative and should be reviewed with the Municipality since the requirements of the Ontario Building Code and other water conservation measures have reduced water demand and wastewater generation significantly.

5.2. Proposed Sanitary Sewers

The proposed development will be internally serviced by gravity sanitary sewers and two (2) pumping stations which are required because of the depth of the watercourses bisecting the subject lands. It is possible to service the majority of the site by gravity. The proposed layout is shown on **Drawing SAN-2**.

The outlet for the wastewater generated by the development will be by a gravity sewer to be designed and constructed. The final route and design details will be confirmed. An option for the routing of the sanitary sewer between the development and the Wastewater Treatment Facility is shown on **Figure 1**.

6.0 Storm Drainage

The proposed Stormwater Drainage will be serviced by a “dual” drainage system. The major system consists of the roadway (rural cross section) and overland flow routes. The minor system consists of road side ditches and / or drainage swales. The design of the dual drainage storm drainage system will be based on the Municipality of Meaford Standard Guidelines. The pre and post-development drainage area plans are shown in **Figures DAP-1 and DAP-2** respectively.

6.1. Minor Storm Drainage

The proposed minor system drainage will be designed to convey the 5-year storm event via road side ditches. A typical cross section of a road side ditch as part of the rural road right-of-way can be found in **Appendix H**. It should be noted that a 5% slope to the property line has been assumed. In order to determine the maximum conveyance capacity of the minor system through the road-side ditches, a capacity calculation using Bentley FlowMaster was conducted. The peak 5-year flow for drainage area A2-2 was considered for the minor system as it contains the most conservative road slope of 0.5% just south of proposed pond P2. Approximately 29.74 ha from the drainage area drain to this location. **Table 6.1** below summarizes the minor system conveyance capacity.

Table 6.1 – Minor System Conveyance Capacity

Storm Event	Peak flow A2Post (m ³ /s)	Flowmaster Conveyance Capacity (m ³ /s)
5 year	2.61	2.66

As can be seen, the conveyance capacity of the road side ditches are adequate to convey the 5-year design storm. The FlowMaster Output can be found in **Appendix A**.

In order to convey lot and road drainage, driveway culverts are proposed in the road side ditches throughout the development.

6.2. Major Storm Drainage

The proposed major system drainage will be designed to convey the 100-year storm event via the road network. A typical cross section of the rural road right-of-way can be found in **Appendix H**. As previously noted, a 5% slope to the property line has been assumed. In order to determine the maximum conveyance capacity of the major system through the road right-of-way, a capacity calculation using Bentley FlowMaster was conducted. Similarly in assessing the minor storm drainage, the peak 100-year flow for drainage area A2-2 was considered for the major system as it contains the most conservative road slope of 0.5% just south of proposed pond P2. Approximately 29.74 ha from the drainage area drain to this location. **Table 6.2** below summarises the major system conveyance capacity.

Table 6.2 – Major System Conveyance Capacity

Storm Event	Peak flow A2Post (m ³ /s)	Flowmaster Conveyance Capacity (m ³ /s)
100 year	5.20	8.08

As can be seen, the conveyance capacity of the road is adequate to convey the peak flow from the 100-year design storm. The FlowMaster Output can be found in **Appendix A**.

There are a total of three (3) culverts proposed under post-development conditions to convey the 100-year peak flow. Culverts #1 and #2 are proposed in drainage area A4-2, inline with Watercourse 3, under proposed Street A and B, and will be designed to convey a 100-year peak flow of 0.519 m³/s and 0.882 m³/s respectively. Culvert #3 is proposed in drainage area A6-3, inline with Watercourse 5 under Street N. The post-development peak flow to be conveyed from the area is 0.464 m³/s. All of the above mentioned peak flows can be accommodated by a 600 mm culvert ranging in slope from 0.5 – 2.0%. The culvert locations are shown in **Figure DAP-2**.

All rooftop drainage will be directed towards the front of the lots and conveyed by the road and road-side ditches. Drainage to SWM facilities will be controlled to pre-development levels before they are ultimately discharged. In some instances where the proposed development is in the vicinity of an existing watercourse, rear lot drainage will discharge directly to the watercourses. This is illustrated in **Figure DAP-2**.

The analysis for the golf course assumed that there is no increase in imperviousness from predevelopment to post-development conditions. As such, the peak flow discharge under post-development conditions can be controlled to pre-development levels without additional quantity control. At the detail design stage, consideration will be given to options to provide irrigation for the proposed golf course from rainwater harvesting ponds.

7.0 Stormwater Management

The proposed development should meet Province of Ontario standards as set out in the MOE 2003 Stormwater Management Planning & Design (SWMP) manual; standards set by the Municipality of Meaford, and Grey Sauble Conservation Authority (GSCA).

7.1. SWM Criteria

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

- Stormwater is to be treated to Enhanced Protection levels as defined in the MOE SWM Planning and Design Manual (2003);
- Post-development peak flows for all events from the site should be controlled to the peak flow resulting from the pre-development conditions;
- The City of Owen Sound's IDF data and a 24hr SCS storm distribution has been used for the analysis; and,
- Runoff volume from the 25 mm, 4-hour Chicago Design Storm is to be detained on-site for erosion control.

7.2. Existing Conditions

7.2.1. Existing Land Use

The study area is primarily considered to be agricultural / rural with open space covering the southern and northern portions of the site.

7.2.2. Existing Drainage Patterns

The total drainage area for the site is approximately 186 ha. The site is generally divided into six (6) major drainage areas. Based on topographic information for the site, drainage is predominantly from the southeast to the northwest. A preliminary environmental constraints analysis conducted by Beacon Environmental in November, 2010, identified a total of seven (7) watercourses which are wholly or partially located within the boundary of the study area. The majority of the drainage generated from the site is conveyed by four (4) of the seven (7) watercourses which discharge through a steep, densely wooded shore cliff bluff which abuts Highway 26 and eventually towards Georgian Bay. The discharge through these watercourses has resulted in several deeply incised gullies in the face of the bluff. Pre-development drainage areas for the site are shown in **Figure DAP-1**.

7.2.3. External Drainage Areas

Four (4) external undeveloped areas to the south of the site contribute stormwater flow to the site. The external areas are located directly south of the site and are identified as EXT1, EXT2, EXT3 and EXT4. EXT1 drains overland towards Watercourse 7. EXT2 will drain to Watercourse 6. EXT 3 drains overland towards watercourse 3 and EXT4 drains overland towards Watercourse 5.

Drainage from EXT1 to the site will be conveyed away from the proposed developed and discharged to Watercourse 7 under pre-development conditions. Therefore, external drainage from EXT1 to the site was not considering in sizing the SWM facility in drainage area A1pre. Similarly, external drainage area EXT3 will be conveyed away from the proposed development and directly discharge to Watercourse 3 under pre-development conditions and will not be considered in sizing a SWM facility.

The proposed grading provides for drainage from areas EXT2 and EXT4 to be conveyed through the development to proposed SWM facilities. These external drainage areas, along with the internal drainage, will be considered in sizing the SWM facilities. All flow up to and including the Regional (Timmins) storm will be controlled to pre-development levels prior to discharge.

7.2.4. Site Land Cover and Soils

The land cover and soil conditions of the site were established from Ontario Soils Mapping. The northern portion of the site is silty clay loam and the southern portion of the site is predominantly clay. The Soil Conservation Service (SCS) curve numbers for the soils types of this site were determined with the MTO Design Charts 1.08 and 1.09 for pasture and other unimproved land. External drainage areas mostly consist of clay soil conditions. MTO Design Charts and Pre-Development Input Parameters can be found under **Appendix B**. A preliminary geotechnical investigation stated that the soil type I in the area consisted of stiff to hard, silt to clayey silt. This is generally consistent with the Ontario Soils Mapping.

7.2.5. Existing Hydrological Conditions

The pre-development drainage areas are illustrated in **Figure DAP-1**. As previously stated, the existing site surface is largely pervious. The City of Owen Sound’s IDF data and a 24hr SCS storm distribution were used to determine the various flows through the site under the 2, 5, 10, 25, 50, 100-year and the Regional (Timmins) storms under pre-development conditions. Pre-development conditions were modelled in Visual OTTHYMO v2.4.0 (VO2) using NASHYD commands. Input parameters used to model the pre-development condition are provided in **Table 7.1**.

Table 7.1 – Pre-Development Condition Input Parameters

Catchment	Drainage Area (ha)	Runoff Coefficient	Curve Number	Tp
A1pre	3.46	0.25	76	0.36
A2pre	26.60	0.25	76	0.65
A3pre	12.75	0.25	76	0.48
A4pre	51.63	0.25	76	0.50
A5pre	33.23	0.25	76	0.42
A6pre	25.89	0.25	76	0.39
EXT1	12.39	0.25	76	0.59
EXT2	6.09	0.25	76	0.44
EXT3	5.79	0.25	76	0.39
EXT4	7.42	0.25	76	0.52

As previously stated, the curve number value is based from the Ontario Soils Map and MTO Design Charts 1.08 and 1.09. The preliminary result from a geotechnical investigation conducted on the site is consistent with Ontario Soils Map and the MTO Design Charts.

Modeling results for pre-development conditions are shown in **Table 7.2** below and pre-development input parameters as well as detailed output for the 2-year to the 100-year storm events for the 24 hour SCS storm based on the City’s IDF parameters.

Flow points have been identified at the discharge location of each of the six (6) drainage areas in order to compare peak flow rates in the pre and post-development conditions. The flow points are generally located near watercourses or slightly downstream to identify proposed discharge locations. The detailed pre-development hydrologic model output can be found in **Appendix C**.

Table 7.2 – Pre-development Peak Flows

Flow Point	Contributing Catchments	Peak Flow (m ³ /s)						Regional (Timmins)
		2-year	5-year	10-year	25-year	50-year	100-year	
A1	A1 PRE + EXT1	0.275	0.420	0.526	0.668	0.779	0.892	1.269
A2	A2 PRE + EXT2	0.525	0.802	1.004	1.275	1.486	1.702	2.518
A3	A3 PRE	0.245	0.374	0.469	0.596	0.695	0.797	1.068
A4	A4 PRE + EXT3	1.207	1.843	2.309	2.936	3.425	3.924	4.951
A5	A5 PRE	0.702	1.070	1.341	1.706	1.990	2.279	2.887
A6	A6 PRE + EXT4	0.718	1.097	1.374	1.748	2.038	2.335	2.951

7.3. Proposed Conditions

With the development of the site, there will be an increase in the impervious area. To mitigate the effects of the development, on-site controls will be required. The locations and details are discussed in the following sections. The post-development flows can be controlled that of the pre-development conditions with the use of the SWM features.

During development of the site, existing drainage patterns on adjacent undeveloped properties will not be altered and stormwater runoff from the development will not be directed to drain onto adjacent undeveloped properties. The external undeveloped drainage areas that currently contribute flows to the site will remain unaltered.

7.3.1. Stormwater Quantity Control

A VO2 model was also created for the post-development site conditions using City of Owen Sound’s IDF data to determine peak flows through the site under proposed conditions. The post-development drainage area plan is shown on **Figure DAP-2**. The NASHYD and STANDHYD input parameters used in the post-development VO2 model are summarised in **Table 7.3** and **7.4** respectively. The detailed calculations for the post-development input parameters and imperviousness calculations are provided in **Appendix D**. The detailed post-development VO2 model output is provided in **Appendix E**.

Values for percent imperviousness of the site were based on the Township’s Standard Guidelines various types of land use. The imperviousness is calculated assuming a runoff coefficient of 0.25 for pervious areas and 0.90 for impervious areas. The input parameters for the STANDHYD commands are shown in **Table 7.3** below.

Table 7.3 – Post-development Input Parameters (STANDHYD Commands)

Catchment	Drainage Area (ha)	XIMP	TIMP
A1-1*	1.18	50%	50%
A1-2-	3.03	24%	34%
A2-1*	2.89	50%	50%
A2-2	37.83	32%	62%
A3	3.28	27%	27%
A4-1*	2.73	0%	22%
A4-3	3.08	49%	86%
A4-4	0.58	4%	35%
A5-1*	0.88	50%	50%
A5-2	10.12	37%	70%
A6-1*	1.09	50%	50%
A6-2	4.60	29%	71%

*These catchments represent the SWM facilities themselves and have an assumed imperviousness of 50%.

Some areas under post-development conditions will remain uncontrolled and have been modelled as NASHYD commands. The parameters were based on existing soil conditions and have been previously explained in **Section 7.2.4**. The input for the NASHYD commands is shown in **Table 7.4** below.

Table 7.4 – Post-Development Condition Input Parameters (NASHYD Commands)

Catchment	Drainage Area (ha)	Runoff Coefficient	Curve Number	Tp
A1-3	0.79	0.25	76	0.28
A1-4	0.96	0.25	76	0.16
A2-3	3.44	0.25	76	0.30
A4-2	35.93	0.25	76	0.51
A4-5	0.53	0.25	76	0.17
A5-3	20.14	0.25	76	0.31
A6-3	17.97	0.25	76	0.18
A6-4	1.95	0.25	76	0.30
EXT1	12.39	0.25	76	0.59
EXT2	6.09	0.25	76	0.44
EXT3	5.79	0.25	76	0.39
EXT4a	3.32	0.25	76	0.29
EXT4b	4.15	0.25	76	0.42

In order to meet the target pre-development flows at various flow points, four (4) SWM facilities are proposed for the current development plan.

Quantity control for the site will be provided by the active storage component of the SWM facilities. Visual Otthymo v2.4.0 (VO2) was used to size the active storage required to control post-development peak runoff rates to the pre-development runoff rates for the same storm. The post-development peak flows and required site storage are shown below in **Table 7.5 and 7.6**. Detailed model results of the post-development model as well as input parameters are provided in **Appendix E**.

Table 7.5 – Post-development Peak Flows

Flow Point	Contributing Catchments	Peak Flow (m ³ /s)						Regional (Timmins)
		2-year	5-year	10-year	25-year	50-year	100-year	
A1	A1-1 to A1-4 and EXT1	0.225	0.343	0.438	0.570	0.680	0.772	1.120
A2	A2-1 to A2-4 and EXT2	0.464	0.679	0.931	1.203	1.390	1.598	2.498
A3	A3	0.180	0.244	0.318	0.389	0.443	0.498	0.329
A4	A4-1 to A4-5 and EXT3	0.997	1.445	1.791	2.242	2.600	2.964	4.104
A5	A5-1 to A5-3	0.608	0.941	1.248	1.645	1.878	2.115	2.611
A6	A6-1 to A6-4 , EXT4a and EXT4b	0.707	1.066	1.328	1.686	1.980	2.278	2.508

Table 7.6 – Proposed Quantity Control Features

SWM Facility	Facility Type	Contributing Catchments	Drainage Area to SWM Facility (ha)	% Imperviousness	Storage Required Regional Event (m ³)	Storage Available Regional Event (m ³)
P1	Dry Pond	A1-1, A1-2	5.170	31	5,178	6,000
P2	Wet Pond	A2-1, A2-2, EXT2	47.690	53	27,570	28,000
P3	Dry Pond	A5-1, A5-2	11.00	68	5,237	6,000
P4	Dry Pond	A6-1, A6-2, EXT4b	9.840	39	5,489	6,500

The proposed ponds all provide adequate storage volumes for the required volume for the Regional storm event. The pond designs are further detailed in **Section 7.3.2**. It is noted that all required and available storage for each drainage area must be confirmed during detailed design.

7.3.2. Stormwater Management Facilities

SWM Facility P1 – Dry Pond

This dry facility is proposed to provide quantity control for catchments A1-1 and A1-4 and services a drainage area of 5.170 ha. The dry pond will control the Regional (Timmins) peak flow to the allowable target peak flow and discharge to watercourse #7, represented by Flow Point A1, at an approximate elevation of 316 m. Details regarding the exact discharge location including the pond outlet design will be provided at detailed design.

SWM Facility P2 – Wet Pond

This wet facility is proposed to provide quantity and quality control for catchments A2-1, A2-2, A2-4 as well as EXT2 and services a drainage area of 47.69 ha. The amount of land required is primarily due to grading associated with creating a permanent pool. The wet pond will control the Regional (Timmins) peak flow to the allowable target peak flow and discharge to watercourse #6 represented by Flow Point A2. The approximate discharge elevation is 317 m. Details regarding the exact discharge location including the pond outlet design will be provided at detailed design.

SWM Facility P3 – Dry Pond

The dry facility is proposed to provide quantity control for catchments A5-1 to A5-3 and services a drainage area of 11.00 ha. The dry pond will control the Regional (Timmins) peak flow to the allowable target peak flow and discharge to watercourse #4 at an elevation of 329 m. In this case, Flow Point A5 is located downstream of the proposed discharge location in order to account for peak flows from uncontrolled area A5-3. Details regarding the exact discharge location including the pond outlet design will be provided at detailed design.

SWM Facility P4 – Dry Pond

The dry facility is proposed to provide quantity control for catchments A6-1 to A6-3 and services a drainage area of 9.84 ha. The dry pond will control the Regional (Timmins) peak flow to the allowable target peak flow and discharge to watercourse #5 at an elevation of 329 m. Details regarding the exact discharge location including the pond outlet design will be provided at detailed design. The final pond design and location will meet the development setbacks established by the Slope Stability Analysis.

The advantages in implementing a wet pond facility include:

- All stormwater quantity, quality, and water balance criteria can be achieved; and,
- Relatively low capital cost.

The advantages in implementing a dry pond facility include:

- Relatively small pond block size compared to wet facility as there is no permanent pool;
- Less maintenance requirements compared to wet facilities; and,
- Lower costs compared to wet facilities.

According to the proposed Phasing Plan for the development, it is recommended that SWM Facility P2 is considered for detail design prior to the other three (3) facilities which will be considered in subsequent phasing of the development.

7.3.3. Stormwater Quality Control

The proposed water quality control measures for the site include a combination of the quality facility (wet pond P2) and oil / grit separator (OGS) units. This combination approach is thought to be the most practical and cost effective method of quality control for the proposed development. Wet ponds are better suited for larger drainage areas as they generally require more land area for construction. In contrast, OGS units are more practical in smaller drainage areas where grading or land use may constrain the construction of a quality facility.

The MOE SWM Planning & Design Manual (2003) was referenced for quality control criteria. In order to meet an Enhanced (Level 1) Protection wet pond, facilities for water quality control were considered in drainage area A2. Storage value requirements for the extended detention and permanent pool for the wet ponds are based on 40 m³/ha and 145 m³/ha respectively, which conforms to the guidance provided in the MOE SWM Planning & Design Manual (2003). The required quality facility sizing is summarized in **Table 7.7** below, and the calculations are provided in **Appendix G**.

Table 7.7 – Water Quality Storage Requirements – Enhanced (Level 1) Protection

SWM Facility	Catchments	Drainage Area (ha)	% Imperviousness	Permanent Pool Storage Volume based on Impervious Level (m ³ /ha)	Extended Detention Storage Volume (m ³ /ha)
P2	A2-1, A2-2, A2-4, EXT2	47.69	53	6,913	1,908

OGS units are proposed for drainage areas directly upstream of dry SWM facilities. The proposed OGS units will be sized to provide 80% removal of total suspended solids (TSS). Required OGS sizing is summarized in **Table 7.8** and the detailed unit output is provided in **Appendix F**.

Table 7.8 – Water Quality Storage Requirements – Enhanced (Level 1) Protection

SWM Facility	Catchments	Drainage Area (ha)	% Imperviousness	% TSS Removal	Proposed OGS Model
P1	A1-1, A1-2	5.170	31	80	CDS30_35
P3	A5-1, A5-2	11.00	68	80	CDS56_53
P4	A6-1, A6-2, EXT4b	9.840	39	80	CDS56_40
Not Applicable	A4-1	2.73	22	80	CDS20_25
Not Applicable	A4-3	3.03	86	80	CDS30_35

Detailed grading and servicing may require the use of additional OGS units throughout the development to meet Enhanced (Level 1) Protection. In order to achieve 80% TSS removal upstream of the proposed SWM facilities P1, P3 and P4, as well as drainage areas A4-1 and A4-2, a CDS30_35, CDS56_53, CDS56_40, CDS20_25 and a CDS30_35 OGS unit or approved equivalent in each respective area, could provide a quality control solution. OGS unit sizing specifications are found in **Appendix F**.

Upon completion the hydrogeological investigation, there may be the opportunities to include storm water mitigation measures such as BMPs/LIDs.

It should be noted that although OGS units have been proposed for quality control, road side ditches have the ability to provide quality control. The design of road side ditches, such that they will have the ability to provide quality control as per the MOE design standards, will be further investigated at the detailed design stage. This may reduce the size of the recommended OGS units.

7.3.4. Erosion Control

The erosion flow criteria considered for the site is to control runoff from the 25 mm 4-hour event. It is proposed to accomplish erosion control through a combination of extended detention wet and dry ponds, as well as best management practices, as described in **Section 7.3.5**.

Under proposed conditions, the total volume of runoff expected for a 25 mm 4-hour Chicago Storm is summarised in **Table 7.9** below.

Table 7.9 – Extended Detention Pond Volumes

SWM Facility	Facility Type	Contributing Catchments	Drainage Area to SWM Facility (ha)	% Imperviousness	Volume of Extended Detention Required (m ³)
P1	Dry Pond	A1-1, A1-2	5.17	31	510
P2	Wet Pond	A2-1, A2-2, EXT2	47.69	53	5,784
P3	Dry Pond	A5-1, A5-2	11.00	68	1,634
P4	Dry Pond	A6-1, A6-2, EXT4b	9.84	39	988

This runoff will be retained in the stormwater detention ponds to reduce potential erosion impacts to the downstream watercourses.

7.3.5. Best Management Practices and Low Impact Development Considerations

Best Management Practices (BMPs) are recommended where possible in order to reduce the peak flows from a developed area. In addition, BMPs can improve water quality by developing an integrated treatment train approach on a site-specific basis. The BMPs are typically categorized as lot level, conveyance, or end-of-pipe controls. Infiltration and percolation rates will be confirmed once soil and hydrogeologic studies are completed. The MOE SWMP (2003) suggests several BMPs for application at the lot level, in the conveyance system, or for multiple lot small drainage areas (less than 2 ha). Potential lot level / conveyance BMPs for the development are listed in **Table 7.10** for water quality, quantity, erosion and water balance controls.

Table 7.10 – Lot Level / Conveyance BMP Analysis

BMP	Primary Objective	Feasible	Rationale
Storage Controls			
Rooftop Storage	Peak Flow Control	N	<ul style="list-style-type: none"> To assist with quantity control Rooftop storage on single family homes is undesirable
Parking Lot Storage	Peak Flow Control	N	<ul style="list-style-type: none"> To assist with quantity control Majority of area is residential with no parking lots
Superpipe Storage	Peak Flow Control	N	<ul style="list-style-type: none"> To assist with quantity control Cannot be implemented due to space restrictions
Rear Yard Storage	Peak Flow Control	N	<ul style="list-style-type: none"> Undesirable or unmanaged ponded water will not be acceptable on residential lands
Infiltration Controls			
Reduced Lot Grading	Water Balance	Y	<ul style="list-style-type: none"> Reduced lot grading will be implemented where available
Green Roof	Water Balance Water Quantity Water Quality	N	<ul style="list-style-type: none"> Green roofs will be difficult to enforce and maintain on private residential lots
Direct Roof Leaders to Soakaway Pits, Cisterns, or Rain Barrels (Rainwater Harvesting)	Water Balance	Y	<ul style="list-style-type: none"> Tentative depending on site layout design Dependent on neighborhood co-operation and implementation
Infiltration Trenches	Water Balance	Y	<ul style="list-style-type: none"> Recommended but dependent on site layout design and soil analysis
Grassed Swales	Water Balance Water Quality	N	<ul style="list-style-type: none"> Undesirable or unmanaged ponded water will not be acceptable on residential lands Space limitations in residential development
Rain Garden	Water Balance Water Quality	Y	<ul style="list-style-type: none"> Tentative depending on site layout design, space restrictions, and neighbourhood approval
Pervious Pipe System	Water Balance	Y	<ul style="list-style-type: none"> Tentative depending on site layout design

It is noted that specific BMPs are to be confirmed on a site-specific basis at the detailed design stage.

The feasibility of quality facilities will be further investigated at the detailed design phase. If these types of facilities are not feasible, alternative treatment methods such as cisterns and water reuse systems could be implemented, including the above mentioned BMP's.

As previously mentioned, opportunities to provide quality control through road side ditches will be further investigated at the detailed design stage.

8.0 Conclusions

Grading

The preliminary proposed grading scheme follows Municipality of Meaford Engineering Design Standards and respects the perimeter grades of the surrounding properties.

The proposed grading respects the existing and proposed drainage patterns as defined under **Section 6** of this FSR. The proposed most northerly entrance will require significant cutting and a retaining wall adjacent to the existing developed lots.

Water Supply

The water distribution modelling reports confirm that there is adequate reserve capacity at the Water Treatment Plant for the proposed development. The water distribution system will need to be extended and a water storage reservoir and booster station constructed to provide the domestic and fire supply for the proposed development.

Storm Drainage

Storm water conveyance will generally be accomplished by constructing road side ditches and constructing storm sewer pipes through areas of development in locations where the road grades dictate. The recommended road design cross section, shown on **Figure DE-1**, consists of a widened pavement with allowance for bicycle or pedestrian walkways. The storm drainage will be conveyed to the roadside ditches or swales which are capable of conveying the major storm events and can also be designed to provide treatment and enhanced infiltration.

Sanitary Sewers

The proposed development will be serviced by a sanitary sewer system. Pumping will be required for conveyance across the water courses in two (2) locations.

The Water Pollution Control Plant, at present, has adequate capacity for the first phase of the development. The Municipality of Meaford has undertaken a review of the options to upgrade and expand the treatment plant and has proposed a capital budget project to undertake the final design of the expansion. The GENIVAR report on the review of the treatment plant upgrading and expansion has recommended capital works to expand the capacity of the treatment facility to 4992 cubic metres per day which will permit the addition of 604 residential dwelling units which is adequate for the full development. Staff have identified that there is existing uncommitted reserve capacity for an additional 492 residential units at the present time. Discussions will be held with the Municipality to review the unit flows used to generate the available capacity at the Wastewater Treatment Facility since the flows are conservative and the anticipated flow from new development is significantly lower due to the requirements of the Ontario Building Code.

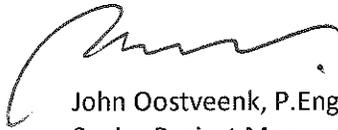
It will be necessary to construct a sanitary sewer from the Water Pollution Control Plant to the proposed site to provide the conveyance for the flows generated by the development.

Stormwater Management

A SWM plan is proposed to reduce the increase in runoff volumes and peak flows as a result of change in land use for the proposed development. In order to meet the design criteria set forth by the Municipality of Meaford, Grey Sauble Conservation Authority and the MOE, quantity and quality control measures are proposed. The location of the stormwater management facilities permits the phasing of the development.

Yours truly,

COLE ENGINEERING GROUP LTD.



John Oostveenk, P.Eng.
Senior Project Manager, Subdivisions



Geoff Masotti, P.Eng.
Project Manager, Water Resources

S:\2010 Projects\D-LD(L10)\Subdivision\L10-512 MHR FSR TIS Lot 9 & 10, 3rd Line, Meaford\Reports\FSR May 2012\MeafordHighlands FSR 05 31 12.doc



Topo information from survey by J. D. Barnes OLS., dated Nov 4, 2011

- NOTES:**
1. The concept has not been updated based on geotechnical studies, borehole data or hydrogeological information. To be confirmed by a qualified professional.
 2. The concept is based on a Karst Assessment completed by Karst Solutions.
 3. Concept boundaries and topographic information is based on surveys completed by JD Barnes & Associates.
 4. The concept has not been updated with results of any field work and/ or environmental analysis completed by Beacon Environmental in Spring of 2012.
 5. Top-of-bank and other environmental constraints boundaries have not been confirmed.
 6. Environmental Area boundaries are based on Beacon Environmental Preliminary Environmental Constraints Mapping dated November 2010 and include medium and high constraint areas.
 7. Stormwater management pond location and sizing is based on the servicing information prepared by Cole Engineering, dated April 2012.
 8. Proposed water supply and sanitary methods are based on servicing information prepared by Cole Engineering, dated April 2012.
 9. Permits will be obtained for development on lands that fall within the Regulated Areas of GSCA under O.Reg. 151/06. Based on Environmental Impact Study prepared by Beacon Environmental.
 10. Exiting Right-of-way width is assumed to be twice the distance from property line to hard surface centerline as shown on the topographic survey.
 11. Areas are approximate between different land uses.

DEVELOPMENT CONCEPT
MEAFORD HIGHLANDS RESORT

LOTS 9 & 10 3RD LINE
 MEAFORD
 COUNTY OF GREY



DEVELOPMENT STATISTICS

RESORT	
Meaford Highlands Inn and Villas	16.53 ha
Spa / Retail/ Aquatic & Wellness Centre	
Golf Course and Club House	19.37 ha
RESORT RESIDENTIAL	
Low Density Resort Residential	21.57 ha
Resort Residential	24.26 ha
Roads	18.79 ha
Environmental Area	40.42 ha
Open Space / Buffer / Trail	1.76 ha
Park	5.14 ha
Storm Water Management	6.06 ha
TOTAL SITE AREA	153.90 ha

ROAD LENGTH

26m ROW:	985 m
20m ROW:	3,295 m
18m ROW:	4,560 m
14m ROW:	540 m

LEGEND

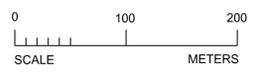
- Property Boundary
- Meaford Highlands Resort and Villas
- Low Density Resort Residential (21m)
- Low Density Resort Residential (18.3m)
- Resort Residential Single Family (15.2m)
- Resort Residential Single Family (12.2m)
- Resort Residential Semi Detached (9m)
- Resort Residential Townhomes(7m)
- Resort Golf Course
- Environmental - High Constraint Area
Source: Beacon Environmental, Nov. 2010
- Environmental - Medium Constraint Area
Source: Beacon Environmental, Nov. 2010
- Park / Parkette
- Trail block / Buffer
- Storm Water Management

REVISIONS LIST

2012 APR 11	REVISE NW SWMP, REMOVE CUL-DE-SAC, REMOVE N SWMP.
2012 APR 5	REVISE LOCATION OF AMPHITHEATRE

WESTON CONSULTING GROUP INC.
 Vaughan Office: 201 Millway Avenue, Unit 19, Vaughan, Ontario, L4K 5K8
 Phone: (905) 738-8080
 Oakville Office: 1680 North Service Road E., Suite 114, Oakville, Ontario, L6H 7G3
 Phone: (905) 844-8749
 1-800-363-3558 Fax: (905) 738-6637 www.westonconsulting.com

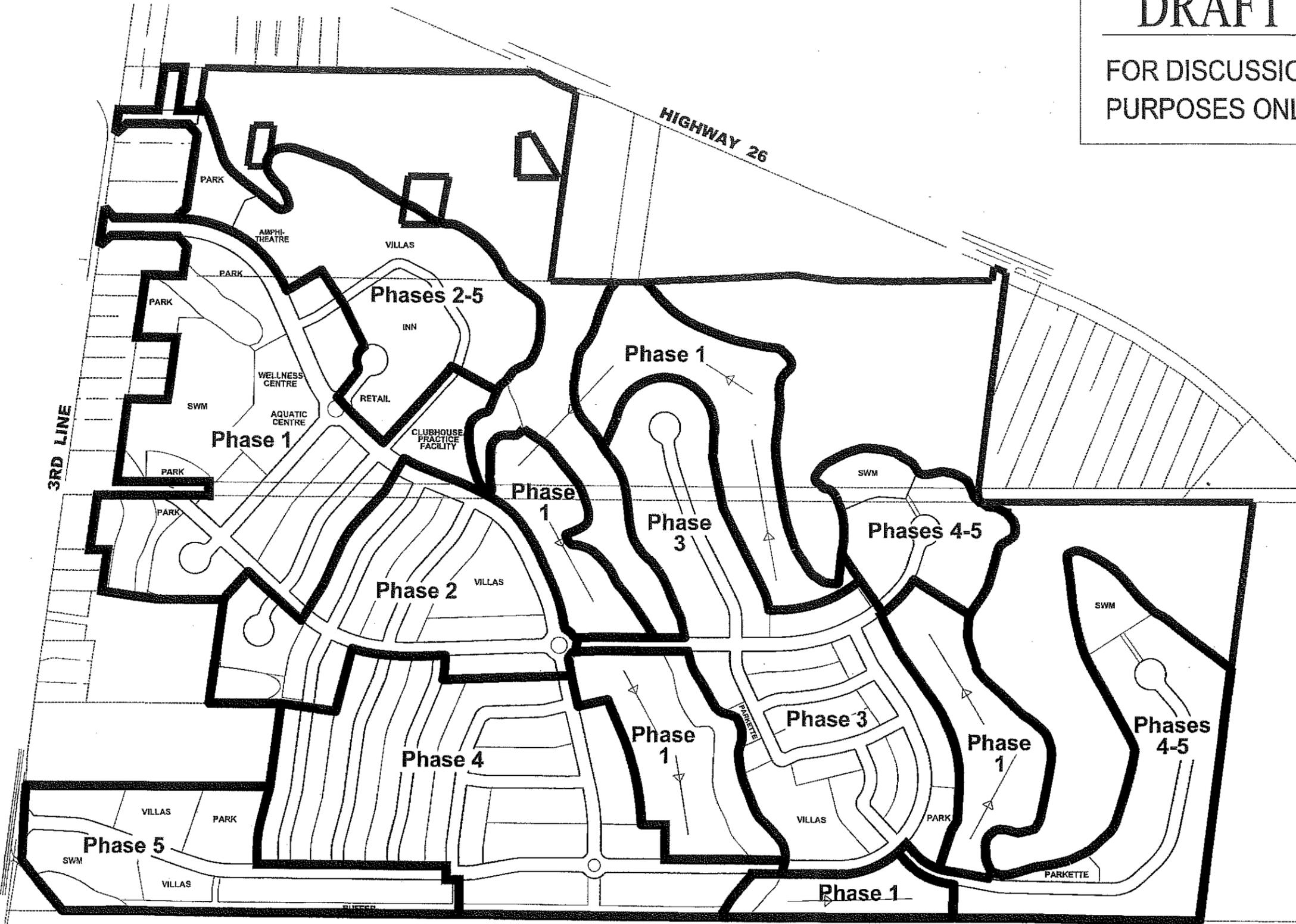
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Date Drawn: 2012 MAR 27	
Drawn By: SB	
Planner: RG	
Scale: see scale bar	
CAD: 5305-1/concepts/C10rev for sub Apr 26_12.dgn	



PHASING PLAN
MEAFORD HIGHLANDS RESORT
 LOTS 9 & 10 3RD LINE
 MEAFORD
 COUNTY OF GREY

WESTON CONSULTING GROUP INC.

DRAFT
 FOR DISCUSSION
 PURPOSES ONLY



LEGEND
 Property Boundary
 Phase Boundary

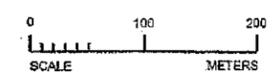
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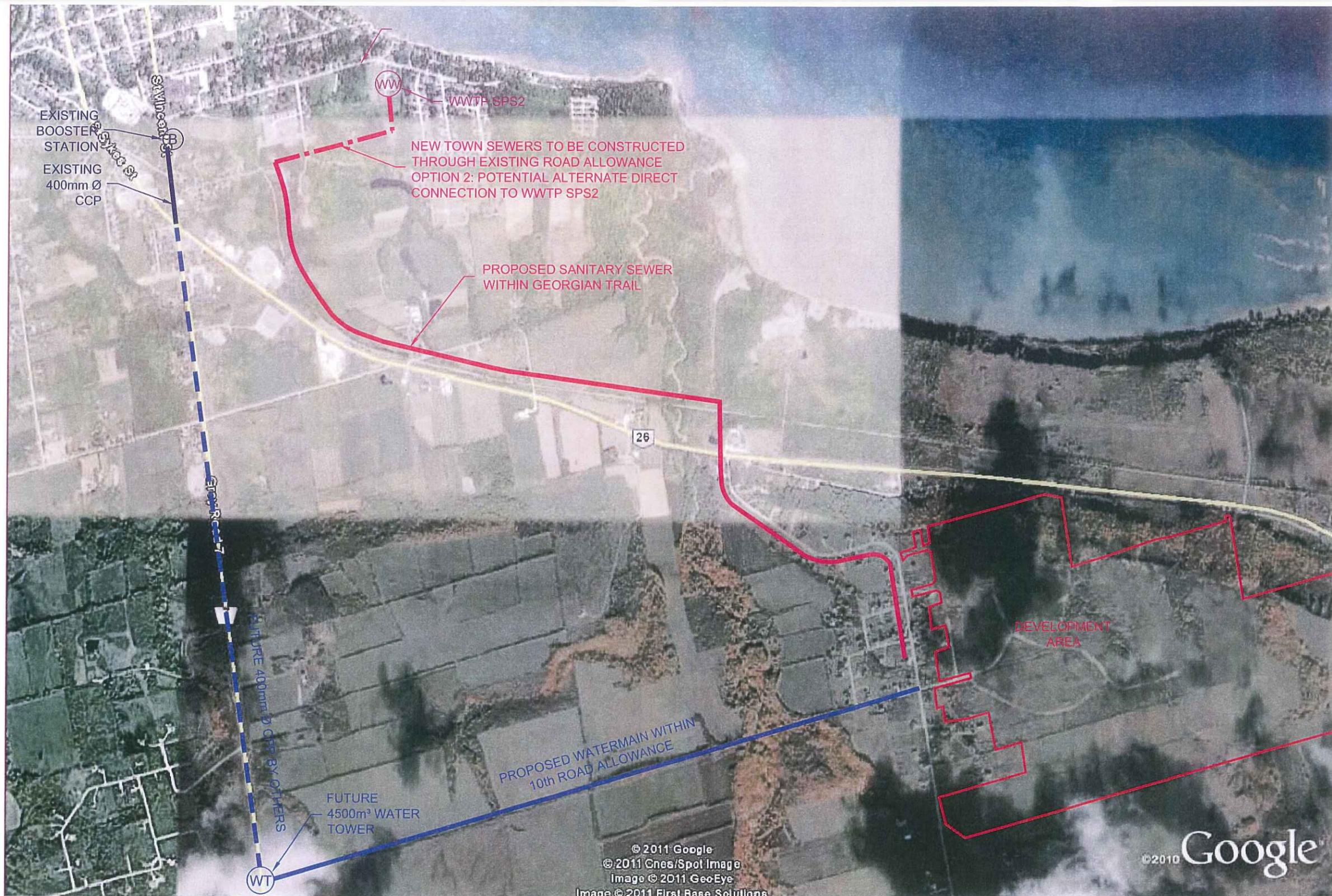
No.	Description

WESTON CONSULTING GROUP INC.
 Vaughan Office: 201 Midway Avenue, Unit 10, Vaughan, Ontario, L4K 5K5
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 Phone: (905) 844-8748

File Number:	5305-1	Drawing Number:	P1
Date Drawn:	2012 APR 19	Scale:	see scale bar
Drawn By:	SB	CAD:	5305-1/concepts/Phasing Plan/P1 Phasing Plan.dwg
Planner:	RG		

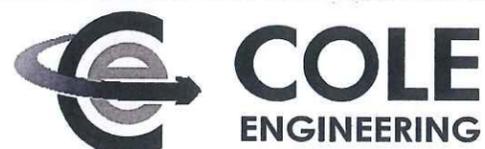
Topo information from survey by J. D. Barnes OLS., dated Nov 4, 2011
 Phasing Plan based on Development Concept C10, Apr 11_12, by Weston Consulting Group Inc.





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70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
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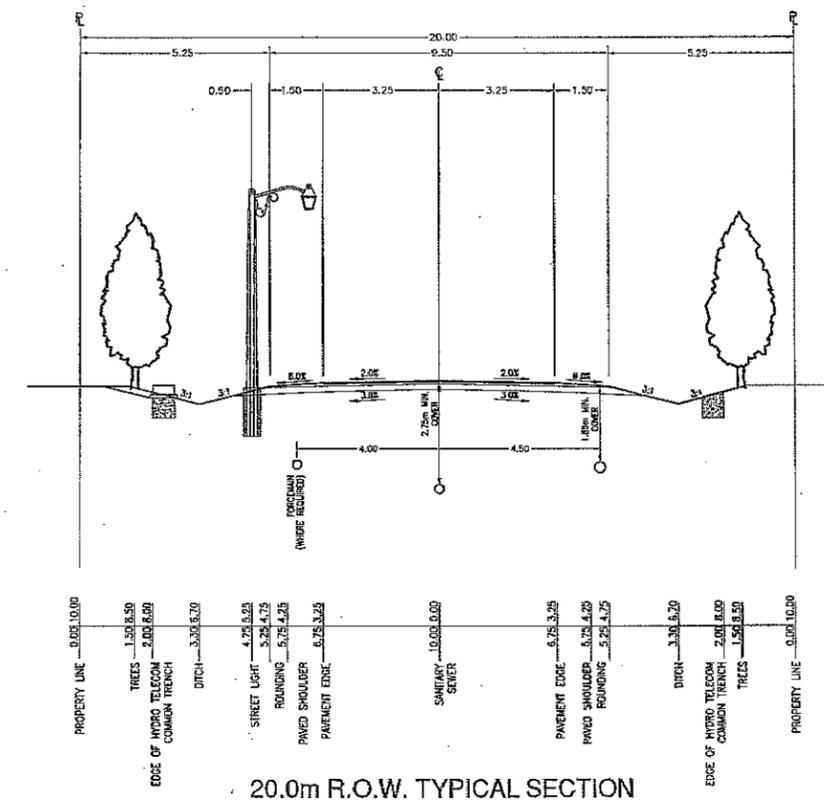
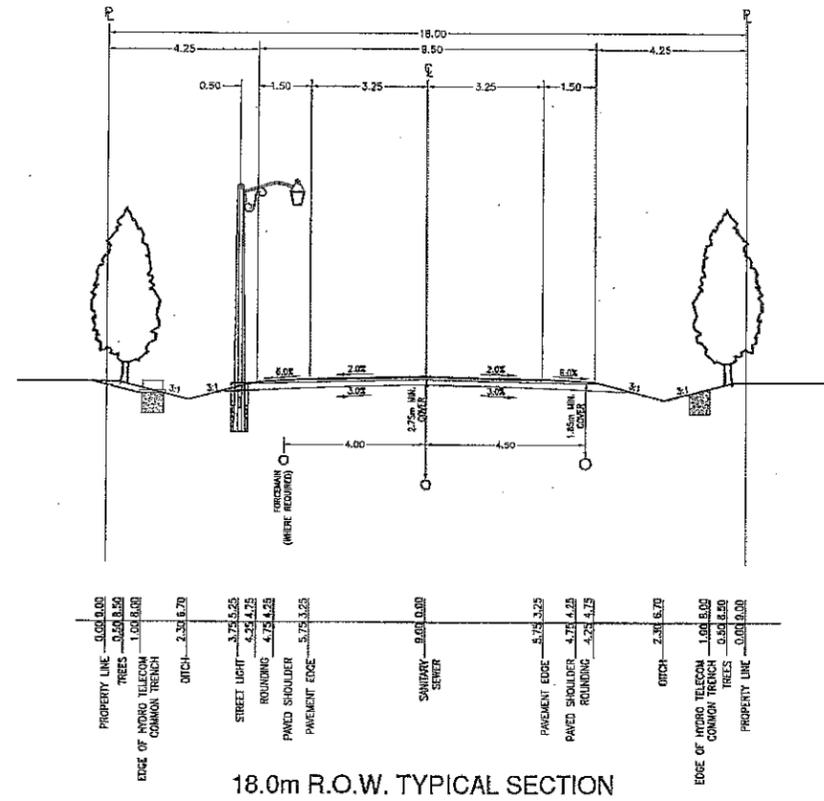
LEGEND

- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- FUTURE WATERMAIN BY OTHERS
- B EXISTING BOOSTER STATION
- B PROPOSED BOOSTER STATION
- WT FUTURE WATER TOWER
- EX. SANITARY SEWERS TO BE UPGRADED (OPTION 1)
- NEW TOWN SEWERS (OPTION 2)
- PROPOSED SANITARY SEWER
- WW EXISTING WWTP SPS2

EXTERNAL WATER & SANITARY SERVICING

PART OF LOT 9, CONCESSION 1 AND
 PARTS OF LOTS 9 AND 10, CONCESSION 2
 MUNICIPALITY OF MEAFORD

DATE:	AUGUST 2011	PROJECT No.:	L10-512
SCALE:	NTS	FIGURE No.:	1

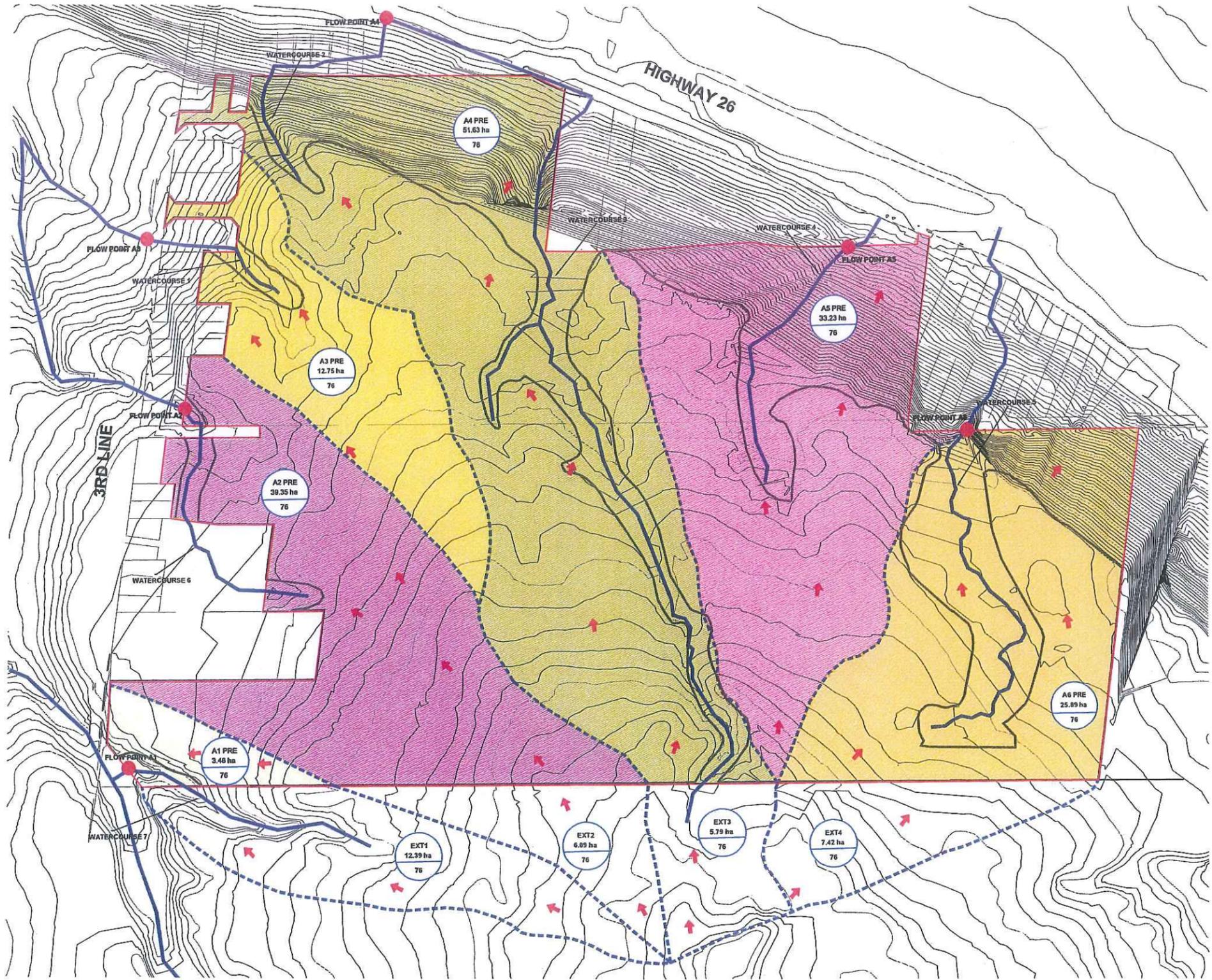


70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
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LEGEND

PRELIMINARY SERVICING ASSESSMENT
 TYPICAL R.O.W. SECTION
 PART OF LOT 9, CONCESSION 1 AND
 PARTS OF LOTS 9 AND 10, CONCESSION 2
 MUNICIPALITY OF MEAFORD

DATE:	MARCH 2012	PROJECT No.:	L10-512
SCALE:	1:200	FIGURE No.:	DE-1



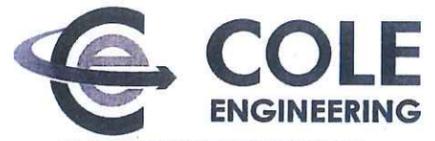
70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
 T:416.987.6161 / 905.940.6161 F:905.940.2064

LEGEND

- PRE-DEVELOPMENT DRAINAGE AREA
- A1 PRE
8.86 ha
76 PRE-DEVELOPMENT AREA
SCS CURVE NUMBER
- WATERCOURSE
- ROAD
- FLOW POINT
- OVERLAND FLOW
- PROPERTY LIMIT
- DEVELOPMENT LIMITS

**PRELIMINARY SERVICING ASSESSMENT
 PRE-DEVELOPMENT DRAINAGE AREA PLAN**
 PART OF LOT 9, CONCESSION 1 AND
 PARTS OF LOTS 9 AND 10, CONCESSION 2
 MUNICIPALITY OF MEAFORD

DATE: MARCH 2012	PROJECT No.: L10-512
SCALE: 1:8000	FIGURE No.: DAP-1



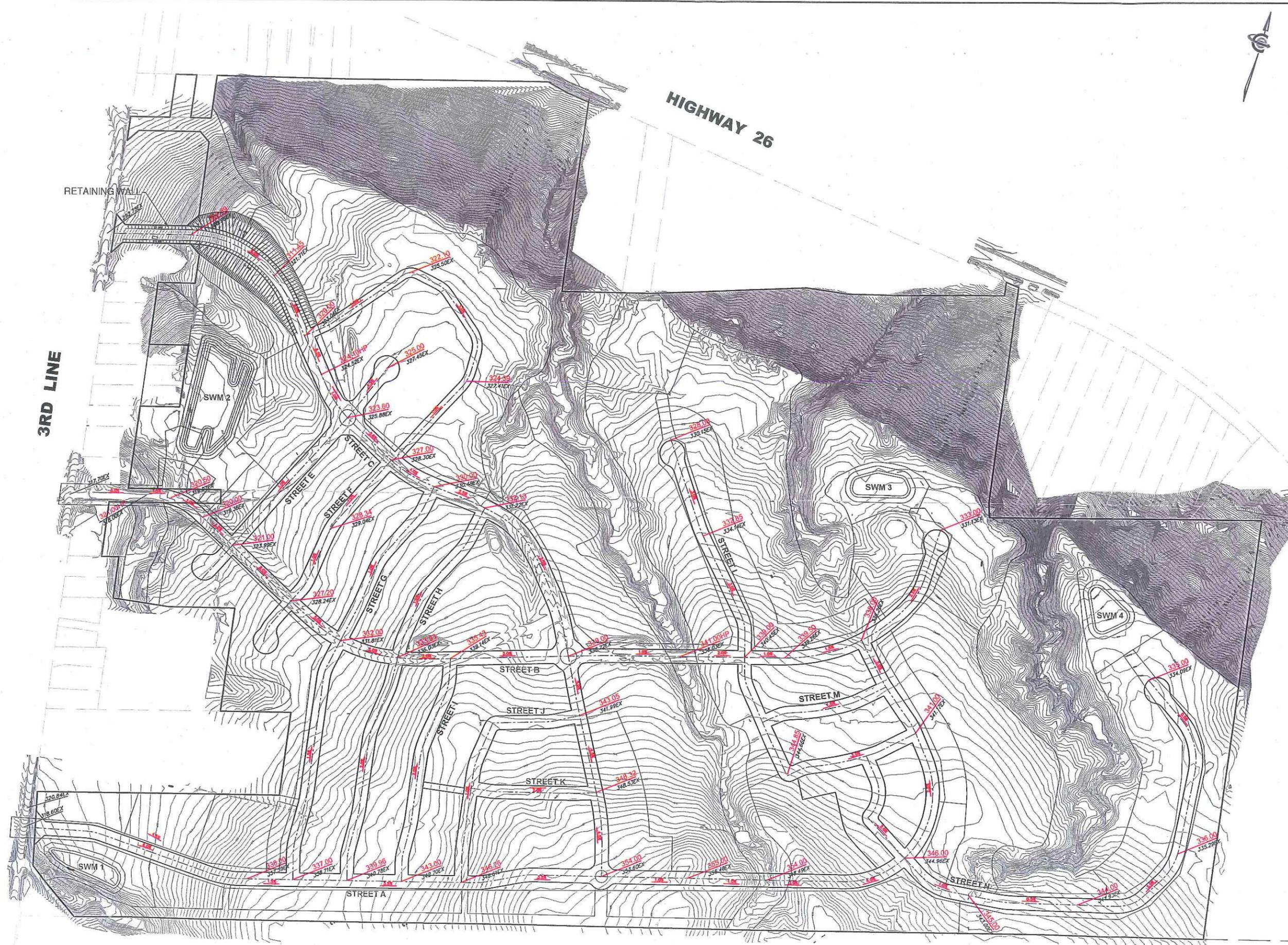
70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
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LEGEND	
	PROPERTY LIMIT
	POST-DEVELOPMENT AREA SCS CURVE NUMBER / PERCENT IMPERVIOUSNESS
	FLOW POINT
	DEVELOPMENT LIMITS
	CULVERT
	WATERCOURSE
	POST-DEVELOPMENT DRAINAGE AREA
	OVERLAND FLOW
	POST-DEVELOPMENT PONDS

**PRELIMINARY SERVICING ASSESSMENT
 POST-DEVELOPMENT DRAINAGE AREA PLAN**
 PART OF LOT 9, CONCESSION 1 AND
 PARTS OF LOTS 9 AND 10, CONCESSION 2
 MUNICIPALITY OF MEAFORD

DATE:	MARCH 2012	PROJECT No.:	L10-512
SCALE:	1:8000	FIGURE No.:	DAP-2

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LEGEND

- EXISTING CONTOUR
- PROPOSED EXISTING GRADE
- PROPOSED 3:1 (MAX) SLOPE

SURVEY INFORMATION
 J.D. BARNES
 LAND INFORMATION SPECIALISTS
 585 ERYINE DRIVE, UNIT E
 BARRIE, ON L4R 9Y3
 PHONE: (705) 739-6170
 FAX: (705) 739-6171

BENCHMARK
 ELEVATIONS SHOWN ON THIS PLAN ARE IN METRES AND ARE DERIVED FROM PUBLISHED BENCHMARK NO. 00119720295 HAVING AN ELEVATION OF 234.558m.

NO.	REVISIONS	DATE	BY
1	FSR	XXX.XXXXXX	P.S.

MUNICIPALITY OF MEAFORD

REVIEWED BY: _____

DATE: _____

ENGINEER'S SEAL

REVIEWING ENGINEER
 PETER SLAMA, P.ENG.

Municipality of Meaford

MEAFORD HIGHLANDS RESORT
 LOTS 9 & 10 3RD LINE
 GRADING PLAN

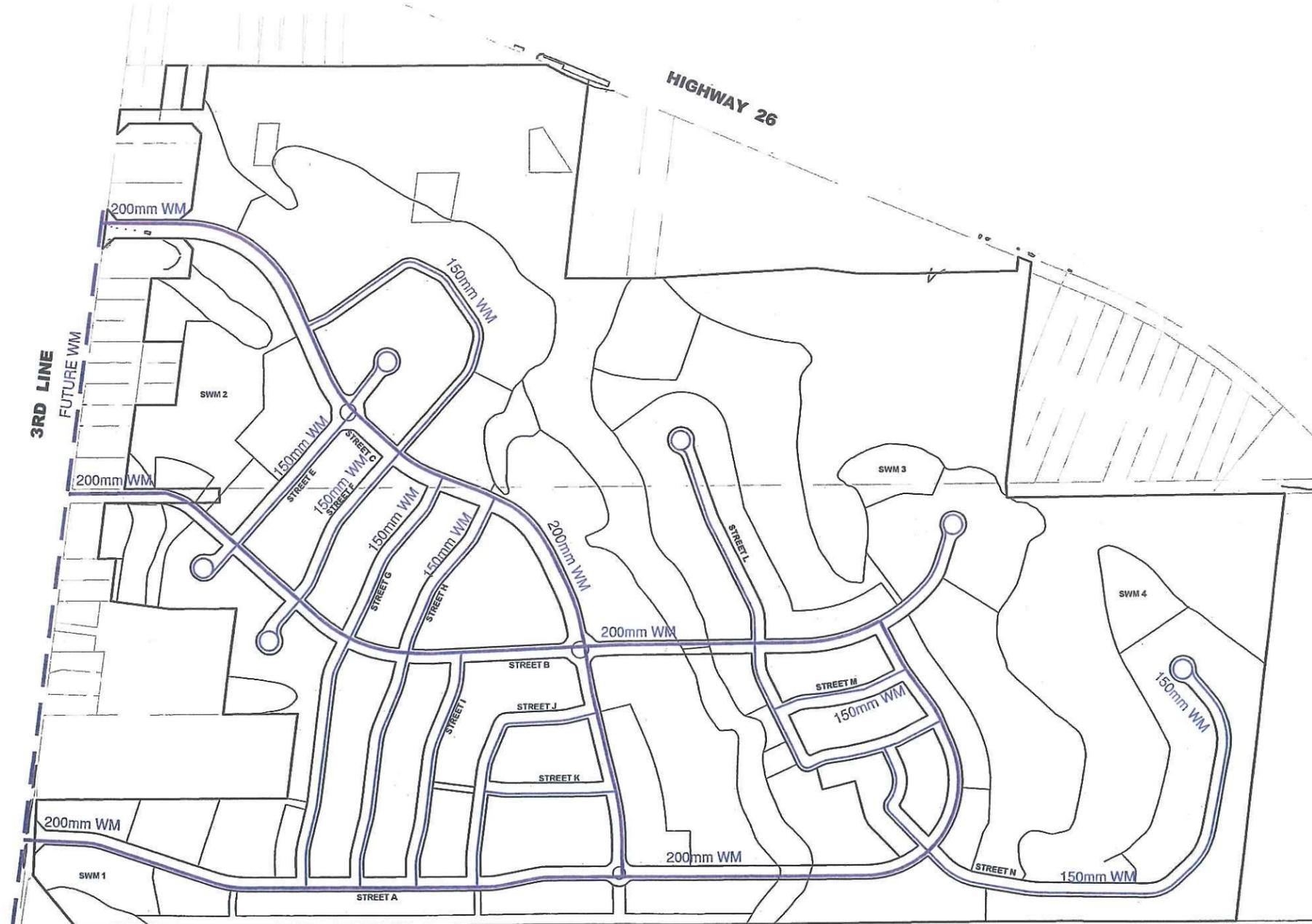
COLE ENGINEERING

19 VALLEYWOOD DRIVE, WILKINSON, ONTARIO L9R 4G5
 TEL: (519) 946-1660 FAX: (519) 946-1624

SCALE: 1:2500 PROJECT NO: L10-512

DRAWN BY: A.L. CHECKED BY: P.S. DESIGNED BY: A.C. DATE: MARCH 2012

DRAWING NO: GR1



70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
 T:416.987.6161 / 905.940.6161 F:905.940.2064

LEGEND

- PROPOSED 150 mm WATERMAIN
- PROPOSED 200 mm WATERMAIN

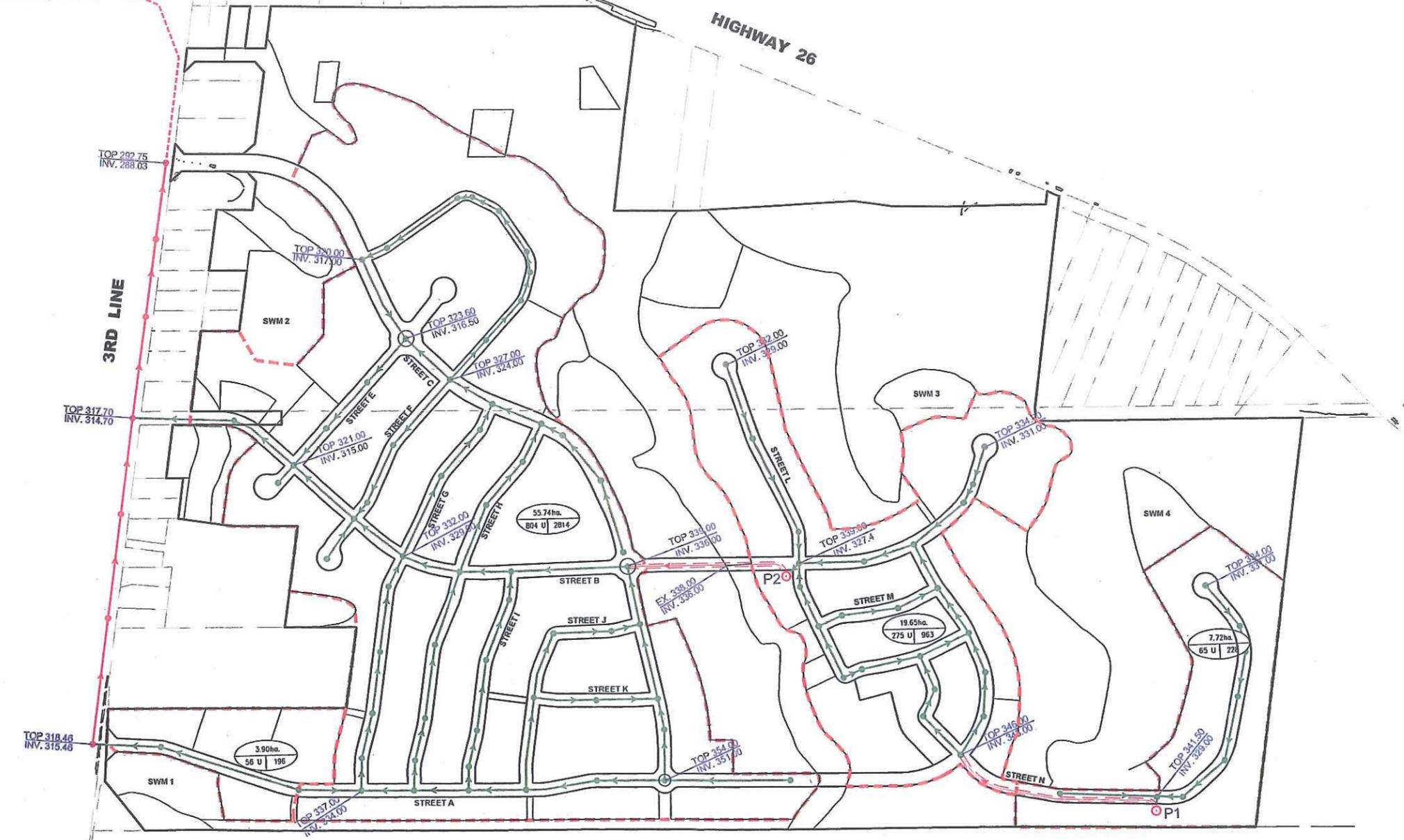
**PRELIMINARY SERVICING ASSESSMENT
 WATERMAIN LAYOUT**

PART OF LOT 9, CONCESSION 1 AND
 PARTS OF LOTS 9 AND 10, CONCESSION 2
 MUNICIPALITY OF MEAFORD

DATE:	MARCH 2012	PROJECT No.:	L10-512
SCALE:	1:7500	FIGURE No.:	WM



TO MEAFORD
TREATMENT PLANT



70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T:416.987.6161 / 905.940.6161 F:905.940.2064

LEGEND

- PROPOSED SANITARY MANHOLE
- PROPOSED LOW FLOW SANITARY PUMP
- TOP 315.50
INV. 332.50 PROPOSED TOP/INVERT ELEVATION
- PROPOSED SANITARY TRUNK SEWER (BY GRAVITY)
- SANITARY DRAINAGE AREA BOUNDARY
- PROPOSED INTERNAL SANITARY SEWER (BY GRAVITY)
- PROPOSED FORCEMAIN
- 7.72ha. AREA
- 65 U | 228 POPULATION
- UNITS

**PRELIMINARY SERVICING ASSESSMENT
SANITARY SEWER LAYOUT (OPTIONAL)**

PART OF LOT 9, CONCESSION 1 AND
PARTS OF LOTS 9 AND 10, CONCESSION 2
MUNICIPALITY OF MEAFORD

DATE:	MARCH 2012	PROJECT No.:	L10-512
SCALE:	1:7500	FIGURE No.:	SAN-2

APPENDIX A
FlowMaster Output

Worksheet for Rural Cross Section - 1

Options

Current Roughness weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Discharge	4.04	m ³ /s
Elevation Range	99.25 to 100.16	m
Flow Area	3.70	m ²
Wetted Perimeter	12.69	m
Hydraulic Radius	0.29	m
Top Width	12.17	m
Normal Depth	0.80	m
Critical Depth	0.64	m
Critical Slope	0.01267	m/m
Velocity	1.09	m/s
Velocity Head	0.06	m
Specific Energy	0.86	m
Froude Number	0.63	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	m
Length	0.00	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.80	m
Critical Depth	0.64	m
Channel Slope	0.00500	m/m
Critical Slope	0.01267	m/m

Worksheet for Triangular road side Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.045
Channel Slope	0.00500 m/m
Normal Depth	0.75 m
Left Side Slope	3.00 m/m (H:V)
Right Side Slope	3.00 m/m (H:V)

Results

Discharge	1.33 m ³ /s
Flow Area	1.69 m ²
Wetted Perimeter	4.74 m
Hydraulic Radius	0.36 m
Top Width	4.50 m
Critical Depth	0.53 m
Critical Slope	0.03326 m/m
Velocity	0.79 m/s
Velocity Head	0.03 m
Specific Energy	0.78 m
Froude Number	0.41
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.00 m
Length	0.00 m
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 m
Profile Description	
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	0.75 m
Critical Depth	0.53 m
Channel Slope	0.00500 m/m
Critical Slope	0.03326 m/m

APPENDIX B
MTO Design Charts and Pre-Development Input Parameters

Design Chart 1.08: Hydrologic Soil Groups (Continued)

- Based on Soil Texture

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

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

Design Chart 1.09: Soil/Land Use Curve Numbers

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

For average antecedent soil moisture condition (AMC II)

² Close-drilled or broadcast.

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

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

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

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

Notes

- (i) All values are based on AMC II except those marked by * (AMC III) or ** (mean of AMC II and AMC III).
- (ii) Values in brackets are AMC II and are to be used only for special cases.
- (iii) Table is not applicable to frozen soils or to periods in which snowmelt contributes to runoff.

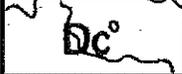
SOILS
OF
GREY COUNTY

NORTH SHEET

ONTARIO

SOIL SURVEY REPORT No. 17



MAP SYMBOL	SOIL TYPE	GREAT GROUP	PARENT MATERIALS	DRAINAGE CLASS
	VINCENT - Silty Loam Clay	Gray-Brown Podzolic	Fine-Textured Limestone Till	Good
	DUNEDIN - Clay	Gray-Brown Podzolic	Fine-Textured Derived from Red Shale	Good



COLE
ENGINEERING

70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T:416.987.6161 / 905.940.6181 F:905.940.2064

SOILS MAP

PART OF LOT 9, CONCESSION 1 AND
PARTS OF LOTS 9 AND 10, CONCESSION 2
MUNICIPALITY OF MEAFORD

DATE:	MARCH 2012	PROJECT No.:	L10-512
SCALE:	N.T.S.	FIGURE No.:	SM



Pre-Development (OTTHYMO)
Input Parameters (NASHYD)

Town of Meaford
File No. L10-512
Date: March, 2012

Pre-Development Drainage Area (OTTHYMO)

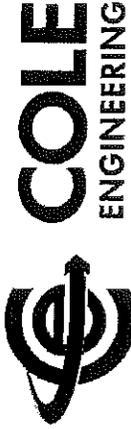
Parameter	Unit	Description	EXT1	EXT2	EXT3	EXT4	A1 PRE	A2 PRE	A3 PRE	A4 PRE	A5 PRE	A6 PRE
Area	ha	Watershed Area	12.39	6.09	5.79	7.42	3.46	26.60	12.75	51.63	33.23	25.89
TP	hr	Unit Hydrograph Time to Peak	0.59	0.44	0.39	0.52	0.36	0.65	0.48	0.42	0.42	0.39
DT	min	Time Step Increment	15									
DWF	cms	Dry Weather Flow (Base Flow)	0									
CN	-	SCS Curve Number	76									
IA	mm	Initial Abstraction	5									
N	-	Number of Linear Reservoir	3									
Rain	mm/hr	Optional Rainfall Intensities	0 - Without Rain									

Note: 1 - Clay / Silty Clay Loam with good drainage - pasture & other unimproved land / Hydrologic Group C
2 - IA for field is used for this development IA=5

Time of Concentration Calculation

Area Number	Area (ha)	C _{pr}	CN	L (m)	Elevation Change (m)	Sw (%)	T _c Airport (min)	T _p (Airport) (hr)
EXT1	12.39	0.25	76	957	40.0	4.18	53.47	0.59
EXT2	6.09	0.25	76	507	20.0	3.94	39.87	0.44
EXT3	5.79	0.25	76	329	10.0	3.04	34.83	0.39
EXT4	7.42	0.25	76	508	12.0	2.36	47.03	0.52
A1 PRE	3.46	0.25	76	408	22.0	5.42	31.97	0.36
A2 PRE	26.60	0.25	76	1031	36.0	3.49	58.89	0.65
A3 PRE	51.63	0.30	76	676	26.0	3.85	43.47	0.48
A4 PRE	33.23	0.30	76	941	94.0	9.99	37.43	0.42
A5 PRE	25.89	0.30	76	875	98.0	11.20	34.76	0.39
A6 PRE	25.89	0.30	76	875	98.0	11.20	34.76	0.39

APPENDIX C
Pre-Development Hydrologic Model Output



Unit Hyd Qpeak (cms) = 0.529
 PEAK FLOW (cms) = 0.125 (1)
 TIME TO PEAK (hrs) = 12.417
 RUNOFF VOLUME (mm) = 14.604
 TOTAL RAINFALL (mm) = 47.300
 RUNOFF COEFFICIENT = 0.309

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

CALIB (0002) | Area (ha) = 26.60 Curve Number (CN) = 76.0
 WASHID (0002) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.65

Unit Hyd Qpeak (cms) = 1.563
 PEAK FLOW (cms) = 0.414 (1)
 TIME TO PEAK (hrs) = 12.667
 RUNOFF VOLUME (mm) = 14.605
 TOTAL RAINFALL (mm) = 47.300
 RUNOFF COEFFICIENT = 0.309

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

CALIB (0012) | Area (ha) = 26.60 Curve Number (CN) = 76.0
 WASHID (0012) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.65
 + ID= 2 (0002) | Area (ha) = 0.414 (1)
 ID= 3 (0012) | Area (ha) = 0.414 (1)

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0009) | Area (ha) = 51.63 Curve Number (CN) = 76.0
 WASHID (0009) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.39

Unit Hyd Qpeak (cms) = 0.516
 PEAK FLOW (cms) = 0.118 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 14.603
 TOTAL RAINFALL (mm) = 47.300
 RUNOFF COEFFICIENT = 0.309

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

CALIB (0003) | Area (ha) = 51.63 Curve Number (CN) = 76.0
 WASHID (0003) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.42

Unit Hyd Qpeak (cms) = 4.695
 PEAK FLOW (cms) = 1.091 (1)
 TIME TO PEAK (hrs) = 12.417
 RUNOFF VOLUME (mm) = 14.604
 TOTAL RAINFALL (mm) = 47.300
 RUNOFF COEFFICIENT = 0.309

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

ADD HYD (0013) | Area (ha) = 56.90 Curve Number (CN) = 76.0
 WASHID (0013) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.52
 + ID= 2 (0008) | Area (ha) = 8.19 Curve Number (CN) = 76.0
 ID= 3 (0013) | Area (ha) = 8.19 Curve Number (CN) = 76.0

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0011) | Area (ha) = 8.19 Curve Number (CN) = 76.0
 WASHID (0011) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.52

Unit Hyd Qpeak (cms) = 0.602
 PEAK FLOW (cms) = 0.149 (1)
 TIME TO PEAK (hrs) = 12.500
 RUNOFF VOLUME (mm) = 14.604
 TOTAL RAINFALL (mm) = 47.300
 RUNOFF COEFFICIENT = 0.309

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

CALIB (0005) | Area (ha) = 25.89 Curve Number (CN) = 76.0
 WASHID (0005) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.39

Unit Hyd Qpeak (cms) = 2.536
 PEAK FLOW (cms) = 0.579 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 14.603
 TOTAL RAINFALL (mm) = 47.300
 RUNOFF COEFFICIENT = 0.309

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

ADD HYD (0014) | Area (ha) = 34.08 Curve Number (CN) = 76.0
 WASHID (0014) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.36
 + ID= 2 (0011) | Area (ha) = 8.19 Curve Number (CN) = 76.0
 ID= 3 (0014) | Area (ha) = 8.19 Curve Number (CN) = 76.0

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0001) | Area (ha) = 34.08 Curve Number (CN) = 76.0
 WASHID (0001) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.36

Unit Hyd Qpeak (cms) = 0.367
 PEAK FLOW (cms) = 0.082 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 14.602
 TOTAL RAINFALL (mm) = 47.300
 RUNOFF COEFFICIENT = 0.309

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



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RUNOFF VOLUME (mm) = 21.918
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370

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

ADD HYD (0013)	AREA (ha)	QPEAK (cms)	R.V. (mm)
1 + 2 = 3	51.63	1.663	21.92
ID# 1 (0002)	51.63	1.663	21.92
+ ID# 2 (0009)	5.27	0.180	21.92
ID # 3 (0013)	56.90	1.843	21.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

WASHED (0011)	AREA (ha)	Curve Number (CN)	# of Linear Res. (N)
1 ID# 1 DT# 5.0 min	51.63	5.00	3.00
U.H. Tp (hrs) =	0.52		

Unit Hyd Qpeak (cms) = 0.602

PEAK FLOW (cms) = 0.228 (1)
 TIME TO PEAK (hrs) = 12.500
 RUNOFF VOLUME (mm) = 21.915
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370

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

WASHED (0005)	AREA (ha)	Curve Number (CN)	# of Linear Res. (N)
1 ID# 1 DT# 5.0 min	25.89	5.00	3.00
U.H. Tp (hrs) =	0.39		

Unit Hyd Qpeak (cms) = 2.536

PEAK FLOW (cms) = 0.884 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 21.917
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370

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

ADD HYD (0014)	AREA (ha)	QPEAK (cms)	R.V. (mm)
1 + 2 = 3	25.89	0.884	21.92
ID# 1 (0005)	25.89	0.884	21.92
+ ID# 2 (0011)	6.19	0.228	21.92
ID # 3 (0014)	34.08	1.097	21.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

WASHED (0001)	AREA (ha)	Curve Number (CN)	# of Linear Res. (N)
1 ID# 1 DT# 5.0 min	3.45	5.00	3.00
U.H. Tp (hrs) =	0.36		

Unit Hyd Qpeak (cms) = 0.567

PEAK FLOW (cms) = 0.125 (1)

WASHED (0008)	AREA (ha)	Curve Number (CN)	# of Linear Res. (N)
1 ID# 1 DT# 5.0 min	6.69	5.00	3.00
U.H. Tp (hrs) =	0.44		

Unit Hyd Qpeak (cms) = 0.329

PEAK FLOW (cms) = 0.180 (1)
 TIME TO PEAK (hrs) = 12.417
 RUNOFF VOLUME (mm) = 21.918
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370

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

WASHED (0002)	AREA (ha)	Curve Number (CN)	# of Linear Res. (N)
1 ID# 1 DT# 5.0 min	26.80	5.00	3.00
U.H. Tp (hrs) =	0.65		

Unit Hyd Qpeak (cms) = 1.563

PEAK FLOW (cms) = 0.631 (1)
 TIME TO PEAK (hrs) = 12.667
 RUNOFF VOLUME (mm) = 21.920
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370

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

WASHED (0012)	AREA (ha)	QPEAK (cms)	R.V. (mm)
1 ID# 1 DT# 5.0 min	32.69	0.802	21.92
U.H. Tp (hrs) =	0.42		

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

WASHED (0003)	AREA (ha)	Curve Number (CN)	# of Linear Res. (N)
1 ID# 1 DT# 5.0 min	51.63	5.00	3.00
U.H. Tp (hrs) =	0.39		

Unit Hyd Qpeak (cms) = 0.516

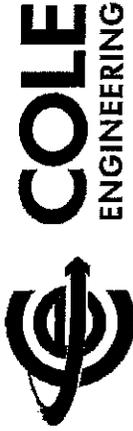
PEAK FLOW (cms) = 0.180 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 21.917
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370

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

WASHED (0003)	AREA (ha)	Curve Number (CN)	# of Linear Res. (N)
1 ID# 1 DT# 5.0 min	51.63	5.00	3.00
U.H. Tp (hrs) =	0.42		

Unit Hyd Qpeak (cms) = 4.693

PEAK FLOW (cms) = 1.663 (1)
 TIME TO PEAK (hrs) = 12.333



TIME TO PEAK (hrs) = 12.39
 RUNOFF VOLUME (cms) = 21.583
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

UNIT HYD SPEAK (cms) = 0.862
 AREA (ha) = 12.39
 CURVE NUMBER (CN) = 76.0
 SLOPE (m/m) = 0.39
 U.H. TP (hrs) = 0.59

PEAK FLOW (cms) = 0.315 (1)
 TIME TO PEAK (hrs) = 12.583
 RUNOFF VOLUME (mm) = 21.913
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0.015) | AREA (ha) = 12.39
 1 + 2 = 3 | (cms) = 0.315 (1)
 ID# = 1 (0001) | TIME TO PEAK (hrs) = 12.583
 + ADD = 2 (0007) | TOTAL RAINFALL (mm) = 21.913
 ID = 3 (0015) | 12.39 0.315 12.583 21.913

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

UNIT HYD SPEAK (cms) = 1.015
 AREA (ha) = 12.75
 CURVE NUMBER (CN) = 76.0
 SLOPE (m/m) = 0.49
 U.H. TP (hrs) = 0.49

PEAK FLOW (cms) = 0.374 (1)
 TIME TO PEAK (hrs) = 12.417
 RUNOFF VOLUME (mm) = 21.919
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

*** SIMULATION NUMBER: 3 ***

FILENAME: C:\MTEmp\dec
 43255\0004668712-654232042
 COMMENTS: MaxFlow 10 Year 24 Hour SCS Type II Stor

TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	6.17	1.35	12.23	9.69
0.17	0.74	6.25	1.35	12.33	9.69
0.33	0.74	6.42	1.35	12.42	9.69
0.42	0.74	6.50	1.35	12.50	9.69
0.58	0.74	6.57	1.35	12.58	9.69
0.67	0.74	6.75	1.35	12.75	4.98
0.81	0.74	6.75	1.35	12.83	4.98

0.74	6.93	1.35	12.92	4.98	15.00	1.21
0.81	6.93	1.35	13.00	4.98	15.08	1.21
0.87	6.93	1.35	13.08	4.98	15.17	1.21
0.94	7.07	1.35	13.17	4.98	15.25	1.21
1.08	7.33	1.35	13.25	4.98	15.33	1.21
1.17	7.33	1.35	13.33	4.98	15.42	1.21
1.25	7.33	1.35	13.42	4.98	15.50	1.21
1.33	7.42	1.35	13.50	4.98	15.58	1.21
1.42	7.42	1.35	13.58	4.98	15.67	1.21
1.50	7.58	1.35	13.67	4.98	15.75	1.21
1.58	7.58	1.35	13.75	4.98	15.83	1.21
1.67	7.75	1.35	13.83	4.98	15.92	1.21
1.75	7.83	1.35	13.92	4.98	16.00	1.21
1.82	7.92	1.35	14.00	4.98	16.08	1.21
1.90	8.08	1.35	14.08	4.98	16.17	1.21
2.08	8.17	1.35	14.17	4.98	16.25	1.21
2.17	8.25	1.35	14.25	4.98	16.33	1.21
2.23	8.25	1.35	14.33	4.98	16.42	1.21
2.33	8.33	1.35	14.42	4.98	16.50	1.21
2.42	8.42	1.35	14.50	4.98	16.58	1.21
2.50	8.50	1.35	14.58	4.98	16.67	1.21
2.58	8.58	1.35	14.67	4.98	16.75	1.21
2.67	8.67	1.35	14.75	4.98	16.83	1.21
2.75	8.75	1.35	14.83	4.98	16.92	1.21
2.83	8.83	1.35	14.92	4.98	17.00	1.21
2.92	8.92	1.35	15.00	4.98	17.08	1.21
3.00	9.08	1.35	15.08	4.98	17.17	1.21
3.08	9.17	1.35	15.17	4.98	17.25	1.21
3.17	9.25	1.35	15.25	4.98	17.33	1.21
3.23	9.25	1.35	15.33	4.98	17.42	1.21
3.33	9.42	1.35	15.42	4.98	17.50	1.21
3.42	9.42	1.35	15.50	4.98	17.58	1.21
3.50	9.50	1.35	15.58	4.98	17.67	1.21
3.58	9.58	1.35	15.67	4.98	17.75	1.21
3.67	9.67	1.35	15.75	4.98	17.83	1.21
3.75	9.75	1.35	15.83	4.98	17.92	1.21
3.83	9.83	1.35	15.92	4.98	18.00	1.21
3.92	9.92	1.35	16.00	4.98	18.08	1.21
4.00	10.00	1.35	16.08	4.98	18.17	1.21
4.08	10.08	1.35	16.17	4.98	18.25	1.21
4.17	10.17	1.35	16.25	4.98	18.33	1.21
4.23	10.25	1.35	16.33	4.98	18.42	1.21
4.33	10.33	1.35	16.42	4.98	18.50	1.21
4.42	10.42	1.35	16.50	4.98	18.58	1.21
4.50	10.50	1.35	16.58	4.98	18.67	1.21
4.58	10.58	1.35	16.67	4.98	18.75	1.21
4.67	10.67	1.35	16.75	4.98	18.83	1.21
4.75	10.75	1.35	16.83	4.98	18.92	1.21
4.83	10.83	1.35	16.92	4.98	19.00	1.21
4.92	10.92	1.35	17.00	4.98	19.08	1.21
5.00	11.00	1.35	17.08	4.98	19.17	1.21
5.08	11.08	1.35	17.17	4.98	19.25	1.21
5.17	11.17	1.35	17.25	4.98	19.33	1.21
5.23	11.25	1.35	17.33	4.98	19.42	1.21
5.33	11.33	1.35	17.42	4.98	19.50	1.21
5.42	11.42	1.35	17.50	4.98	19.58	1.21
5.50	11.50	1.35	17.58	4.98	19.67	1.21
5.58	11.58	1.35	17.67	4.98	19.75	1.21
5.67	11.67	1.35	17.75	4.98	19.83	1.21
5.75	11.75	1.35	17.83	4.98	19.92	1.21
5.83	11.83	1.35	17.92	4.98	20.00	1.21
5.92	11.92	1.35	18.00	4.98	20.08	1.21
6.00	12.00	1.35	18.08	4.98	20.17	1.21
6.08	12.08	1.35	18.17	4.98	20.25	1.21
6.17	12.17	1.35	18.25	4.98	20.33	1.21

Area (ha) = 39.23 Curve Number (CN) = 76.0
 # of Linear Res. (N) = 3.00
 U.H. TP (hrs) = 0.42
 Unit Hyd Speak (cms) = 3.022



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ID= 1 DT= 5.0 min | Ia (cms) = 5.00 # of Linear Res. (N) = 3.00
U.H. Tp (hrs) = 0.42

Unit Hyd Ouput (cms) = 4.695

PEAK FLOW (cms) = 2.084 (1)
TIME TO PEAK (hrs) = 12.333
RUNOFF VOLUME (mm) = 27.222
TOTAL RAINFALL (mm) = 67.300
RUNOFF COEFFICIENT = 0.405

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

ADD HYD (0013)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID= 1 (0003)	51.63	2.084	12.33	27.23
+ ID= 2 (0009)	5.27	0.225	12.33	27.23
ID = 3 (0013)	56.90	2.309	12.33	27.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0011) | Area (ha) = 9.19 Curve Number (CN) = 76.0
WASHYD (0011) | Ia (cms) = 5.00 # of Linear Res. (N) = 3.00
ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.52

Unit Hyd Ouput (cms) = 0.602

PEAK FLOW (cms) = 0.285 (1)
TIME TO PEAK (hrs) = 12.500
RUNOFF VOLUME (mm) = 27.234
TOTAL RAINFALL (mm) = 67.300
RUNOFF COEFFICIENT = 0.405

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

CALIB (0005) | Area (ha) = 25.89 Curve Number (CN) = 76.0
WASHYD (0005) | Ia (cms) = 5.00 # of Linear Res. (N) = 3.00
ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.39

Unit Hyd Ouput (cms) = 2.536

PEAK FLOW (cms) = 1.107 (1)
TIME TO PEAK (hrs) = 12.333
RUNOFF VOLUME (mm) = 27.231
TOTAL RAINFALL (mm) = 67.300
RUNOFF COEFFICIENT = 0.405

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

ADD HYD (0014)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID= 1 (0006)	23.69	1.107	12.33	27.23
+ ID= 2 (0011)	9.19	0.285	12.50	27.23
ID = 3 (0014)	32.88	1.392	12.33	27.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB

PEAK FLOW (cms) = 1.541 (1)
TIME TO PEAK (hrs) = 12.333
RUNOFF VOLUME (mm) = 27.222
TOTAL RAINFALL (mm) = 67.300
RUNOFF COEFFICIENT = 0.405

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

CALIB (0008) | Area (ha) = 6.99 Curve Number (CN) = 76.0
WASHYD (0008) | Ia (cms) = 5.00 # of Linear Res. (N) = 3.00
ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.44

Unit Hyd Ouput (cms) = 0.529

PEAK FLOW (cms) = 0.238 (1)
TIME TO PEAK (hrs) = 12.417
RUNOFF VOLUME (mm) = 27.233
TOTAL RAINFALL (mm) = 67.300
RUNOFF COEFFICIENT = 0.405

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

CALIB (0002) | Area (ha) = 26.60 Curve Number (CN) = 76.0
WASHYD (0002) | Ia (cms) = 5.00 # of Linear Res. (N) = 3.00
ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.65

Unit Hyd Ouput (cms) = 1.563

PEAK FLOW (cms) = 0.789 (1)
TIME TO PEAK (hrs) = 12.667
RUNOFF VOLUME (mm) = 27.235
TOTAL RAINFALL (mm) = 67.300
RUNOFF COEFFICIENT = 0.405

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

CALIB (0012) | Area (ha) = 0.789 Curve Number (CN) = 76.0
WASHYD (0012) | Ia (cms) = 5.00 # of Linear Res. (N) = 3.00
ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.52
ID= 2 (0009) | 6.29 0.234 12.42 27.23
ID = 3 (0012) | 32.69 1.014 12.58 27.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0009) | Area (ha) = 5.27 Curve Number (CN) = 76.0
WASHYD (0009) | Ia (cms) = 5.00 # of Linear Res. (N) = 3.00
ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.39

Unit Hyd Ouput (cms) = 0.516

PEAK FLOW (cms) = 0.225 (1)
TIME TO PEAK (hrs) = 12.333
RUNOFF VOLUME (mm) = 27.231
TOTAL RAINFALL (mm) = 67.300
RUNOFF COEFFICIENT = 0.405

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

CALIB (0003) | Area (ha) = 51.63 Curve Number (CN) = 76.0
WASHYD (0003) | Ia (cms) = 5.00 # of Linear Res. (N) = 3.00



WASHED (0001) | Area (ha) = 3.46 | Curve Number (CN) = 76.0
 ID= 1 DF= 5.0 m/s | Ia (mm) = 5.00 | % of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.59

Unit Hyd Qpeak (cms) = 0.367

PEAK FLOW (cms) = 0.156 (1)
 TIME TO PEAK (hrs) = 12.333
 RUMOFF VOLUME (mm) = 27.230
 TOTAL RAINFALL (mm) = 67.300
 RUMOFF COEFFICIENT = 0.405

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

WASHED (0007) | Area (ha) = 12.39 | Curve Number (CN) = 76.0
 ID= 1 DF= 5.0 m/s | Ia (mm) = 5.00 | % of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.59

Unit Hyd Qpeak (cms) = 0.802

PEAK FLOW (cms) = 0.394 (1)
 TIME TO PEAK (hrs) = 12.333
 RUMOFF VOLUME (mm) = 27.230
 TOTAL RAINFALL (mm) = 67.300
 RUMOFF COEFFICIENT = 0.405

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

AND HYD (0015) | AREA QPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (ft/s) (mm)
 ID= 1 (0001): 3.46 0.156 17.33 27.23
 + ID= 2 (0007): 12.39 0.394 12.38 27.23
 TOTAL RAINFALL (mm) = 67.300
 RUMOFF COEFFICIENT = 0.405
 ID = 3 (0015): 15.85 0.526 12.59 27.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

WASHED (0016) | Area (ha) = 12.75 | Curve Number (CN) = 76.0
 ID= 1 DF= 5.0 m/s | Ia (mm) = 5.00 | % of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.48

Unit Hyd Qpeak (cms) = 1.015

PEAK FLOW (cms) = 0.469 (1)
 TIME TO PEAK (hrs) = 12.417
 RUMOFF VOLUME (mm) = 27.230
 TOTAL RAINFALL (mm) = 67.300
 RUMOFF COEFFICIENT = 0.405

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

*** SIMULATION NUMBER: 4 ***

TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	6.17	1.55	12.25	11.15
					19.33
					1.39

File Name: C:\AW\Temp\Adec
 bh7bd-a23-46c-8a8a-296a0b39d85
 1844184-2318-4f82-8558-3910a8e0769b
 Comments: Maxford 25 year 5CS Type II Stor

0.17	0.85	6.25	1.55	12.33	11.15	18.42	1.39
0.23	0.65	6.33	1.55	12.42	11.15	18.50	1.39
0.33	0.65	6.42	1.55	12.50	11.15	18.58	1.39
0.42	0.65	6.50	1.55	12.58	11.15	18.67	1.39
0.51	0.65	6.58	1.55	12.67	5.75	18.75	1.39
0.58	0.65	6.67	1.55	12.75	5.75	18.83	1.39
0.65	0.65	6.75	1.55	12.83	5.75	18.92	1.39
0.72	0.65	6.82	1.55	12.92	5.75	19.00	1.39
0.79	0.65	6.89	1.55	13.00	5.75	19.08	1.39
0.86	0.65	6.96	1.55	13.08	5.75	19.17	1.39
0.93	0.65	7.00	1.55	13.17	1.08	19.21	1.39
1.00	0.65	7.08	1.55	13.25	1.08	19.33	1.39
1.08	0.65	7.17	1.55	13.33	1.08	19.42	1.39
1.17	0.65	7.25	1.55	13.42	1.08	19.50	1.39
1.23	0.65	7.33	1.55	13.50	1.08	19.58	1.39
1.33	0.65	7.42	1.55	13.58	1.08	19.67	1.39
1.42	0.65	7.50	1.55	13.67	6.35	19.75	1.39
1.50	0.65	7.58	1.55	13.75	6.35	19.83	1.39
1.58	0.65	7.67	1.55	13.83	6.35	19.92	1.39
1.65	0.65	7.75	1.55	13.92	6.35	20.00	1.39
1.72	0.65	7.83	1.55	14.00	6.35	20.08	1.39
1.83	0.65	7.92	1.55	14.08	6.35	20.17	0.93
1.92	0.65	8.00	1.55	14.17	2.32	20.25	0.93
2.00	0.65	8.08	1.55	14.25	2.32	20.33	0.93
2.08	0.65	8.17	2.09	14.33	2.32	20.42	0.93
2.17	1.01	8.25	2.09	14.42	2.32	20.50	0.93
2.23	1.01	8.33	2.09	14.50	2.32	20.58	0.93
2.31	1.01	8.42	2.09	14.58	2.32	20.67	0.93
2.38	1.01	8.50	2.09	14.67	2.32	20.75	0.93
2.46	1.01	8.58	2.09	14.75	2.32	20.83	0.93
2.58	1.01	8.67	2.09	14.83	2.32	20.93	0.93
2.67	1.01	8.75	2.09	14.92	2.32	21.00	0.93
2.75	1.01	8.83	2.09	15.00	2.32	21.08	0.93
2.83	1.01	8.92	2.09	15.08	2.32	21.17	0.93
2.92	1.01	9.00	2.09	15.17	2.32	21.25	0.93
3.00	1.01	9.08	2.48	15.25	2.32	21.33	0.93
3.07	1.01	9.17	2.48	15.33	2.32	21.42	0.93
3.17	1.01	9.25	2.48	15.42	2.32	21.50	0.93
3.23	1.01	9.33	2.48	15.50	2.32	21.58	0.93
3.31	1.01	9.42	2.48	15.58	2.32	21.67	0.93
3.38	1.01	9.50	2.48	15.67	2.32	21.75	0.93
3.46	1.01	9.58	2.48	15.75	2.32	21.83	0.93
3.58	1.01	9.67	2.79	15.83	2.32	21.92	0.93
3.67	1.01	9.75	2.79	15.92	2.32	22.00	0.93
3.75	1.01	9.83	2.79	16.00	2.32	22.08	0.93
3.83	1.01	9.92	2.79	16.08	2.32	22.17	0.93
3.92	1.01	10.00	2.79	16.17	1.39	22.25	0.93
4.00	1.01	10.08	3.56	16.25	1.39	22.33	0.93
4.09	1.01	10.17	3.56	16.33	1.39	22.42	0.93
4.17	1.01	10.25	3.56	16.42	1.39	22.50	0.93
4.23	1.01	10.33	3.56	16.50	1.39	22.58	0.93
4.31	1.24	10.42	3.56	16.58	1.39	22.67	0.93
4.38	1.24	10.50	3.56	16.67	1.39	22.75	0.93
4.42	1.24	10.58	3.56	16.75	1.39	22.83	0.93
4.49	1.24	10.67	4.80	16.83	1.39	22.92	0.93
4.57	1.24	10.75	4.80	16.92	1.39	23.00	0.93
4.63	1.24	10.83	4.80	17.00	1.39	23.08	0.93
4.68	1.24	10.92	4.80	17.08	1.39	23.17	0.93
4.75	1.24	11.00	4.80	17.16	1.39	23.25	0.93
4.80	1.24	11.08	4.80	17.25	1.39	23.33	0.93
4.88	1.24	11.17	7.43	17.33	1.39	23.42	0.93
4.92	1.24	11.25	7.43	17.42	1.39	23.50	0.93
4.95	1.24	11.33	7.43	17.50	1.39	23.58	0.93
5.03	1.24	11.42	7.43	17.58	1.39	23.67	0.93
5.12	1.24	11.50	7.43	17.66	1.39	23.75	0.93
5.20	1.24	11.58	7.43	17.75	1.39	23.83	0.93
5.28	1.24	11.67	32.20	17.83	1.39	23.92	0.93
5.37	1.24	11.75	32.20	17.92	1.39	24.00	0.93
5.42	1.24	11.83	32.20	18.00	1.39	24.08	0.93
5.48	1.24	11.92	32.20	18.08	1.39	24.17	0.93
5.52	1.24	12.00	85.45	18.17	1.39	24.25	0.93
6.00	1.24	12.17	11.15	18.25	1.39	24.33	0.93



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| CALIB | (0004) | Area (ha) = 39.53 | Curve Number (CN) = 76.0
 | WASHD | (0001) | Ia (mm) = 26.60 | # of Linear Res. (N) = 3.00
 | ID= 1 DF= 5.0 min | U.H. Tp (hrs) = 0.44

Unit Hyd Qpeak (cms) = 3.022

PEAK FLOW (cms) = 1.706 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 34.344
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

| CALIB | (0005) | Area (ha) = 5.09 | Curve Number (CN) = 76.0
 | WASHD | (0001) | Ia (mm) = 26.60 | # of Linear Res. (N) = 3.00
 | ID= 1 DF= 5.0 min | U.H. Tp (hrs) = 0.44

Unit Hyd Qpeak (cms) = 0.529

PEAK FLOW (cms) = 0.303 (1)
 TIME TO PEAK (hrs) = 12.417
 RUNOFF VOLUME (mm) = 34.344
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

| CALIB | (0002) | Area (ha) = 26.60 | Curve Number (CN) = 76.0
 | WASHD | (0001) | Ia (mm) = 26.60 | # of Linear Res. (N) = 3.00
 | ID= 1 DF= 5.0 min | U.H. Tp (hrs) = 0.65

Unit Hyd Qpeak (cms) = 1.563

PEAK FLOW (cms) = 1.002 (1)
 TIME TO PEAK (hrs) = 12.667
 RUNOFF VOLUME (mm) = 34.347
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

| CALIB | (0012) | Area (ha) = 32.09 | Curve Number (CN) = 76.0
 | WASHD | (0001) | Ia (mm) = 26.60 | # of Linear Res. (N) = 3.00
 | ID= 1 DF= 5.0 min | U.H. Tp (hrs) = 0.39

Unit Hyd Qpeak (cms) = 2.536

PEAK FLOW (cms) = 1.407 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 34.343
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

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

| CALIB | (0002) | Area (ha) = 51.03 | Curve Number (CN) = 76.0
 | WASHD | (0001) | Ia (mm) = 26.60 | # of Linear Res. (N) = 3.00
 | ID= 1 DF= 5.0 min | U.H. Tp (hrs) = 0.42

Unit Hyd Qpeak (cms) = 4.685

PEAK FLOW (cms) = 2.650 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 34.344
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

| ADD HYD | (0013) | AREA OPEAK TPEAK R.V.
 | 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID1= 1 (0003): 51.03 2.650 12.33 34.34
 + ID2= 2 (0009): 5.27 0.286 12.33 34.34
 ID = 3 (0013): 56.30 2.936 12.33 34.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB | (0011) | Area (ha) = 8.19 | Curve Number (CN) = 76.0
 | WASHD | (0001) | Ia (mm) = 26.60 | # of Linear Res. (N) = 3.00
 | ID= 1 DF= 5.0 min | U.H. Tp (hrs) = 0.52

Unit Hyd Qpeak (cms) = 0.602

PEAK FLOW (cms) = 0.362 (1)
 TIME TO PEAK (hrs) = 12.667
 RUNOFF VOLUME (mm) = 34.347
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

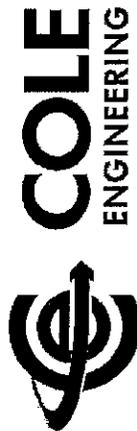
| CALIB | (0005) | Area (ha) = 25.09 | Curve Number (CN) = 76.0
 | WASHD | (0001) | Ia (mm) = 26.60 | # of Linear Res. (N) = 3.00
 | ID= 1 DF= 5.0 min | U.H. Tp (hrs) = 0.39

Unit Hyd Qpeak (cms) = 2.536

PEAK FLOW (cms) = 1.407 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 34.343
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

| ADD HYD | (0014) | AREA OPEAK TPEAK R.V.
 | 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID1= 1 (0005): 25.09 1.407 12.33 34.34
 + ID2= 2 (0011): 8.19 0.286 12.33 34.34



ID = 3 (0014); 34.00 1.748 12.33 34.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| GULB | Area (ha) = 3.46 | Curve Number (CN) = 76.0
 | WASHD | I_a (mm) = 5.00 | # of Linear Res. (N) = 3.00
 | ID=1 DV=5.0 min | U.H. Tp (hrs) = 0.36

Unit Hyd Opeak (cms) = 0.367

PEAK FLOW (cms) = 0.198 (4)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 34.341
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

| GULB | Area (ha) = 12.39 | Curve Number (CN) = 76.0
 | WASHD | I_a (mm) = 5.00 | # of Linear Res. (N) = 3.00
 | ID=1 DV=5.0 min | U.H. Tp (hrs) = 0.36

Unit Hyd Opeak (cms) = 0.902

PEAK FLOW (cms) = 0.501 (4)
 TIME TO PEAK (hrs) = 12.593
 RUNOFF VOLUME (mm) = 34.346
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

| ADD HYD (0015) | AREA OPEAK R.V.
 | 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 + ID=1 (0001); 3.46 0.198 12.33 34.34
 + ID=2 (0007); 12.39 0.501 12.59 34.35
 ID = 3 (0015); 15.85 0.668 12.40 34.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| GULB | Area (ha) = 12.75 | Curve Number (CN) = 76.0
 | WASHD | I_a (mm) = 5.00 | # of Linear Res. (N) = 3.00
 | ID=1 DV=5.0 min | U.H. Tp (hrs) = 0.48

Unit Hyd Opeak (cms) = 1.015

PEAK FLOW (cms) = 0.596 (4)
 TIME TO PEAK (hrs) = 12.417
 RUNOFF VOLUME (mm) = 34.345
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

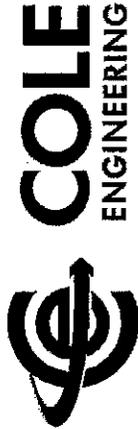
(4) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 ** SIMULATION NUMBER: 5 **

PEAK STORM | Filename: C:\WinTemp\dms

hb7hd-ws23-4crb-8ab-296c0db39033
 1b24607-dcdf-4583-9270-42694abb6e57
 Comments: Measford 30 year 24 Hour ECR Type II stor

TIME	RAIN								
hr:min	mm/hr								
0:00	0.00	6:17	1.70	12:25	12.23	18.33	1.53	18:43	1.53
0:08	0.93	6:25	1.70	12:33	12.23	18.43	1.53	18:50	1.53
0:17	0.93	6:33	1.70	12:42	12.23	18.50	1.53	19:00	1.53
0:24	0.93	6:42	1.70	12:50	12.23	19:08	1.53	19:10	1.53
0:32	0.93	6:50	1.70	12:58	12.23	19:17	1.53	19:25	1.53
0:40	0.93	6:59	1.70	13:07	12.23	19:25	1.53	19:33	1.53
0:48	0.93	7:07	1.70	13:15	12.23	19:33	1.53	19:42	1.53
0:56	0.93	7:15	1.70	13:23	12.23	19:42	1.53	19:50	1.53
0:64	0.93	7:23	1.70	13:31	12.23	19:50	1.53	19:58	1.53
0:72	0.93	7:31	1.70	13:39	12.23	19:58	1.53	20:06	1.53
0:80	0.93	7:39	1.70	13:47	12.23	20:06	1.53	20:14	1.53
0:88	0.93	7:47	1.70	13:55	12.23	20:14	1.53	20:22	1.53
0:96	0.93	7:55	1.70	14:03	12.23	20:22	1.53	20:30	1.53
1:04	0.93	8:03	1.70	14:11	12.23	20:30	1.53	20:38	1.53
1:12	0.93	8:11	1.70	14:19	12.23	20:38	1.53	20:46	1.53
1:20	0.93	8:19	1.70	14:27	12.23	20:46	1.53	20:54	1.53
1:28	0.93	8:27	1.70	14:35	12.23	20:54	1.53	21:02	1.53
1:36	0.93	8:35	1.70	14:43	12.23	21:02	1.53	21:10	1.53
1:44	0.93	8:43	1.70	14:51	12.23	21:10	1.53	21:18	1.53
1:52	0.93	8:51	1.70	14:59	12.23	21:18	1.53	21:26	1.53
2:00	0.93	8:59	1.70	15:07	12.23	21:26	1.53	21:34	1.53
2:08	0.93	9:07	1.70	15:15	12.23	21:34	1.53	21:42	1.53
2:16	0.93	9:15	1.70	15:23	12.23	21:42	1.53	21:50	1.53
2:24	0.93	9:23	1.70	15:31	12.23	21:50	1.53	21:58	1.53
2:32	0.93	9:31	1.70	15:39	12.23	21:58	1.53	22:06	1.53
2:40	0.93	9:39	1.70	15:47	12.23	22:06	1.53	22:14	1.53
2:48	0.93	9:47	1.70	15:55	12.23	22:14	1.53	22:22	1.53
2:56	0.93	9:55	1.70	16:03	12.23	22:22	1.53	22:30	1.53
3:04	0.93	10:03	1.70	16:11	12.23	22:30	1.53	22:38	1.53
3:12	0.93	10:11	1.70	16:19	12.23	22:38	1.53	22:46	1.53
3:20	0.93	10:19	1.70	16:27	12.23	22:46	1.53	22:54	1.53
3:28	0.93	10:27	1.70	16:35	12.23	22:54	1.53	23:02	1.53
3:36	0.93	10:35	1.70	16:43	12.23	23:02	1.53	23:10	1.53
3:44	0.93	10:43	1.70	16:51	12.23	23:10	1.53	23:18	1.53
3:52	0.93	10:51	1.70	16:59	12.23	23:18	1.53	23:26	1.53
4:00	0.93	10:59	1.70	17:07	12.23	23:26	1.53	23:34	1.53
4:08	0.93	11:07	1.70	17:15	12.23	23:34	1.53	23:42	1.53
4:16	0.93	11:15	1.70	17:23	12.23	23:42	1.53	23:50	1.53
4:24	0.93	11:23	1.70	17:31	12.23	23:50	1.53	23:58	1.53
4:32	0.93	11:31	1.70	17:39	12.23	23:58	1.53	24:06	1.53
4:40	0.93	11:39	1.70	17:47	12.23	24:06	1.53	24:14	1.53
4:48	0.93	11:47	1.70	17:55	12.23	24:14	1.53	24:22	1.53
4:56	0.93	11:55	1.70	18:03	12.23	24:22	1.53	24:30	1.53
5:04	0.93	12:03	1.70	18:11	12.23	24:30	1.53	24:38	1.53
5:12	0.93	12:11	1.70	18:19	12.23	24:38	1.53	24:46	1.53
5:20	0.93	12:19	1.70	18:27	12.23	24:46	1.53	24:54	1.53
5:28	0.93	12:27	1.70	18:35	12.23	24:54	1.53	25:02	1.53
5:36	0.93	12:35	1.70	18:43	12.23	25:02	1.53	25:10	1.53
5:44	0.93	12:43	1.70	18:51	12.23	25:10	1.53	25:18	1.53
5:52	0.93	12:51	1.70	18:59	12.23	25:18	1.53	25:26	1.53
6:00	0.93	12:59	1.70	19:07	12.23	25:26	1.53	25:34	1.53
6:08	0.93	13:07	1.70	19:15	12.23	25:34	1.53	25:42	1.53
6:16	0.93	13:15	1.70	19:23	12.23	25:42	1.53	25:50	1.53
6:24	0.93	13:23	1.70	19:31	12.23	25:50	1.53	25:58	1.53
6:32	0.93	13:31	1.70	19:39	12.23	25:58	1.53	26:06	1.53
6:40	0.93	13:39	1.70	19:47	12.23	26:06	1.53	26:14	1.53
6:48	0.93	13:47	1.70	19:55	12.23	26:14	1.53	26:22	1.53
6:56	0.93	13:55	1.70	20:03	12.23	26:22	1.53	26:30	1.53
7:04	0.93	14:03	1.70	20:11	12.23	26:30	1.53	26:38	1.53
7:12	0.93	14:11	1.70	20:19	12.23	26:38	1.53	26:46	1.53
7:20	0.93	14:19	1.70	20:27	12.23	26:46	1.53	26:54	1.53
7:28	0.93	14:27	1.70	20:35	12.23	26:54	1.53	27:02	1.53
7:36	0.93	14:35	1.70	20:43	12.23	27:02	1.53	27:10	1.53
7:44	0.93	14:43	1.70	20:51	12.23	27:10	1.53	27:18	1.53
7:52	0.93	14:51	1.70	20:59	12.23	27:18	1.53	27:26	1.53
8:00	0.93	14:59	1.70	21:07	12.23	27:26	1.53	27:34	1.53
8:08	0.93	15:07	1.70	21:15	12.23	27:34	1.53	27:42	1.53
8:16	0.93	15:15	1.70	21:23	12.23	27:42	1.53	27:50	1.53
8:24	0.93	15:23	1.70	21:31	12.23	27:50	1.53	27:58	1.53
8:32	0.93	15:31	1.70	21:39	12.23	27:58	1.53	28:06	1.53
8:40	0.93	15:39	1.70	21:47	12.23	28:06	1.53	28:14	1.53
8:48	0.93	15:47	1.70	21:55	12.23	28:14	1.53	28:22	1.53
8:56	0.93	15:55	1.70	22:03	12.23	28:22	1.53	28:30	1.53
9:04	0.93	16:03	1.70	22:11	12.23	28:30	1.53	28:38	1.53
9:12	0.93	16:11	1.70	22:19	12.23	28:38	1.53	28:46	1.53
9:20	0.93	16:19	1.70	22:27	12.23	28:46	1.53	28:54	1.53
9:28	0.93	16:27	1.70	22:35	12.23	28:54	1.53	29:02	1.53
9:36	0.93	16:35	1.70	22:43	12.23	29:02	1.53	29:10	1.53
9:44	0.93	16:43	1.70	22:51	12.23	29:10	1.53	29:18	1.53
9:52	0.93	16:51	1.70	22:59	12.23	29:18	1.53	29:26	1.53
10:00	0.93	16:59	1.70	23:07	12.23	29:26	1.53	29:34	1.53
10:08	0.93	17:07	1.70	23:15	12.23	29:34	1.53	29:42	1.53
10:16	0.93	17:15	1.70	23:23	12.23	29:42	1.53	29:50	1.53
10:24	0.93	17:23	1.70	23:31	12.23	29:50	1.53	29:58	1.53
10:32	0.93	17:31	1.70	23:39	12.23	29:58	1.53	30:06	1.53
10:40	0.93	17:39	1.70	23:47	12.23	30:06	1.53	30:14	1.53
10:48	0.93	17:47	1.70	23:55	12.23	30:14	1.53	30:22	1.53
10:56	0.93	17:55	1.70	24:03	12.23	30:22	1.53	30:30	1.53
11:04	0.93	18:03	1.70	24:11	12.23	30:30	1.53	30:38	1.53
11:12	0.93	18:11	1.70	24:19	12.23	30:38	1.53	30:46	1.53
11:20	0.93	18:19	1.70	24:27	12.23	30:46	1.53	30:54	1.53
11:28	0.93	18:27	1.70	24:35	12.23	30:54	1.53	31:02	1.53
11:36	0.93	18:35	1.70	24:43	12.23	31:02	1.53	31:10	1.53
11:44	0.93	18:43	1.70	24:51	12.23	31:10	1.53	31:18	1.53
11:52	0.93	18:51	1.70	24:59	12.23	31:18	1.53	31:26	1.53
12:00	0.93	18:59	1.70	25:07	12.23	31:26	1.53	31:34	1.53
12:08	0.93	19:07	1.70	25:15	12.23	31:34	1.53	31:42	1.53
12:16	0.93	19:15	1.70	25:23	12.23	31:42	1.53	31:50	1.53
12:24	0.93	19:23	1.70	25:31	12.23	31:50	1.53	31:58	1.53
12:32	0.93	19:31	1.70	25:39	12.23	31:58	1.53	32:06	1.53
12:40	0.93	19:39	1.70	25:47	12.23	32:06	1.53	32:14	1.53
12:48	0.93	19:47	1.70	25:55	12.23	32:14	1.53	32:22	1.53
12:56	0.93	19:55	1.70	26:03	12.23	32:22	1.53	32:30	1.53
13:04	0.93	20:03	1.70	26:11	12.23	32:30	1.53	32:38	1.53
1									



 *** SIMULATION NUMBER: 6 ***

Filename: C:\WLETemp\hac
 h07h0c223-acc9-98ba-256c6cb3955\
 1460c223-9702-4d13-8d8b-32d27d37c1b
 Comments: Peakval 30 Year 24 Hour 865 Type II Stor

REAR STORM
 Probabl = 92.30 mm

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.08	0.00	6.17	1.85	12.25	13.29	18.93	1.66
0.17	1.62	6.25	1.85	12.33	13.29	19.42	1.66
0.25	1.62	6.33	1.85	12.42	13.29	19.50	1.66
0.33	1.62	6.42	1.85	12.50	13.29	19.58	1.66
0.42	1.62	6.50	1.85	12.58	13.29	19.67	1.66
0.50	1.62	6.58	1.85	12.67	13.29	19.75	1.66
0.58	1.62	6.67	1.85	12.75	13.29	19.83	1.66
0.67	1.62	6.75	1.85	12.83	13.29	19.90	1.66
0.75	1.62	6.83	1.85	12.92	13.29	19.98	1.66
0.83	1.62	6.92	1.85	13.00	13.29	20.06	1.66
0.92	1.62	7.00	1.85	13.08	13.29	20.14	1.66
1.00	1.62	7.08	1.85	13.17	13.29	20.22	1.66
1.08	1.62	7.17	1.85	13.25	13.29	20.30	1.66
1.17	1.62	7.25	1.85	13.33	13.29	20.38	1.66
1.25	1.62	7.33	1.85	13.42	13.29	20.46	1.66
1.33	1.62	7.42	1.85	13.50	13.29	20.54	1.66
1.42	1.62	7.50	1.85	13.58	13.29	20.62	1.66
1.50	1.62	7.58	1.85	13.67	13.29	20.70	1.66
1.58	1.62	7.67	1.85	13.75	13.29	20.78	1.66
1.67	1.62	7.75	1.85	13.83	13.29	20.86	1.66
1.75	1.62	7.83	1.85	13.92	13.29	20.94	1.66
1.83	1.62	7.92	1.85	14.00	13.29	21.02	1.66
1.92	1.62	8.00	1.85	14.08	13.29	21.10	1.66
2.00	1.62	8.08	1.85	14.17	13.29	21.18	1.66
2.08	1.62	8.17	2.49	14.25	2.77	20.33	1.11
2.17	1.62	8.25	2.49	14.33	2.77	20.42	1.11
2.25	1.62	8.33	2.49	14.42	2.77	20.50	1.11
2.33	1.62	8.42	2.49	14.50	2.77	20.58	1.11
2.42	1.62	8.50	2.49	14.58	2.77	20.67	1.11
2.50	1.62	8.58	2.49	14.67	2.77	20.75	1.11
2.58	1.62	8.67	2.49	14.75	2.77	20.83	1.11
2.67	1.62	8.75	2.49	14.83	2.77	20.92	1.11
2.75	1.62	8.83	2.49	14.92	2.77	21.00	1.11
2.83	1.62	8.92	2.49	15.00	2.77	21.08	1.11
2.92	1.62	9.00	2.49	15.08	2.77	21.17	1.11
3.00	1.62	9.09	2.49	15.17	2.77	21.25	1.11
3.08	1.62	9.17	2.49	15.25	2.77	21.33	1.11
3.17	1.62	9.25	2.49	15.33	2.77	21.42	1.11
3.25	1.62	9.33	2.49	15.42	2.77	21.50	1.11
3.33	1.62	9.42	2.49	15.50	2.77	21.58	1.11
3.42	1.62	9.50	2.49	15.58	2.77	21.67	1.11
3.50	1.62	9.58	2.49	15.67	2.77	21.75	1.11
3.58	1.62	9.67	2.49	15.75	2.77	21.83	1.11
3.67	1.62	9.75	2.49	15.83	2.77	21.92	1.11
3.75	1.62	9.83	2.49	15.92	2.77	22.00	1.11
3.83	1.62	9.92	2.49	16.00	2.77	22.08	1.11
3.92	1.62	10.00	2.49	16.08	2.77	22.17	1.11
4.00	1.62	10.08	2.49	16.17	2.77	22.25	1.11
4.08	1.62	10.17	2.49	16.25	2.77	22.33	1.11
4.17	1.62	10.25	2.49	16.33	2.77	22.42	1.11
4.25	1.62	10.33	2.49	16.42	2.77	22.50	1.11
4.33	1.62	10.42	2.49	16.50	2.77	22.58	1.11
4.42	1.62	10.50	2.49	16.58	2.77	22.67	1.11
4.50	1.62	10.58	2.49	16.67	2.77	22.75	1.11
4.58	1.62	10.67	2.49	16.75	2.77	22.83	1.11
4.67	1.62	10.75	2.49	16.83	2.77	22.92	1.11
4.75	1.62	10.83	2.49	16.92	2.77	23.00	1.11
4.83	1.62	10.92	2.49	17.00	2.77	23.08	1.11
4.92	1.62	11.00	2.49	17.08	2.77	23.17	1.11
5.00	1.62	11.08	2.49	17.17	2.77	23.25	1.11
5.08	1.62	11.17	2.49	17.25	2.77	23.33	1.11
5.17	1.62	11.25	2.49	17.33	2.77	23.42	1.11
5.25	1.62	11.33	2.49	17.42	2.77	23.50	1.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALLIB (0001) Area (ha) = 3.46 Curve Number (CN) = 76.0
 WASHFD (0002) Area (ha) = 5.00 U.H. Tp (hrs) = 3.00
 ID = 1 DT = 5.0 min U.H. Tp (hrs) = 0.59
 Unit Hyd Qpeak (cms) = 0.367
 PEAK FLOW (cms) = 0.231 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 39.865
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLIB (0015) Area (ha) = 12.39 Curve Number (CN) = 76.0
 WASHFD (0007) Area (ha) = 5.00 U.H. Tp (hrs) = 3.00
 ID = 1 DT = 5.0 min U.H. Tp (hrs) = 0.59
 Unit Hyd Qpeak (cms) = 0.802
 PEAK FLOW (cms) = 0.583 (1)
 TIME TO PEAK (hrs) = 12.583
 RUNOFF VOLUME (mm) = 39.871
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLIB (0015) Area (ha) = 12.75 Curve Number (CN) = 76.0
 WASHFD (0015) Area (ha) = 5.00 U.H. Tp (hrs) = 3.00
 ID = 1 DT = 5.0 min U.H. Tp (hrs) = 0.48
 Unit Hyd Qpeak (cms) = 1.013
 PEAK FLOW (cms) = 0.585 (1)
 TIME TO PEAK (hrs) = 12.477
 RUNOFF VOLUME (mm) = 39.870
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLIB (0015) Area (ha) = 15.85 Curve Number (CN) = 76.0
 WASHFD (0015) Area (ha) = 5.00 U.H. Tp (hrs) = 3.00
 ID = 1 DT = 5.0 min U.H. Tp (hrs) = 0.48
 Unit Hyd Qpeak (cms) = 1.177
 PEAK FLOW (cms) = 0.585 (1)
 TIME TO PEAK (hrs) = 12.477
 RUNOFF VOLUME (mm) = 39.870
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLIB (0015) Area (ha) = 15.85 Curve Number (CN) = 76.0
 WASHFD (0015) Area (ha) = 5.00 U.H. Tp (hrs) = 3.00
 ID = 1 DT = 5.0 min U.H. Tp (hrs) = 0.48
 Unit Hyd Qpeak (cms) = 1.177
 PEAK FLOW (cms) = 0.585 (1)
 TIME TO PEAK (hrs) = 12.477
 RUNOFF VOLUME (mm) = 39.870
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLIB (0015) Area (ha) = 15.85 Curve Number (CN) = 76.0
 WASHFD (0015) Area (ha) = 5.00 U.H. Tp (hrs) = 3.00
 ID = 1 DT = 5.0 min U.H. Tp (hrs) = 0.48
 Unit Hyd Qpeak (cms) = 1.177
 PEAK FLOW (cms) = 0.585 (1)
 TIME TO PEAK (hrs) = 12.477
 RUNOFF VOLUME (mm) = 39.870
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 ID = 1 DT = 5.0 min U.H. Tp (hrs) = 0.48
 Unit Hyd Qpeak (cms) = 1.177
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 TIME TO PEAK (hrs) = 12.477
 RUNOFF VOLUME (mm) = 39.870
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



COLE ENGINEERING

5.32	1.48	11.42	0.95	17.50	1.65	23.56	1.11
5.42	1.48	11.80	0.95	17.58	1.66	23.66	1.11
5.50	1.48	11.56	0.95	17.67	1.66	23.75	1.11
5.58	1.48	11.67	0.95	17.75	1.66	23.83	1.11
5.67	1.48	11.75	0.95	17.83	1.66	23.92	1.11
5.75	1.48	11.83	0.95	17.92	1.66	24.00	1.11
5.83	1.48	11.92	0.95	18.00	1.66	24.08	1.11
5.92	1.48	12.00	0.95	18.08	1.66	24.16	1.11
6.00	1.48	12.09	0.95	18.17	1.66	24.24	1.11
6.00	1.48	12.17	0.95	18.25	1.66	24.32	1.11

CALIB (0004) | Area (ha) = 33.23 | Curve Number (CN) = 76.0
 NASHID (0001) | Ia (mm) = 5.00 | % of Linear Res. (R) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.42

Unit Hyd Qpeak (cms) = 3.022

PEAK FLOW (cms) = 2.275 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 45.493
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

CALIB (0008) | Area (ha) = 5.09 | Curve Number (CN) = 76.0
 NASHID (0001) | Ia (mm) = 5.00 | % of Linear Res. (R) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.44

Unit Hyd Qpeak (cms) = 0.529

PEAK FLOW (cms) = 0.404 (1)
 TIME TO PEAK (hrs) = 12.417
 RUNOFF VOLUME (mm) = 45.493
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

CALIB (0002) | Area (ha) = 26.60 | Curve Number (CN) = 76.0
 NASHID (0001) | Ia (mm) = 5.00 | % of Linear Res. (R) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.69

Unit Hyd Qpeak (cms) = 1.563

PEAK FLOW (cms) = 1.237 (1)
 TIME TO PEAK (hrs) = 12.667
 RUNOFF VOLUME (mm) = 45.493
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

ADD HYD (0012) | AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID= 1 (0002) | 26.60 1.337 12.67 45.50
 + ID= 2 (0008) | 5.09 0.404 12.42 45.49
 ID= 3 (0012) | 32.69 1.742 12.58 45.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

CALIB (0005) | Area (ha) = 5.27 | Curve Number (CN) = 76.0
 NASHID (0001) | Ia (mm) = 5.00 | % of Linear Res. (R) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.52

Unit Hyd Qpeak (cms) = 0.516

PEAK FLOW (cms) = 0.382 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 45.493
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

CALIB (0003) | Area (ha) = 51.63 | Curve Number (CN) = 76.0
 NASHID (0001) | Ia (mm) = 5.00 | % of Linear Res. (R) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.42

Unit Hyd Qpeak (cms) = 4.895

PEAK FLOW (cms) = 3.562 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 45.493
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

ADD HYD (0013) | AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID= 1 (0003) | 51.63 3.542 12.33 45.49
 + ID= 2 (0009) | 5.27 0.382 12.33 45.49
 ID= 3 (0013) | 56.90 3.924 12.33 45.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

CALIB (0011) | Area (ha) = 9.15 | Curve Number (CN) = 76.0
 NASHID (0001) | Ia (mm) = 5.00 | % of Linear Res. (R) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.52

Unit Hyd Qpeak (cms) = 0.602

PEAK FLOW (cms) = 0.483 (1)
 TIME TO PEAK (hrs) = 12.500
 RUNOFF VOLUME (mm) = 45.493
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

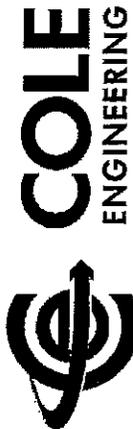
(1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB (0005) | Area (ha) = 25.89 | Curve Number (CN) = 76.0
 NASHID (0001) | Ia (mm) = 5.00 | % of Linear Res. (R) = 3.00
 ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.39

Unit Hyd Qpeak (cms) = 2.826

PEAK FLOW (cms) = 1.876 (1)
 TIME TO PEAK (hrs) = 12.533
 RUNOFF VOLUME (mm) = 45.493

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



TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

ADD HYD (0014) | AREA OPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID# = 1 (0001) | 25.89 1.878 12.33 45.49
 * ID# = 2 (0011) | 8.19 0.463 12.50 45.50
 ID = 3 (0014) | 34.08 2.338 12.33 45.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CGS1B (0001) | Area (ha) = 3.46 Curve Number (CN) = 76.0
 1 ID = 1 DT = 5.0 min | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.35

Unit Hyd Opneak (cms) = 0.367

PEAK FLOW (cms) = 0.264 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 45.489
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

CGS1B (0007) | Area (ha) = 12.39 Curve Number (CN) = 76.0
 1 ID = 1 DT = 5.0 min | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.59

Unit Hyd Opneak (cms) = 0.502

PEAK FLOW (cms) = 0.569 (1)
 TIME TO PEAK (hrs) = 12.593
 RUNOFF VOLUME (mm) = 45.436
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

ADD HYD (0015) | AREA OPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID# = 1 (0001) | 5.46 0.284 12.33 45.49
 + ID# = 2 (0007) | 12.39 0.668 12.58 45.50
 ID = 3 (0015) | 15.85 0.892 12.50 45.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CGS1B (0015) | Area (ha) = 12.75 Curve Number (CN) = 76.0
 1 ID = 1 DT = 5.0 min | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.46

Unit Hyd Opneak (cms) = 1.015

PEAK FLOW (cms) = 0.787 (1)
 TIME TO PEAK (hrs) = 12.417

RUNOFF VOLUME (mm) = 45.485
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

 ** SIMULATION NUMBER: 7 **

Filename: C:\Vlump\duo
 25752-a223-4c69-8aba-286c4b595053A
 Append=5555-4789-4200-90485228667
 Comments: Rainfall Storm event mm/hr

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.10	13.00	3.10	3.00	6.10	43.00	9.10	13.00
1.10	13.00	3.20	3.00	6.20	43.00	9.20	13.00
2.10	13.00	3.30	3.00	6.30	43.00	9.30	13.00
3.10	13.00	3.40	3.00	6.40	43.00	9.40	13.00
4.10	13.00	3.50	3.00	6.50	43.00	9.50	13.00
5.10	13.00	3.60	3.00	6.60	43.00	9.60	13.00
6.10	13.00	3.70	3.00	6.70	43.00	9.70	13.00
7.10	13.00	3.80	3.00	6.80	43.00	9.80	13.00
8.10	13.00	3.90	3.00	6.90	43.00	9.90	13.00
9.10	13.00	4.00	3.00	7.00	43.00	10.00	13.00
10.10	13.00	4.10	3.00	7.10	43.00	10.10	13.00
11.10	13.00	4.20	3.00	7.20	43.00	10.20	13.00
12.10	13.00	4.30	3.00	7.30	43.00	10.30	13.00
13.10	13.00	4.40	3.00	7.40	43.00	10.40	13.00
14.10	13.00	4.50	3.00	7.50	43.00	10.50	13.00
15.10	13.00	4.60	3.00	7.60	43.00	10.60	13.00
16.10	13.00	4.70	3.00	7.70	43.00	10.70	13.00
17.10	13.00	4.80	3.00	7.80	43.00	10.80	13.00
18.10	13.00	4.90	3.00	7.90	43.00	10.90	13.00
19.10	13.00	5.00	3.00	8.00	43.00	11.00	13.00
20.10	13.00	5.10	3.00	8.10	43.00	11.10	13.00
21.10	13.00	5.20	3.00	8.20	43.00	11.20	13.00
22.10	13.00	5.30	3.00	8.30	43.00	11.30	13.00
23.10	13.00	5.40	3.00	8.40	43.00	11.40	13.00
24.10	13.00	5.50	3.00	8.50	43.00	11.50	13.00
25.10	13.00	5.60	3.00	8.60	43.00	11.60	13.00
26.10	13.00	5.70	3.00	8.70	43.00	11.70	13.00
27.10	13.00	5.80	3.00	8.80	43.00	11.80	13.00
28.10	13.00	5.90	3.00	8.90	43.00	11.90	13.00
29.10	13.00	6.00	3.00	9.00	43.00	12.00	13.00
30.10	13.00	6.00	3.00	9.00	43.00	12.00	13.00

CGS1B (0064) | Area (ha) = 33.23 Curve Number (CN) = 76.0
 1 ID = 1 DT = 5.0 min | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.42

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

TRANSFORMED HYETOGRAPH

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	13.00	3.00	3.00	6.00	43.00	9.00	13.00
1.00	13.00	3.10	3.00	6.10	43.00	9.10	13.00
2.00	13.00	3.20	3.00	6.20	43.00	9.20	13.00
3.00	13.00	3.30	3.00	6.30	43.00	9.30	13.00
4.00	13.00	3.40	3.00	6.40	43.00	9.40	13.00
5.00	13.00	3.50	3.00	6.50	43.00	9.50	13.00
6.00	13.00	3.60	3.00	6.60	43.00	9.60	13.00
7.00	13.00	3.70	3.00	6.70	43.00	9.70	13.00
8.00	13.00	3.80	3.00	6.80	43.00	9.80	13.00
9.00	13.00	3.90	3.00	6.90	43.00	9.90	13.00
10.00	13.00	4.00	3.00	7.00	43.00	10.00	13.00
11.00	13.00	4.10	3.00	7.10	43.00	10.10	13.00
12.00	13.00	4.20	3.00	7.20	43.00	10.20	13.00
13.00	13.00	4.30	3.00	7.30	43.00	10.30	13.00
14.00	13.00	4.40	3.00	7.40	43.00	10.40	13.00
15.00	13.00	4.50	3.00	7.50	43.00	10.50	13.00
16.00	13.00	4.60	3.00	7.60	43.00	10.60	13.00
17.00	13.00	4.70	3.00	7.70	43.00	10.70	13.00
18.00	13.00	4.80	3.00	7.80	43.00	10.80	13.00
19.00	13.00	4.90	3.00	7.90	43.00	10.90	13.00
20.00	13.00	5.00	3.00	8.00	43.00	11.00	13.00
21.00	13.00	5.10	3.00	8.10	43.00	11.10	13.00
22.00	13.00	5.20	3.00	8.20	43.00	11.20	13.00
23.00	13.00	5.30	3.00	8.30	43.00	11.30	13.00
24.00	13.00	5.40	3.00	8.40	43.00	11.40	13.00
25.00	13.00	5.50	3.00	8.50	43.00	11.50	13.00
26.00	13.00	5.60	3.00	8.60	43.00	11.60	13.00
27.00	13.00	5.70	3.00	8.70	43.00	11.70	13.00
28.00	13.00	5.80	3.00	8.80	43.00	11.80	13.00
29.00	13.00	5.90	3.00	8.90	43.00	11.90	13.00
30.00	13.00	6.00	3.00	9.00	43.00	12.00	13.00



1.000	15.00	4.000	3.00	7.080	43.00	10.00	13.00
1.083	20.00	4.083	3.00	7.080	43.00	10.00	13.00
1.167	20.00	4.167	3.00	7.080	43.00	10.00	13.00
1.250	20.00	4.250	3.00	7.080	43.00	10.00	13.00
1.333	20.00	4.333	3.00	7.080	43.00	10.00	13.00
1.417	20.00	4.417	3.00	7.080	43.00	10.00	13.00
1.500	20.00	4.500	3.00	7.080	43.00	10.00	13.00
1.583	20.00	4.583	3.00	7.080	43.00	10.00	13.00
1.667	20.00	4.667	3.00	7.080	43.00	10.00	13.00
1.750	20.00	4.750	3.00	7.080	43.00	10.00	13.00
1.833	20.00	4.833	3.00	7.080	43.00	10.00	13.00
1.917	20.00	4.917	3.00	7.080	43.00	10.00	13.00
2.000	20.00	5.000	3.00	7.080	43.00	10.00	13.00
2.083	20.00	5.083	3.00	7.080	43.00	10.00	13.00
2.167	20.00	5.167	3.00	7.080	43.00	10.00	13.00
2.250	20.00	5.250	3.00	7.080	43.00	10.00	13.00
2.333	20.00	5.333	3.00	7.080	43.00	10.00	13.00
2.417	20.00	5.417	3.00	7.080	43.00	10.00	13.00
2.500	20.00	5.500	3.00	7.080	43.00	10.00	13.00
2.583	20.00	5.583	3.00	7.080	43.00	10.00	13.00
2.667	20.00	5.667	3.00	7.080	43.00	10.00	13.00
2.750	20.00	5.750	3.00	7.080	43.00	10.00	13.00
2.833	20.00	5.833	3.00	7.080	43.00	10.00	13.00
2.917	20.00	5.917	3.00	7.080	43.00	10.00	13.00
3.000	20.00	6.000	3.00	7.080	43.00	10.00	13.00

Unit Hyd Opeak (cms) = 3.022
 PEAK FLOW (cms) = 2.687 (1)
 TIME TO PEAK (hrs) = 7.083
 RUNOFF VOLUME (mm) = 131.763
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS (0008) Area (ha) = 6.89 Curve Number (CN) = 76.0
 WASHY (0002) Ia (mm) = 5.09 # of Linear Res. (N) = 3.00
 ID = 1 DT = 5.0 min U.R. Tp (hrs) = 0.41
 Unit Hyd Opeak (cms) = 0.529
 PEAK FLOW (cms) = 0.523 (1)
 TIME TO PEAK (hrs) = 7.083
 RUNOFF VOLUME (mm) = 131.763
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS (0002) Area (ha) = 26.60 Curve Number (CN) = 76.0
 WASHY (0002) Ia (mm) = 5.09 # of Linear Res. (N) = 3.00
 ID = 1 DT = 5.0 min U.R. Tp (hrs) = 0.55
 Unit Hyd Opeak (cms) = 1.563
 PEAK FLOW (cms) = 2.014 (1)
 TIME TO PEAK (hrs) = 7.333
 RUNOFF VOLUME (mm) = 131.775
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS (0012) Area (ha) = 25.88 Curve Number (CN) = 76.0
 WASHY (0002) Ia (mm) = 5.09 # of Linear Res. (N) = 3.00
 ID = 1 DT = 5.0 min U.R. Tp (hrs) = 0.52
 Unit Hyd Opeak (cms) = 0.602
 PEAK FLOW (cms) = 0.671 (1)
 TIME TO PEAK (hrs) = 7.167
 RUNOFF VOLUME (mm) = 131.767
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS (0002) Area (ha) = 26.60 Curve Number (CN) = 76.0
 WASHY (0002) Ia (mm) = 5.09 # of Linear Res. (N) = 3.00
 ID = 1 DT = 5.0 min U.R. Tp (hrs) = 0.52
 Unit Hyd Opeak (cms) = 0.529
 PEAK FLOW (cms) = 0.523 (1)
 TIME TO PEAK (hrs) = 7.083
 RUNOFF VOLUME (mm) = 131.763
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

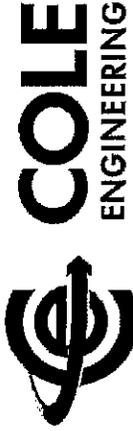
CALLS (0009) Area (ha) = 5.27 Curve Number (CN) = 76.0
 WASHY (0011) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DT = 5.0 min U.R. Tp (hrs) = 0.39
 Unit Hyd Opeak (cms) = 0.516
 PEAK FLOW (cms) = 0.466 (1)
 TIME TO PEAK (hrs) = 7.083
 RUNOFF VOLUME (mm) = 131.759
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS (0003) Area (ha) = 51.63 Curve Number (CN) = 76.0
 WASHY (0003) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DT = 5.0 min U.R. Tp (hrs) = 0.42
 Unit Hyd Opeak (cms) = 4.695
 PEAK FLOW (cms) = 4.486 (1)
 TIME TO PEAK (hrs) = 7.083
 RUNOFF VOLUME (mm) = 131.763
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS (0013) Area (ha) = 56.90 Curve Number (CN) = 76.0
 WASHY (0013) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DT = 5.0 min U.R. Tp (hrs) = 0.52
 Unit Hyd Opeak (cms) = 0.602
 PEAK FLOW (cms) = 0.671 (1)
 TIME TO PEAK (hrs) = 7.167
 RUNOFF VOLUME (mm) = 131.767
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS (0003) Area (ha) = 25.88 Curve Number (CN) = 76.0
 WASHY (0003) Ia (mm) = 5.09 # of Linear Res. (N) = 3.00
 ID = 1 DT = 5.0 min U.R. Tp (hrs) = 0.52
 Unit Hyd Opeak (cms) = 0.602
 PEAK FLOW (cms) = 0.671 (1)
 TIME TO PEAK (hrs) = 7.167
 RUNOFF VOLUME (mm) = 131.767
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS (0012) Area (ha) = 25.88 Curve Number (CN) = 76.0
 WASHY (0012) Ia (mm) = 5.09 # of Linear Res. (N) = 3.00
 ID = 1 DT = 5.0 min U.R. Tp (hrs) = 0.52
 Unit Hyd Opeak (cms) = 0.602
 PEAK FLOW (cms) = 0.671 (1)
 TIME TO PEAK (hrs) = 7.167
 RUNOFF VOLUME (mm) = 131.767
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



Unit Hyd Qpeak (cms) = 2.536
 PEAK FLOW (cms) = 2.287 (1)
 TIME TO PEAK (hrs) = 7.063
 RUNOFF VOLUME (cms) = 131.753
 TOTAL RAINFALL (mm) = 133.000
 RUNOFF COEFFICIENT = 0.683

Unit Hyd Qpeak (cms) = 1.015
 PEAK FLOW (cms) = 1.068 (1)
 TIME TO PEAK (hrs) = 7.187
 RUNOFF VOLUME (cms) = 131.763
 TOTAL RAINFALL (mm) = 133.000
 RUNOFF COEFFICIENT = 0.683

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

** SIMULATION NUMBER: 8 **

CHICAGO STORM
 Postal= 78.03 mm
 used in: TEMPERATURE = A / (t + B) °C
 B= 4.060
 C= 0.320

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

TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.17	4.34	1.17	36.21	2.17	10.60
0.33	5.00	1.33	203.51	2.33	8.96
0.50	5.92	1.50	50.96	2.50	7.78
0.67	7.33	1.67	25.51	2.67	6.90
0.83	3.77	1.83	17.18	2.83	6.21
1.00	13.10	2.00	13.06	3.00	3.55
				4.00	3.74

MODIFY STORM
 CRSE= 1
 Multiplication Factor= 0.32
 Time shift (min) = 0.00

TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.167	1.39	1.167	12.26	2.167	3.40
0.333	1.86	1.333	65.26	2.333	2.88
0.500	1.90	1.500	16.36	2.500	2.50
0.667	2.35	1.667	6.19	2.667	2.21
0.833	3.13	1.833	5.32	2.833	1.99
1.000	4.85	2.000	4.19	3.000	1.81
				4.000	1.20

CSWB (0004) | Area (ha) = 33.23 Curve Number (CN) = 76.0
 WASHD | ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 9.00 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.42

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

TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.39	1.083	12.26	2.083	3.40
0.167	1.89	1.167	12.26	2.167	3.40
0.250	1.60	1.250	65.26	2.250	2.88
0.333	1.69	1.333	65.26	2.333	2.88
0.417	1.89	1.417	16.36	2.417	2.50
0.500	1.89	1.500	16.36	2.500	2.50
0.583	2.35	1.583	6.19	2.583	2.21
0.667	2.35	1.667	6.19	2.667	2.21
0.750	3.13	1.750	5.32	2.750	1.99
0.833	3.13	1.833	5.32	2.833	1.99
				3.833	1.59
				4.833	1.27

U.H. Tp (hrs) = 0.39

Unit Hyd Qpeak (cms) = 2.536
 PEAK FLOW (cms) = 2.287 (1)
 TIME TO PEAK (hrs) = 7.063
 RUNOFF VOLUME (cms) = 131.753
 TOTAL RAINFALL (mm) = 133.000
 RUNOFF COEFFICIENT = 0.683

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

ADD HYD (0014) |
 1 + 2 = 3

AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (ha) (mm) (hrs) (ha)
 ID= 1 (0005): 23.89 2.287 7.06 131.76
 + ID= 2 (0011): 9.19 0.671 7.17 131.77
 ID = 3 (0014): 34.08 2.951 7.08 131.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CSWB (0007) |
 WASHD | ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.39

Area (ha) = 3.45 Curve Number (CN) = 76.0
 U.H. Tp (hrs) = 5.00 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.36

Unit Hyd Qpeak (cms) = 0.367
 PEAK FLOW (cms) = 0.310 (1)
 TIME TO PEAK (hrs) = 7.063
 RUNOFF VOLUME (cms) = 131.752
 TOTAL RAINFALL (mm) = 133.000
 RUNOFF COEFFICIENT = 0.683

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

CSWB (0007) |
 WASHD | ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.39

Area (ha) = 12.33 Curve Number (CN) = 76.0
 U.H. Tp (hrs) = 5.00 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.39

Unit Hyd Qpeak (cms) = 0.902
 PEAK FLOW (cms) = 0.972 (1)
 TIME TO PEAK (hrs) = 7.250
 RUNOFF VOLUME (cms) = 133.000
 TOTAL RAINFALL (mm) = 133.000
 RUNOFF COEFFICIENT = 0.683

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

ADD HYD (0015) |
 1 + 2 = 3

AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (ha) (mm) (hrs) (ha)
 ID= 1 (0007): 3.46 0.310 7.08 131.75
 + ID= 2 (0007): 12.39 0.973 7.25 131.77
 ID = 3 (0015): 15.85 1.269 7.17 131.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CSWB (0016) |
 WASHD | ID= 1 DT= 5.0 min | U.H. Tp (hrs) = 0.42

Area (ha) = 12.75 Curve Number (CN) = 76.0
 U.H. Tp (hrs) = 9.00 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.42



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0.917 4.85 | 1.917 4.15 | 2.917 1.81 | 3.92 1.20
 1.000 4.85 | 2.000 4.15 | 3.000 1.81 | 4.00 1.20

Unit Hyd Qpeak (cms) = 3.022

PEAK FLOW (cms) = 0.250 (1)
 TIME TO PEAK (hrs) = 1.533
 RUNOFF VOLUME (mm) = 4.008
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

CALIB (0015) Area (ha) = 6.09 Curve Number (CN) = 76.0
 WASHID (0005) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DM = 5.0 min U.H. Tp (hrs) = 0.44

Unit Hyd Qpeak (cms) = 0.529

PEAK FLOW (cms) = 0.044 (1)
 TIME TO PEAK (hrs) = 1.833
 RUNOFF VOLUME (mm) = 4.008
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

CALIB (0012) Area (ha) = 25.60 Curve Number (CN) = 76.0
 WASHID (0005) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DM = 5.0 min U.H. Tp (hrs) = 0.65

Unit Hyd Qpeak (cms) = 1.563

PEAK FLOW (cms) = 0.150 (1)
 TIME TO PEAK (hrs) = 1.527
 RUNOFF VOLUME (mm) = 4.008
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

CALIB (0012) Area (ha) = 32.69 Curve Number (CN) = 76.0
 WASHID (0005) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DM = 5.0 min U.H. Tp (hrs) = 0.61
 + ID2 = 2 (0008): 6.09 0.044 1.83 4.01
 ID = 3 (0012): 32.69 0.189 2.08 4.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0009) Area (ha) = 5.27 Curve Number (CN) = 76.0
 WASHID (0005) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DM = 5.0 min U.H. Tp (hrs) = 0.39

Unit Hyd Qpeak (cms) = 0.515

PEAK FLOW (cms) = 0.062 (1)
 TIME TO PEAK (hrs) = 1.833
 RUNOFF VOLUME (mm) = 4.008
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

CALIB (0003) Area (ha) = 51.63 Curve Number (CN) = 76.0
 WASHID (0005) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DM = 5.0 min U.H. Tp (hrs) = 0.42

Unit Hyd Qpeak (cms) = 4.695

PEAK FLOW (cms) = 0.389 (1)
 TIME TO PEAK (hrs) = 1.833
 RUNOFF VOLUME (mm) = 4.008
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

CALIB (0013) Area (ha) = 56.90 Curve Number (CN) = 76.0
 WASHID (0005) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DM = 5.0 min U.H. Tp (hrs) = 0.42
 + ID2 = 2 (0009): 5.27 0.062 1.83 4.01
 ID = 3 (0013): 56.90 0.430 1.83 4.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0011) Area (ha) = 8.15 Curve Number (CN) = 76.0
 WASHID (0005) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DM = 5.0 min U.H. Tp (hrs) = 0.52

Unit Hyd Qpeak (cms) = 0.602

PEAK FLOW (cms) = 0.054 (1)
 TIME TO PEAK (hrs) = 2.000
 RUNOFF VOLUME (mm) = 4.008
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

CALIB (0005) Area (ha) = 23.89 Curve Number (CN) = 76.0
 WASHID (0005) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DM = 5.0 min U.H. Tp (hrs) = 0.59

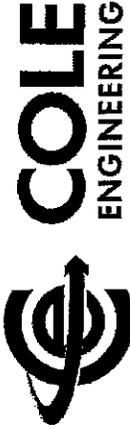
Unit Hyd Qpeak (cms) = 2.536

PEAK FLOW (cms) = 0.204 (1)
 TIME TO PEAK (hrs) = 1.833
 RUNOFF VOLUME (mm) = 4.008
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

CALIB (0014) Area (ha) = 34.06 Curve Number (CN) = 76.0
 WASHID (0005) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DM = 5.0 min U.H. Tp (hrs) = 0.41
 + ID2 = 2 (0011): 8.15 0.054 2.00 4.01
 ID = 3 (0014): 34.06 0.235 1.83 4.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0001) | Area (ha) = 3.46 | Curve Number (CN) = 76.0
 WASHFD (0001) | Ia (mm) = 5.40 | # of Linear Res. (N) = 3.00
 ID# 1 D# 5.0 M3 | U.H. Tp (hrs) = 0.36

Unit Hyd Qpeak (cms) = 0.367
 PEAK FLOW (cms) = 0.029 (1)
 TIME TO PEAK (hrs) = 1.75
 RUNOFF VOLUME (mm) = 4.007
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

CALIB (0007) | Area (ha) = 12.59 | Curve Number (CN) = 76.0
 WASHFD (0007) | Ia (mm) = 5.40 | # of Linear Res. (N) = 3.00
 ID# 1 D# 5.0 M3 | U.H. Tp (hrs) = 0.36

Unit Hyd Qpeak (cms) = 0.902
 PEAK FLOW (cms) = 0.074 (1)
 TIME TO PEAK (hrs) = 2.083
 RUNOFF VOLUME (mm) = 4.008
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

ADD HYD (0015) | AREA QPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID# 1 (0001) | 3.46 0.029 1.75 4.01
 + 12.59 0.074 2.08 4.01
 ID# 3 (0015) | 15.65 0.099 2.00 4.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0016) | Area (ha) = 12.75 | Curve Number (CN) = 76.0
 WASHFD (0016) | Ia (mm) = 5.00 | # of Linear Res. (N) = 3.00
 ID# 1 D# 5.0 M3 | U.H. Tp (hrs) = 0.46

Unit Hyd Qpeak (cms) = 1.015
 PEAK FLOW (cms) = 0.088 (1)
 TIME TO PEAK (hrs) = 1.917
 RUNOFF VOLUME (mm) = 4.008
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

FINISH

APPENDIX D
Post-Development Input Parameters



Post-Development (OTTHYMO)
Input Parameters (STANDHYD)

Town of Meaford
File No. L10-512
Date: March, 2012

Post-Development Drainage Area (OTTHYMO)

Parameter	Description	A1-1	A1-2	A2-1	A2-2	A3	A4-1	A4-3	A4-4	A5-1	A5-2	A6-1	A6-2
AREA	(ha)	1.16	3.03	2.89	37.93	3.28	2.73	3.08	0.58	0.88	10.12	1.09	4.60
XIMP	Impervious Area (Direct Connection)	50%	24%	50%	32%	27%	0%	49%	4%	50%	37%	50%	29%
TIMP	Total Impervious Area	50%	34%	50%	62%	27%	22%	86%	35%	50%	70%	50%	71%
LGI	Overland Flow Length (Impervious)	88.69	142.13	138.8	502.2	147.67	134.91	143.29	62.18	76.59	259.74	85.24	175.1
SLPI	Average Slope (Impervious)	1.0%											
DT	Time Step Increment	15											
DWF	Dry Weather Flow (Base Flow)	0											
LOSS	Rainfall Loss Method	Modified SCS Curve Number											
SLPP	Average Slope (Pervious)	2.0%											
LGP	Overland Flow Length (Pervious)	40											
MNP	Manning's Roughness Coefficient (Pervious)	0.25											
DPSI	Depression Storage (Impervious)	1											
MNI	Manning's Roughness Coefficient (Impervious)	0.013											



Post-Development (OTTHYMO)
Input Parameters (NASHYD)

Town of Westford
File No. L16-512
Date: March 2012

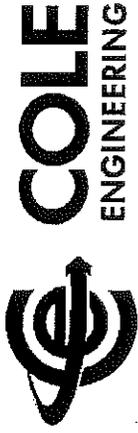
Post-Development Drainage Area (OTTHYMO)

Parameter	Unit	Description	EXT1	EXT2	EXT3	EXT4a	EXT4b	A1-3	A1-4	A2-3	A2-4	A4-2	A4-5	A5-3	A5-3	A6-4
Area	ha	Watershed Area	12.99	6.09	5.74	3.32	4.15	0.79	0.88	3.44	0.88	35.93	0.53	20.14	17.97	1.95
TP	hr	Unit Hydrograph Time to Peak	0.61	0.42	0.38	0.29	0.42	0.28	0.16	0.30	0.56	0.51	0.17	0.31	0.18	0.30
DT	min	Time Step Increment	15													
DWPF	cms	Dry Weather Flow (Base Flow)	0													
CN	-	SCS Curve Number	78													
IA	mm	Initial Abstraction	5													
N	-	Number of Linear Reservoir	3													
Rain	mm/hr	Optional Rainfall Intensity	0 - Without Rain													

Note: 1 - Clay / Silty Clay Loam with good drainage - pasture & other unimproved land / Hydrologic Group C
2 - IA for field is used for this development IA=5

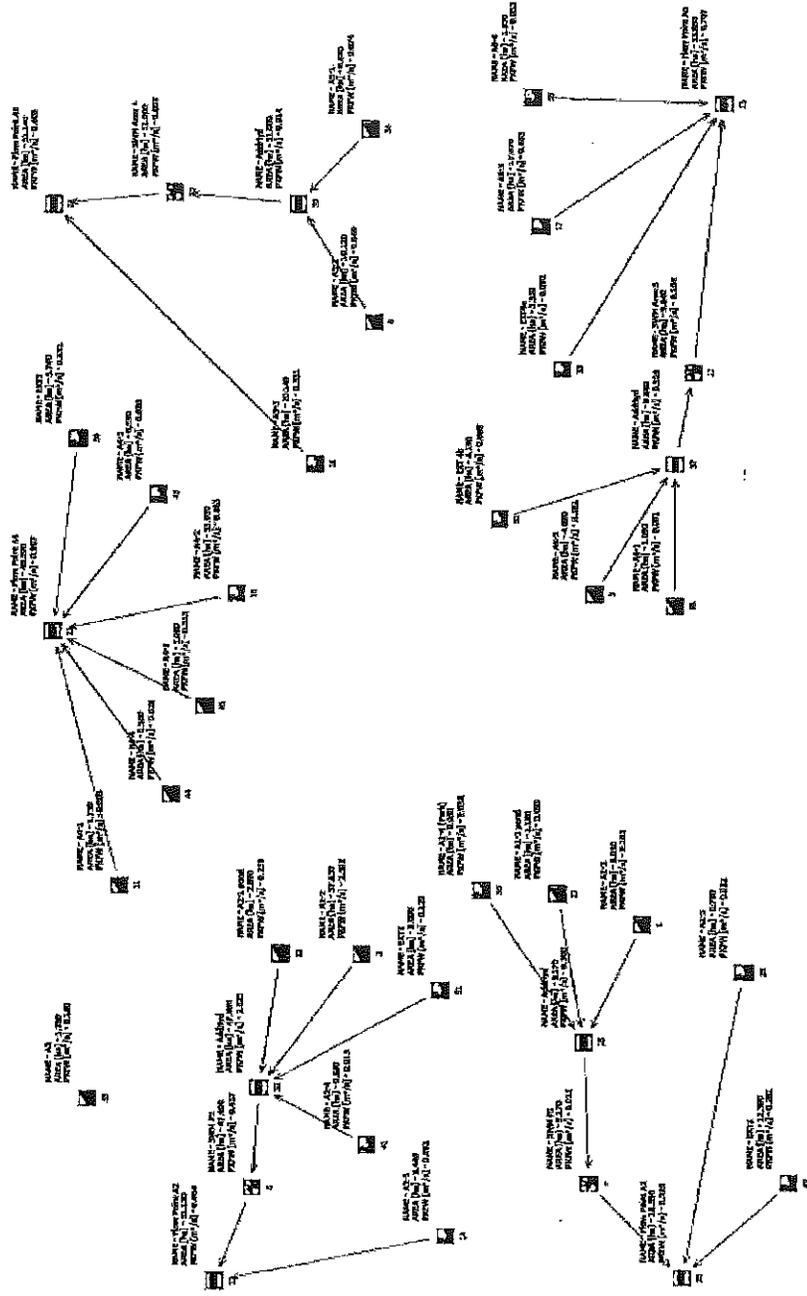
Time of Concentration Calculation									
Area Number	Area (ha)	C	CN	L (m)	Elevation Change (m)	Sw (%)	Tc Airport (min)	TP (Airport) (hr)	
EXT1	12.99	0.25	78	964	38.0	3.84	64.71	0.61	
EXT2	6.09	0.25	78	477	20.0	4.18	37.71	0.42	
EXT3	5.74	0.25	76	324	10.0	3.08	34.39	0.38	
EXT4a	3.32	0.25	76	270	14.0	5.19	26.45	0.29	
EXT4b	4.15	0.25	76	480	20.0	4.17	37.91	0.42	
A1-3	0.79	0.25	75	289	20.0	6.92	24.88	0.28	
A1-4	0.88	0.30	75	120	10.0	8.33	14.19	0.16	
A2-3	3.44	0.25	78	280	14	5.00	27.26	0.30	
A2-4	0.88	0.25	75	517	15	2.85	50.26	0.56	
A4-2	35.93	0.30	75	1221	100	8.19	45.53	0.51	
A4-5	0.53	0.25	75	97	6	5.19	14.96	0.17	
A5-3	20.14	0.30	75	883	102	14.93	27.93	0.31	
A6-3	17.97	0.30	76	142	10	7.04	18.32	0.18	
A6-4	1.95	0.30	76	579	78	13.13	26.83	0.30	

APPENDIX E
Post-Development Hydrologic Model Output



L10-512
Meaford Highlands Resort, Municipality of Meaford, ON
Post Development Model Schematic
April, 2012

VO2 Model Schematic





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V V I SSSS U U A L
U V I SE U A A L
V V I SE U A A L
V V I SSSS UUUU A A LLLL
OOO TTTT H H Y Y M M O O T M
O O T T H H Y Y M M O O
O O T T H H Y Y M M O O
OOO T T T H H Y Y M M O O O Company Serial

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

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Summary filename: C:\WinTemp\cbbscc64-7cfl1-4331-3c44-82c1e28252b\A\comario.sum

DATE: 04/01/2012 TIME: 08:06:02
USER:

COMMENTS:

** SIMULATION NUMBER: 1 **

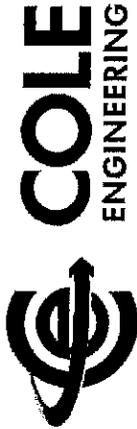
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Comments: Measur 2 year 24 Hour SCS Type II Storm

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.08	0.00	6.17	0.95	12.25	6.81	18.33	0.85
0.17	0.52	6.25	0.95	12.33	6.81	18.42	0.85
0.25	0.52	6.33	0.95	12.42	6.81	18.50	0.85
0.33	0.52	6.42	0.95	12.50	6.81	18.58	0.85
0.42	0.52	6.50	0.95	12.58	6.81	18.67	0.85
0.50	0.52	6.59	0.95	12.67	6.81	18.75	0.85
0.59	0.52	6.67	0.95	12.75	6.81	18.83	0.85
0.67	0.52	6.75	0.95	12.83	6.81	18.92	0.85
0.75	0.52	6.83	0.95	12.92	6.81	19.00	0.85
0.83	0.52	6.92	0.95	13.00	6.81	19.08	0.85
0.92	0.52	7.00	0.95	13.08	6.81	19.17	0.85
1.00	0.52	7.08	0.95	13.17	6.81	19.25	0.85
1.08	0.52	7.17	0.95	13.25	6.81	19.33	0.85
1.17	0.52	7.25	0.95	13.33	6.81	19.42	0.85
1.25	0.52	7.33	0.95	13.42	6.81	19.50	0.85
1.33	0.52	7.42	0.95	13.50	6.81	19.58	0.85
1.42	0.52	7.50	0.95	13.58	6.81	19.67	0.85
1.50	0.52	7.59	0.95	13.67	6.81	19.75	0.85
1.59	0.52	7.67	0.95	13.75	6.81	19.83	0.85
1.67	0.52	7.75	0.95	13.83	6.81	19.92	0.85
1.75	0.52	7.83	0.95	13.92	6.81	20.00	0.85
1.83	0.52	7.92	0.95	14.00	6.81	20.08	0.85

1.92	0.52	8.00	0.95	14.08	3.88	20.17	0.57
2.00	0.52	8.08	0.95	14.17	3.88	20.25	0.57
2.08	0.52	8.17	1.28	14.25	1.42	20.33	0.57
2.17	0.61	8.25	1.28	14.33	1.42	20.42	0.57
2.25	0.61	8.33	1.28	14.42	1.42	20.50	0.57
2.33	0.61	8.42	1.28	14.50	1.42	20.58	0.57
2.42	0.61	8.50	1.28	14.58	1.42	20.67	0.57
2.50	0.61	8.59	1.28	14.67	1.42	20.75	0.57
2.59	0.61	8.67	1.28	14.75	1.42	20.83	0.57
2.67	0.61	8.75	1.28	14.83	1.42	20.92	0.57
2.75	0.61	8.83	1.28	14.92	1.42	21.00	0.57
2.83	0.61	8.92	1.28	15.00	1.42	21.08	0.57
2.92	0.61	9.00	1.28	15.08	1.42	21.17	0.57
3.00	0.61	9.08	1.28	15.17	1.42	21.25	0.57
3.08	0.61	9.17	1.51	15.25	1.42	21.33	0.57
3.17	0.61	9.25	1.51	15.33	1.42	21.42	0.57
3.25	0.61	9.33	1.51	15.42	1.42	21.50	0.57
3.33	0.61	9.42	1.51	15.50	1.42	21.58	0.57
3.42	0.61	9.50	1.51	15.58	1.42	21.67	0.57
3.50	0.61	9.59	1.51	15.67	1.42	21.75	0.57
3.59	0.61	9.67	1.70	15.75	1.42	21.83	0.57
3.67	0.61	9.75	1.70	15.83	1.42	21.92	0.57
3.75	0.61	9.83	1.70	15.92	1.42	22.00	0.57
3.83	0.61	9.92	1.70	16.00	1.42	22.08	0.57
3.92	0.61	10.00	1.70	16.08	1.42	22.17	0.57
4.00	0.61	10.08	1.70	16.17	0.85	22.25	0.57
4.08	0.76	10.25	2.18	16.25	0.85	22.33	0.57
4.17	0.76	10.33	2.18	16.33	0.85	22.42	0.57
4.25	0.76	10.42	2.18	16.42	0.85	22.50	0.57
4.33	0.76	10.50	2.18	16.50	0.85	22.58	0.57
4.42	0.76	10.58	2.18	16.58	0.85	22.67	0.57
4.50	0.76	10.67	2.18	16.67	0.85	22.75	0.57
4.59	0.76	10.75	2.93	16.75	0.85	22.83	0.57
4.67	0.76	10.83	2.93	16.83	0.85	22.92	0.57
4.75	0.76	10.92	2.93	16.92	0.85	23.00	0.57
4.83	0.76	11.00	2.93	17.00	0.85	23.08	0.57
4.92	0.76	11.08	2.93	17.08	0.85	23.17	0.57
5.00	0.76	11.17	2.93	17.17	0.85	23.25	0.57
5.08	0.76	11.25	4.54	17.25	0.85	23.33	0.57
5.17	0.76	11.33	4.54	17.33	0.85	23.42	0.57
5.25	0.76	11.42	4.54	17.42	0.85	23.50	0.57
5.33	0.76	11.50	4.54	17.50	0.85	23.58	0.57
5.42	0.76	11.58	4.54	17.58	0.85	23.67	0.57
5.50	0.76	11.67	4.54	17.67	0.85	23.75	0.57
5.59	0.76	11.75	4.54	17.75	0.85	23.83	0.57
5.67	0.76	11.83	4.54	17.83	0.85	23.92	0.57
5.75	0.76	11.92	4.54	17.92	0.85	24.00	0.57
5.83	0.76	12.00	4.54	18.00	0.85	24.08	0.57
5.92	0.76	12.08	4.54	18.08	0.85	24.17	0.57
6.00	0.76	12.17	4.54	18.17	0.85	24.25	0.57

CALLS (0014) Area (ha)= 3.44 Curve Number (CN)= 76.0
ID= 1 DT= 5.0 min U.L. (mm)= 5.00 # of Linear Res. (N)= 3.00
U.L. TP (hms)= 0.30
Unit: Hyd Qpeak (cms)= 0.438
PEAK FLOW (cms)= 0.093 (1)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 14.599
TOTAL RAINFALL (mm)= 47.300
RUNOFF COEFFICIENT = 0.309
(1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS (0002) Area (ha)= 37.83
ID= 1 DT= 5.0 min Total Imp(\$)= 62.00 Dir. Conn. (\$)= 32.00



ADD HED (002B) | AREA OPEAK TPEAK R.V. |
 I + 2 = B | (ha) (cms) (hrs) (mm) |
 + ID= 1 (0008): 47.69 0.437 13.17 28.54 |
 ID= 2 (0014): 3.44 0.093 12.25 14.60 |
 ID= 3 (0020): 51.13 0.464 12.83 27.60 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALLIB | AREA (ha)= 35.33 Curve Number (CN)= 76.0 |
 STANDARD (0041) | I_a (mm)= 5.00 # of Linear Res. (N)= 3.00 |
 I_b= 1 DT= 5.0 min | U.H. T_p (hrs)= 0.51 |

Unit Hyd Opeak (cms)= 2.691 |
 PEAK FLOW (cms)= 0.663 (1) |
 TIME TO PEAK (hrs)= 12.500 |
 RUNOFF VOLUME (mm)= 14.604 |
 TOTAL RAINFALL (mm)= 47.300 |
 RUNOFF COEFFICIENT = 0.309 |

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

CALLIB | AREA (ha)= 0.53 Curve Number (CN)= 76.0 |
 STANDARD (0045) | I_a (mm)= 5.00 # of Linear Res. (N)= 3.00 |
 I_b= 1 DT= 5.0 min | U.H. T_p (hrs)= 0.17 |

Unit Hyd Opeak (cms)= 0.119 |
 PEAK FLOW (cms)= 0.095 (1) |
 TIME TO PEAK (hrs)= 12.083 |
 RUNOFF VOLUME (mm)= 14.353 |
 TOTAL RAINFALL (mm)= 47.300 |
 RUNOFF COEFFICIENT = 0.306 |

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

CALLIB | AREA (ha)= 5.74 Curve Number (CN)= 76.0 |
 STANDARD (0054) | I_a (mm)= 5.00 # of Linear Res. (N)= 3.00 |
 I_b= 1 DT= 5.0 min | U.H. T_p (hrs)= 0.38 |

Unit Hyd Opeak (cms)= 0.577 |
 PEAK FLOW (cms)= 0.131 (1) |
 TIME TO PEAK (hrs)= 12.333 |
 RUNOFF VOLUME (mm)= 14.603 |
 TOTAL RAINFALL (mm)= 47.300 |
 RUNOFF COEFFICIENT = 0.309 |

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

CALLIB | AREA (ha)= 2.73 Curve Number (CN)= 76.0 |
 STANDARD (0051) | I_a (mm)= 5.00 # of Linear Res. (N)= 3.00 |
 I_b= 1 DT= 5.0 min | U.H. T_p (hrs)= 0.10 |

Surface Area (ha)= 0.60 IMPERVIOUS PERCENTS (I) |
 Dep. Storage (mm)= 1.00 |
 Average Slope (ft)= 1.00 |
 Length (mi)= 134.91 |
 Manning's n = 0.013 |

Max. Eff. Inten. (mm/hr)= 52.22 31.45 |
 over (min)= 5.00 20.00 |
 Storage Coeff. (ha)= 5.96 (11) 13.18 (11) |
 Unit Hyd. Peak (cms)= 0.74 0.97 |
 Unit Hyd. Peak (cms)= 0.74 0.97 |
 PEAK FLOW (cms)= 0.00 0.11 |
 TIME TO PEAK (hrs)= 12.08 12.25 |
 RUNOFF VOLUME (mm)= 46.30 19.57 |
 TOTAL RAINFALL (mm)= 47.30 47.30 |
 RUNOFF COEFFICIENT = 0.98 0.41 |

**** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! |
 IMPERVIOUS AREAS BELOW 20% |
 YOU SHOULD CONSIDER SETTING THE AREA. |

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: |
 CN* = 76.0 I_a = Dep. Storage (Above) |
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL |
 THAN THE STORAGE COEFFICIENT. |
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. |

CALLIB | AREA (ha)= 0.58 |
 STANDARD (0044) | Total Imp (%) = 35.00 Dir. Com. (%) = 4.00 |
 I_b= 1 DT= 5.0 min |

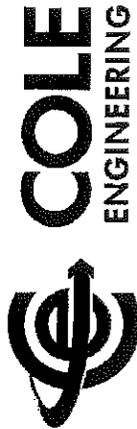
Surface Area (ha)= 0.20 IMPERVIOUS PERVIOUS (I) |
 Dep. Storage (mm)= 1.00 |
 Average Slope (ft)= 1.00 |
 Length (mi)= 82.18 |
 Manning's n = 0.013 |
 Max. Eff. Inten. (mm/hr)= 32.22 39.59 |
 over (min)= 5.00 15.00 |
 Storage Coeff. (ha)= 2.43 (11) 12.72 (11) |
 Unit Hyd. Peak (cms)= 5.00 15.00 |
 Unit Hyd. Peak (cms)= 0.29 0.08 |
 PEAK FLOW (cms)= 0.00 0.03 |
 TIME TO PEAK (hrs)= 12.08 12.17 |
 RUNOFF VOLUME (mm)= 46.30 47.30 |
 TOTAL RAINFALL (mm)= 47.30 47.30 |
 RUNOFF COEFFICIENT = 0.98 0.43 |

**** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! |
 IMPERVIOUS AREAS BELOW 20% |
 YOU SHOULD CONSIDER SETTING THE AREA. |

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: |
 CN* = 76.0 I_a = Dep. Storage (Above) |
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL |
 THAN THE STORAGE COEFFICIENT. |
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. |

CALLIB | AREA (ha)= 3.00 |
 STANDARD (0040) | Total Imp (%) = 46.00 Dir. Com. (%) = 49.00 |
 I_b= 1 DT= 5.0 min |

Surface Area (ha)= 2.45 IMPERVIOUS PERVIOUS (I) |
 Dep. Storage (mm)= 1.00 |
 Average Slope (ft)= 1.00 |
 Length (mi)= 143.29 |
 Manning's n = 0.013 |
 Max. Eff. Inten. (mm/hr)= 52.22 150.85 |
 over (min)= 5.00 10.00 |
 Storage Coeff. (ha)= 4.11 (11) 10.10 (11) |
 Unit Hyd. Peak (cms)= 5.00 15.00 |
 Unit Hyd. Peak (cms)= 0.24 0.13 |



ID = 3 (0021); 48.59 0.997 12.33 16.52
 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB		Area (ha) = 0.58	
ID#	STANDARD (0034)	Peak Imp (ft)	DLR. Coeff. (%) = 50.00
1	2	3	4
Surface Area	(ha)	ImperVIOUS	PerVIOUS (l)
Dep. Storage	(mm)	0.44	0.44
Average Slope	(%)	1.00	1.50
Manings n		1.00	2.00
		76.5	40.0
		0.313	0.250
Max. Eff. Inten. (mm/hr)		52.22	29.75
Storage Coeff. (min)		5.00	20.00
Unit Hyd. Peak (cms)		2.82 (ii)	16.06 (ii)
Unit Hyd. Peak (cms)		3.00	20.00
Unit Hyd. Peak (cms)		0.28	0.06
PEAK FLOW (cms)		0.06	0.01
TIME TO PEAK (hrs)		12.08	12.25
RUNOFF VOLUME (mm)		46.30	16.65
TOTAL RAINFALL (mm)		47.30	47.30
RUNOFF COEFFICIENT		0.94	0.35
TOTALS			
		0.074 (iii)	0.00
		31.66	31.66
		47.30	47.30
		0.67	0.67

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

(1) CH PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 CH = 0.0
 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB		Area (ha) = 10.12	
ID#	STANDARD (0004)	Total Imp (%) = 76.00	DLR. Coeff. (%) = 37.00
1	2	3	4
Surface Area	(ha)	ImperVIOUS	PerVIOUS (l)
Dep. Storage	(mm)	1.00	1.50
Average Slope	(%)	1.00	2.00
Length	(m)	259.74	40.00
Manings n		0.013	0.250
Max. Eff. Inten. (mm/hr)		52.22	71.02
Storage Coeff. (min)		3.00	15.00
Unit Hyd. Peak (cms)		2.80 (ii)	13.00 (ii)
Unit Hyd. Peak (cms)		0.19	0.08
PEAK FLOW (cms)		0.52	0.37
TIME TO PEAK (hrs)		12.08	12.17
RUNOFF VOLUME (mm)		46.30	25.60
TOTAL RAINFALL (mm)		47.30	47.30
RUNOFF COEFFICIENT		0.96	0.54
TOTALS			
		0.840 (iii)	0.00
		12.00	12.00
		33.26	33.26
		47.30	47.30
		0.70	0.70

(1) CH PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 CH = 76.0
 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0035)		Area (ha) = 10.12	
ID#	STANDARD (0035)	Peak Imp (ft)	DLR. Coeff. (%) = 33.26
1	2	3	4
Area	(ha)	Open	R.V. (mm)
		12.08	16.78
		12.33	14.50
		12.33	14.50

TOTALS
 0.333 (iii)
 12.08
 38.96
 47.30
 0.92

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

(1) CH PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 CH = 76.0
 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021)		Area (ha) = 30.66	
ID#	STANDARD (0021)	Peak Imp (ft)	DLR. Coeff. (%) = 14.95
1	2	3	4
Area	(ha)	Open	R.V. (mm)
		35.83	14.60
		0.663	12.59
		2.73	12.25
		0.108	19.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)		Area (ha) = 41.74	
ID#	STANDARD (0021)	Peak Imp (ft)	DLR. Coeff. (%) = 16.73
1	2	3	4
Area	(ha)	Open	R.V. (mm)
		38.66	12.42
		0.736	14.96
		3.08	12.08
		0.333	38.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)		Area (ha) = 42.82	
ID#	STANDARD (0021)	Peak Imp (ft)	DLR. Coeff. (%) = 16.78
1	2	3	4
Area	(ha)	Open	R.V. (mm)
		41.74	12.33
		0.855	16.73
		0.028	21.28
		0.855	12.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)		Area (ha) = 42.85	
ID#	STANDARD (0021)	Peak Imp (ft)	DLR. Coeff. (%) = 16.78
1	2	3	4
Area	(ha)	Open	R.V. (mm)
		42.82	12.33
		0.855	16.78
		0.020	14.55
		0.855	12.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)		Area (ha) = 42.85	
ID#	STANDARD (0021)	Peak Imp (ft)	DLR. Coeff. (%) = 16.78
1	2	3	4
Area	(ha)	Open	R.V. (mm)
		42.85	12.33
		0.867	16.78
		0.331	14.50
		0.867	12.33



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RUNOFF COEFFICIENT = 0.309

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

ADD HYD (0037) |
 1 + 2 = 3 |
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID# 1 (0063): 4.60 0.523 12.08 21.47
 + ID# 2 (0036): 1.09 0.091 12.08 31.47
 ID = 3 (0037): 5.69 0.472 12.08 32.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0037) |
 3 + 2 = 1 |
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID# 3 (0037): 5.69 0.472 12.08 32.63
 + ID# 2 (0052): 4.15 0.088 12.42 14.60
 ID = 1 (0037): 9.84 0.523 12.08 25.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0011) |
 IN= 2 -> OUT= 1 |
 DT= 5.0 min |
 OUTFLOW STORAGE |
 (cms) (ha-m.) (cms) (hrs) (mm)
 0.0000 0.0000 0.2600 0.2100
 0.1100 0.1100 0.3000 0.2450
 0.1600 0.1600 0.3500 0.2700
 0.2000 0.1800 0.4000 0.2500

INFLOW: ID= 2 (0037) 9.840 0.523 12.08 25.03
 OUTFLOW: ID= 1 (0011) 9.840 0.104 13.00 23.00
 PEAK FLOW REDUCTION [(Qout/Qin) (%)] = 19.89
 TIME SHIFT OF PEAK FLOW (min) = 55.00
 MAXIMUM STORAGE USED (ha-m.) = 0.1044

CALLIB |
 NASHVD (0053) |
 ID= 1 DT= 5.0 min |
 Area (ha) = 3.92 Curve Number (CN) = 76.0
 Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.25

Unit Hyd Opeak (cms) = 0.437
 PEAK FLOW (cms) = 0.082 (1)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 14.599
 TOTAL RAINFALL (mm) = 47.300
 RUNOFF COEFFICIENT = 0.309

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

CALLIB |
 NASHVD (0059) |
 ID= 1 DT= 5.0 min |
 Area (ha) = 1.95 Curve Number (CN) = 76.0
 Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.30

Unit Hyd Opeak (cms) = 0.245

PEAK FLOW (cms) = 0.053 (1)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 14.599
 TOTAL RAINFALL (mm) = 47.300
 RUNOFF COEFFICIENT = 0.309

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

ADD HYD (0023) |
 1 + 2 = 3 |
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID# 1 (0011): 5.15 0.104 13.00 25.00
 + ID# 2 (0017): 37.97 0.489 12.25 14.60
 ID = 3 (0023): 27.41 0.163 12.25 18.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0023) |
 3 + 2 = 1 |
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID# 3 (0023): 27.91 0.569 12.25 18.23
 + ID# 2 (0053): 3.32 0.032 12.25 14.60
 ID = 1 (0023): 31.13 0.655 12.25 17.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0023) |
 1 + 2 = 3 |
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID# 1 (0023): 31.13 0.655 12.25 17.89
 + ID# 2 (0058): 1.95 0.053 12.25 14.60
 ID = 3 (0023): 33.08 0.707 12.25 17.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALLIB |
 SPANHYD (0027) |
 ID= 1 DT= 5.0 min |
 Area (ha) = 1.18
 Total Imp(%) = 56.00 DLE. Conn. (%) = 50.00

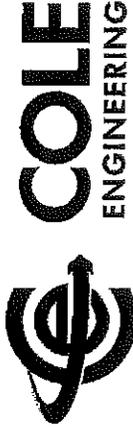
Surface Area (ha) = 0.55 PERCENTS (1)
 Dep. Storage (mm) = 1.00 0.50
 Average Slope (%) = 1.00 2.00
 Length (m) = 88.69 40.00
 Manning's n = 0.013 0.250
 Max. Eff. Inten. (mm/hr) = 52.22 20.76
 Storage Coeff (mm) = 5.00 20.00
 Unit Hyd Opeak (cms) = 5.00 20.00
 Unit Hyd Peak (cms) = 5.00 20.00
 Unit Hyd Peak (cms) = 0.27 0.56

PEAK FLOW (cms) = 0.09 0.02
 TIME TO PEAK (hrs) = 12.08 12.25
 RUNOFF VOLUME (mm) = 46.30 16.65
 TOTAL RAINFALL (mm) = 47.30 47.30
 RUNOFF COEFFICIENT = 0.98 0.35

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

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Ia = Dep. Storage (above)

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



TD= 1 (0.026); 10.45 0.225 12.58 17.32
 TD= 2 (0.049); 16.29 0.261 14.60 22.95
 TD= 3 (0.076); 21.99 0.297 16.75 29.58
 TD= 4 (0.103); 27.70 0.333 18.80 37.25
 TD= 5 (0.130); 33.41 0.369 20.85 45.92
 TD= 6 (0.157); 39.12 0.405 22.90 54.59
 TD= 7 (0.184); 44.83 0.441 24.95 63.26
 TD= 8 (0.211); 50.54 0.477 27.00 71.93
 TD= 9 (0.238); 56.25 0.513 29.05 80.60
 TD= 10 (0.265); 61.96 0.549 31.10 89.27
 TD= 11 (0.292); 67.67 0.585 33.15 97.94
 TD= 12 (0.319); 73.38 0.621 35.20 106.61
 TD= 13 (0.346); 79.09 0.657 37.25 115.28
 TD= 14 (0.373); 84.80 0.693 39.30 123.95
 TD= 15 (0.400); 90.51 0.729 41.35 132.62
 TD= 16 (0.427); 96.22 0.765 43.40 141.29
 TD= 17 (0.454); 101.93 0.801 45.45 150.00
 TD= 18 (0.481); 107.64 0.837 47.50 158.67
 TD= 19 (0.508); 113.35 0.873 49.55 167.34
 TD= 20 (0.535); 119.06 0.909 51.60 176.01
 TD= 21 (0.562); 124.77 0.945 53.65 184.68
 TD= 22 (0.589); 130.48 0.981 55.70 193.35
 TD= 23 (0.616); 136.19 1.017 57.75 202.02
 TD= 24 (0.643); 141.90 1.053 59.80 210.69
 TD= 25 (0.670); 147.61 1.089 61.85 219.36
 TD= 26 (0.697); 153.32 1.125 63.90 228.03
 TD= 27 (0.724); 159.03 1.161 65.95 236.70
 TD= 28 (0.751); 164.74 1.197 68.00 245.37
 TD= 29 (0.778); 170.45 1.233 70.05 254.04
 TD= 30 (0.805); 176.16 1.269 72.10 262.71
 TD= 31 (0.832); 181.87 1.305 74.15 271.38
 TD= 32 (0.859); 187.58 1.341 76.20 280.05
 TD= 33 (0.886); 193.29 1.377 78.25 288.72
 TD= 34 (0.913); 199.00 1.413 80.30 297.39
 TD= 35 (0.940); 204.71 1.449 82.35 306.06
 TD= 36 (0.967); 210.42 1.485 84.40 314.73
 TD= 37 (0.994); 216.13 1.521 86.45 323.40
 TD= 38 (1.021); 221.84 1.557 88.50 332.07
 TD= 39 (1.048); 227.55 1.593 90.55 340.74
 TD= 40 (1.075); 233.26 1.629 92.60 349.41
 TD= 41 (1.102); 238.97 1.665 94.65 358.08
 TD= 42 (1.129); 244.68 1.701 96.70 366.75
 TD= 43 (1.156); 250.39 1.737 98.75 375.42
 TD= 44 (1.183); 256.10 1.773 100.80 384.09
 TD= 45 (1.210); 261.81 1.809 102.85 392.76
 TD= 46 (1.237); 267.52 1.845 104.90 401.43
 TD= 47 (1.264); 273.23 1.881 106.95 410.10
 TD= 48 (1.291); 278.94 1.917 109.00 418.77
 TD= 49 (1.318); 284.65 1.953 111.05 427.44
 TD= 50 (1.345); 290.36 1.989 113.10 436.11
 TD= 51 (1.372); 296.07 2.025 115.15 444.78
 TD= 52 (1.399); 301.78 2.061 117.20 453.45
 TD= 53 (1.426); 307.49 2.097 119.25 462.12
 TD= 54 (1.453); 313.20 2.133 121.30 470.79
 TD= 55 (1.480); 318.91 2.169 123.35 479.46
 TD= 56 (1.507); 324.62 2.205 125.40 488.13
 TD= 57 (1.534); 330.33 2.241 127.45 496.80
 TD= 58 (1.561); 336.04 2.277 129.50 505.47
 TD= 59 (1.588); 341.75 2.313 131.55 514.14
 TD= 60 (1.615); 347.46 2.349 133.60 522.81
 TD= 61 (1.642); 353.17 2.385 135.65 531.48
 TD= 62 (1.669); 358.88 2.421 137.70 540.15
 TD= 63 (1.696); 364.59 2.457 139.75 548.82
 TD= 64 (1.723); 370.30 2.493 141.80 557.49
 TD= 65 (1.750); 376.01 2.529 143.85 566.16
 TD= 66 (1.777); 381.72 2.565 145.90 574.83
 TD= 67 (1.804); 387.43 2.601 147.95 583.50
 TD= 68 (1.831); 393.14 2.637 150.00 592.17
 TD= 69 (1.858); 398.85 2.673 152.05 600.84
 TD= 70 (1.885); 404.56 2.709 154.10 609.51
 TD= 71 (1.912); 410.27 2.745 156.15 618.18
 TD= 72 (1.939); 415.98 2.781 158.20 626.85
 TD= 73 (1.966); 421.69 2.817 160.25 635.52
 TD= 74 (1.993); 427.40 2.853 162.30 644.19
 TD= 75 (2.020); 433.11 2.889 164.35 652.86
 TD= 76 (2.047); 438.82 2.925 166.40 661.53
 TD= 77 (2.074); 444.53 2.961 168.45 670.20
 TD= 78 (2.101); 450.24 2.997 170.50 678.87
 TD= 79 (2.128); 455.95 3.033 172.55 687.54
 TD= 80 (2.155); 461.66 3.069 174.60 696.21
 TD= 81 (2.182); 467.37 3.105 176.65 704.88
 TD= 82 (2.209); 473.08 3.141 178.70 713.55
 TD= 83 (2.236); 478.79 3.177 180.75 722.22
 TD= 84 (2.263); 484.50 3.213 182.80 730.89
 TD= 85 (2.290); 490.21 3.249 184.85 739.56
 TD= 86 (2.317); 495.92 3.285 186.90 748.23
 TD= 87 (2.344); 501.63 3.321 188.95 756.90
 TD= 88 (2.371); 507.34 3.357 191.00 765.57
 TD= 89 (2.398); 513.05 3.393 193.05 774.24
 TD= 90 (2.425); 518.76 3.429 195.10 782.91
 TD= 91 (2.452); 524.47 3.465 197.15 791.58
 TD= 92 (2.479); 530.18 3.501 199.20 800.25
 TD= 93 (2.506); 535.89 3.537 201.25 808.92
 TD= 94 (2.533); 541.60 3.573 203.30 817.59
 TD= 95 (2.560); 547.31 3.609 205.35 826.26
 TD= 96 (2.587); 553.02 3.645 207.40 834.93
 TD= 97 (2.614); 558.73 3.681 209.45 843.60
 TD= 98 (2.641); 564.44 3.717 211.50 852.27
 TD= 99 (2.668); 570.15 3.753 213.55 860.94
 TD= 100 (2.695); 575.86 3.789 215.60 869.61
 TD= 101 (2.722); 581.57 3.825 217.65 878.28
 TD= 102 (2.749); 587.28 3.861 219.70 886.95
 TD= 103 (2.776); 592.99 3.897 221.75 895.62
 TD= 104 (2.803); 598.70 3.933 223.80 904.29
 TD= 105 (2.830); 604.41 3.969 225.85 912.96
 TD= 106 (2.857); 610.12 4.005 227.90 921.63
 TD= 107 (2.884); 615.83 4.041 229.95 930.30
 TD= 108 (2.911); 621.54 4.077 232.00 938.97
 TD= 109 (2.938); 627.25 4.113 234.05 947.64
 TD= 110 (2.965); 632.96 4.149 236.10 956.31
 TD= 111 (2.992); 638.67 4.185 238.15 964.98
 TD= 112 (3.019); 644.38 4.221 240.20 973.65
 TD= 113 (3.046); 650.09 4.257 242.25 982.32
 TD= 114 (3.073); 655.80 4.293 244.30 990.99
 TD= 115 (3.100); 661.51 4.329 246.35 999.66
 TD= 116 (3.127); 667.22 4.365 248.40 1008.33
 TD= 117 (3.154); 672.93 4.401 250.45 1017.00
 TD= 118 (3.181); 678.64 4.437 252.50 1025.67
 TD= 119 (3.208); 684.35 4.473 254.55 1034.34
 TD= 120 (3.235); 690.06 4.509 256.60 1043.01
 TD= 121 (3.262); 695.77 4.545 258.65 1051.68
 TD= 122 (3.289); 701.48 4.581 260.70 1060.35
 TD= 123 (3.316); 707.19 4.617 262.75 1069.02
 TD= 124 (3.343); 712.90 4.653 264.80 1077.69
 TD= 125 (3.370); 718.61 4.689 266.85 1086.36
 TD= 126 (3.397); 724.32 4.725 268.90 1095.03
 TD= 127 (3.424); 730.03 4.761 270.95 1103.70
 TD= 128 (3.451); 735.74 4.797 273.00 1112.37
 TD= 129 (3.478); 741.45 4.833 275.05 1121.04
 TD= 130 (3.505); 747.16 4.869 277.10 1129.71
 TD= 131 (3.532); 752.87 4.905 279.15 1138.38
 TD= 132 (3.559); 758.58 4.941 281.20 1147.05
 TD= 133 (3.586); 764.29 4.977 283.25 1155.72
 TD= 134 (3.613); 770.00 5.013 285.30 1164.39
 TD= 135 (3.640); 775.71 5.049 287.35 1173.06
 TD= 136 (3.667); 781.42 5.085 289.40 1181.73
 TD= 137 (3.694); 787.13 5.121 291.45 1190.40
 TD= 138 (3.721); 792.84 5.157 293.50 1199.07
 TD= 139 (3.748); 798.55 5.193 295.55 1207.74
 TD= 140 (3.775); 804.26 5.229 297.60 1216.41
 TD= 141 (3.802); 810.00 5.265 299.65 1225.08
 TD= 142 (3.829); 815.71 5.301 301.70 1233.75
 TD= 143 (3.856); 821.42 5.337 303.75 1242.42
 TD= 144 (3.883); 827.13 5.373 305.80 1251.09
 TD= 145 (3.910); 832.84 5.409 307.85 1259.76
 TD= 146 (3.937); 838.55 5.445 309.90 1268.43
 TD= 147 (3.964); 844.26 5.481 311.95 1277.10
 TD= 148 (3.991); 850.00 5.517 314.00 1285.77
 TD= 149 (4.018); 855.71 5.553 316.05 1294.44
 TD= 150 (4.045); 861.42 5.589 318.10 1303.11
 TD= 151 (4.072); 867.13 5.625 320.15 1311.78
 TD= 152 (4.099); 872.84 5.661 322.20 1320.45
 TD= 153 (4.126); 878.55 5.697 324.25 1329.12
 TD= 154 (4.153); 884.26 5.733 326.30 1337.79
 TD= 155 (4.180); 890.00 5.769 328.35 1346.46
 TD= 156 (4.207); 895.71 5.805 330.40 1355.13
 TD= 157 (4.234); 901.42 5.841 332.45 1363.80
 TD= 158 (4.261); 907.13 5.877 334.50 1372.47
 TD= 159 (4.288); 912.84 5.913 336.55 1381.14
 TD= 160 (4.315); 918.55 5.949 338.60 1389.81
 TD= 161 (4.342); 924.26 5.985 340.65 1398.48
 TD= 162 (4.369); 930.00 6.021 342.70 1407.15
 TD= 163 (4.396); 935.71 6.057 344.75 1415.82
 TD= 164 (4.423); 941.42 6.093 346.80 1424.49
 TD= 165 (4.450); 947.13 6.129 348.85 1433.16
 TD= 166 (4.477); 952.84 6.165 350.90 1441.83
 TD= 167 (4.504); 958.55 6.201 352.95 1450.50
 TD= 168 (4.531); 964.26 6.237 355.00 1459.17
 TD= 169 (4.558); 970.00 6.273 357.05 1467.84
 TD= 170 (4.585); 975.71 6.309 359.10 1476.51
 TD= 171 (4.612); 981.42 6.345 361.15 1485.18
 TD= 172 (4.639); 987.13 6.381 363.20 1493.85
 TD= 173 (4.666); 992.84 6.417 365.25 1502.52
 TD= 174 (4.693); 998.55 6.453 367.30 1511.19
 TD= 175 (4.720); 1004.26 6.489 369.35 1519.86
 TD= 176 (4.747); 1010.00 6.525 371.40 1528.53
 TD= 177 (4.774); 1015.71 6.561 373.45 1537.20
 TD= 178 (4.801); 1021.42 6.597 375.50 1545.87
 TD= 179 (4.828); 1027.13 6.633 377.55 1554.54
 TD= 180 (4.855); 1032.84 6.669 379.60 1563.21
 TD= 181 (4.882); 1038.55 6.705 381.65 1571.88
 TD= 182 (4.909); 1044.26 6.741 383.70 1580.55
 TD= 183 (4.936); 1050.00 6.777 385.75 1589.22
 TD= 184 (4.963); 1055.71 6.813 387.80 1597.89
 TD= 185 (4.990); 1061.42 6.849 389.85 1606.56
 TD= 186 (5.017); 1067.13 6.885 391.90 1615.23
 TD= 187 (5.044); 1072.84 6.921 393.95 1623.90
 TD= 188 (5.071); 1078.55 6.957 396.00 1632.57
 TD= 189 (5.098); 1084.26 6.993 398.05 1641.24
 TD= 190 (5.125); 1090.00 7.029 400.10 1649.91
 TD= 191 (5.152); 1095.71 7.065 402.15 1658.58
 TD= 192 (5.179); 1101.42 7.101 404.20 1667.25
 TD= 193 (5.206); 1107.13 7.137 406.25 1675.92
 TD= 194 (5.233); 1112.84 7.173 408.30 1684.59
 TD= 195 (5.260); 1118.55 7.209 410.35 1693.26
 TD= 196 (5.287); 1124.26 7.245 412.40 1701.93
 TD= 197 (5.314); 1130.00 7.281 414.45 1710.60
 TD= 198 (5.341); 1135.71 7.317 416.50 1719.27
 TD= 199 (5.368); 1141.42 7.353 418.55 1727.94
 TD= 200 (5.395); 1147.13 7.389 420.60 1736.61
 TD= 201 (5.422); 1152.84 7.425 422.65 1745.28
 TD= 202 (5.449); 1158.55 7.461 424.70 1753.95
 TD= 203 (5.476); 1164.26 7.497 426.75 1762.62
 TD= 204 (5.503); 1170.00 7.533 428.80 1771.29
 TD= 205 (5.530); 1175.71 7.569 430.85 1779.96
 TD= 206 (5.557); 1181.42 7.605 432.90 1788.63
 TD= 207 (5.584); 1187.13 7.641 434.95 1797.30
 TD= 208 (5.611); 1192.84 7.677 437.00 1805.97
 TD= 209 (5.638); 1198.55 7.713 439.05 1814.64
 TD= 210 (5.665); 1204.26 7.749 441.10 1823.31
 TD= 211 (5.692); 1210.00 7.785 443.15 1831.98
 TD= 212 (5.719); 1215.71 7.821 445.20 1840.65
 TD= 213 (5.746); 1221.42 7.857 447.25 1849.32
 TD= 214 (5.773); 1227.13 7.893 449.30 1857.99
 TD= 215 (5.800); 1232.84 7.929 451.35 1866.66
 TD= 216 (5.827); 1238.55 7.965 453.40 1875.33
 TD= 217 (5.854); 1244.26 8.001 455.45 1884.00
 TD= 218 (5.881); 1250.00 8.037 457.50 1892.67
 TD= 219 (5.908); 1255.71 8.073 459.55 1901.34
 TD= 220 (5.935); 1261.42 8.109 461.60 1910.01
 TD= 221 (5.962); 1267.13 8.145 463.65 1918.68
 TD= 222 (5.989); 1272.84 8.181 465.70 1927.35
 TD= 223 (6.016); 1278.55 8.217 467.75 1936.02
 TD= 224 (6.043); 1284.26 8.253 469.80 1944.69
 TD= 225 (6.070); 1290.00 8.289 471.85 1953.36
 TD= 226 (6.097); 1295.71 8.325 473.90 1962.03
 TD= 227 (6.124); 1301.42 8.361 475.95 1970.70
 TD= 228 (6.151); 1307.13 8.397 478.00 1979.37
 TD= 229 (6.178); 1312.84 8.433 480.05 1988.04
 TD= 230 (6.205); 1318.55 8.469 482.10 1996.71
 TD= 231 (6.232); 1324.26 8.505 484.15 2005.38
 TD= 232 (6.259); 1330.00 8.541 486.20 2014.05
 TD= 233 (6.286); 1335.71 8.577 488.25 2022.72
 TD= 234 (6.313); 1341.42 8.613 490.30 2031.39
 TD= 235 (6.340); 1347.13 8.649 492.35 2040.06
 TD= 236 (6.367); 1352.84 8.685 494.40 2048.73
 TD= 237 (6.394); 1358.55 8.721 496.45 2057.40
 TD= 238 (6.421); 1364.26 8.757 498.50 2066.07
 TD= 239 (6.448); 1370.00 8.793 500.55 2074.74
 TD= 240 (6.475); 1375.71 8.829 502.60 2083.41
 TD= 241 (6.502); 1381.42 8.865 504.65 2092.08
 TD= 242 (6.529); 1387.13 8.901 506.70 2100.75
 TD= 243 (6.556); 1392.84 8.937 508.75 2109.42
 TD= 244 (6.583); 1398.55 8.973 510.80 2118.09
 TD= 245 (6.610); 1404.26 9.009 512.85 2126.76
 TD= 246 (6.637); 1410.00 9.045 514.90 2135.43
 TD= 247 (6.664); 1415.71 9.081 516.95 2144.10
 TD= 248 (6.691); 1421.42 9.117 519.00 2152.77
 TD= 249 (6.718); 1427.13 9.153 521.05 2161.44
 TD= 250 (6.745); 1432.84 9.189 523.10 2170.11
 TD= 251 (6.772); 1438.55 9.225 525.15 2178.78
 TD= 252 (6.799); 1444.26 9.261 527.20 2187.45
 TD= 253 (6.826); 1450.00 9.297 529.25 2196.12
 TD= 254 (6.853); 1455.71 9.333 531.30 2204.79
 TD= 255 (6.880); 1461.42 9.369 533.35 2213.46
 TD= 256 (6.907); 1467.13 9.405 535.40 2222.13
 TD= 257 (6.934); 1472.84 9.441 537.45 2230.80
 TD= 258 (6.961); 1478.55 9.477 539.50 2239.47
 TD= 259 (6.988); 1484.26 9.513 541.55 2248.14
 TD= 260 (7.015); 1490.00 9.549 543.60 2256.81
 TD= 261 (7.042); 1495.71 9.585 545.65 2265.48
 TD= 262 (7.069); 1501.42 9.621 547.70 2274.15
 TD= 263 (7.096); 1507.13 9.657 549.75 2282.82
 TD= 264 (7.123); 1512.84 9.693 551.80 2291.49
 TD= 265 (7.150); 1518.55 9.729 553.85 2300.16
 TD= 266 (7.177); 1524.26 9.765 555.90 2308.83
 TD= 267 (7.204); 1530.00 9.801 557.95 2317.50
 TD= 268 (7.231); 1535.71 9.837 560.00 2326.17
 TD= 269 (7.258); 1541.42 9.873 562.05 2334.84
 TD= 270 (7.285); 1547.13 9.909 564.10 2343.51
 TD= 271 (7.312); 1552.84 9.945 566.15 2352.18
 TD= 272 (7.339); 1558.55 9.981 568.20 2360.85
 TD= 273 (7.366); 1564.26 1.017 570.25 2369.52
 TD= 274 (7.393); 1570.00 1.053 572.30 2378.19
 TD= 275 (7.420); 1575.71 1.089 574.35 2386.86
 TD= 276 (7.447); 1581.42 1.125 576.40 2395.53
 TD= 277 (7.474); 1587.13 1.161 578.45 2404.20
 TD= 278 (7.501); 1592.84 1.197 580.5



IMPERVIOUS PERVIOUS (I)
 Surface Area (ha) = 41.50
 Dep. Storage (mm) = 1.50
 Average Slope (S) = 2.00
 Length (m) = 502.20
 Manning's n = 0.250

Max. Eff. Inlet. (mm/hr) = 65.47
 over (mm) = 10.00
 Storage Coeff. (C) = 7.97 (I)
 Unit Hyd. Peak (mm) = 10.00
 Unit Hyd. Peak (cms) = 0.13

PEAK FLOW (cms) = 1.86
 TIME TO PEAK (hrs) = 12.00
 RUNOFF VOLUME (mm) = 59.30
 TOTAL RAINFALL (mm) = 59.30
 RUNOFF COEFFICIENT = 0.98

(I) ON PROCEEDING SELECTED FOR PREVIOUS LOSSES:
 (I) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (II) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

{} CALLIE {} AREA (ha) = 2.59
 {} STANDARD (0032) {} TOTAL EMP (S) = 50.00 D.L. Conn. (S) = 50.00
 {} ID= 1 DT= 5.0 min {}

IMPERVIOUS PERVIOUS (I)
 Surface Area (ha) = 1.50
 Dep. Storage (mm) = 1.50
 Average Slope (S) = 2.00
 Length (m) = 138.60
 Manning's n = 0.250

Max. Eff. Inlet. (mm/hr) = 65.47
 over (mm) = 5.00
 Storage Coeff. (C) = 3.68 (I)
 Unit Hyd. Peak (mm) = 5.00
 Unit Hyd. Peak (cms) = 0.25

PEAK FLOW (cms) = 0.25
 TIME TO PEAK (hrs) = 12.00
 RUNOFF VOLUME (mm) = 59.30
 TOTAL RAINFALL (mm) = 59.30
 RUNOFF COEFFICIENT = 0.98

{} ON PROCEEDING SELECTED FOR PREVIOUS LOSSES:
 (I) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (II) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

{} CALLIE {} AREA (ha) = 0.88
 {} STANDARD (0041) {} TOTAL EMP (S) = 50.00 D.L. Conn. (S) = 76.0
 {} ID= 1 DT= 5.0 min {} # of Linear Res. (R) = 3.00

Unit Hyd Peak (cms) = 0.060
 PEAK FLOW (cms) = 0.023 (I)
 TIME TO PEAK (hrs) = 12.583
 RUNOFF VOLUME (mm) = 21.918
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370

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

{} CALLIE {} AREA (ha) = 6.08
 {} STANDARD (0051) {} TOTAL EMP (S) = 5.00 D.L. Conn. (S) = 76.0
 {} ID= 1 DT= 5.0 min {} # of Linear Res. (R) = 3.00

Unit Hyd Peak (cms) = 0.554
 PEAK FLOW (cms) = 0.196 (I)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 21.918
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370

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

{} ADD HYD (0030) {} AREA (ha) = 40.72
 {} 1 + 2 = 3 {} QPEAK (cms) = 12.08
 {} ID= 1 (0030): 40.72 3.456 12.08 41.16
 {} + ID= 2 (0030): 2.78 3.113 12.17 41.16
 {} ID= 3 (0030): 0.88 0.023 12.58 21.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

{} ADD HYD (0030) {} AREA (ha) = 41.60
 {} 1 + 2 = 3 {} QPEAK (cms) = 12.08
 {} ID= 1 (0030): 41.60 3.467 12.08 40.76
 {} + ID= 2 (0041): 0.88 0.023 12.58 21.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

{} ADD HYD (0030) {} AREA (ha) = 47.69
 {} 1 + 2 = 3 {} QPEAK (cms) = 12.17
 {} ID= 1 (0030): 41.60 3.467 12.08 40.76
 {} + ID= 2 (0041): 0.88 0.023 12.58 21.92
 {} ID= 3 (0030): 47.69 3.468 12.17 39.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

{} RESERVOIR (0030) {} AREA (ha) = 47.690
 {} ID= 2 (0030) {} QPEAK (cms) = 3.508
 {} ID= 1 (0030) {} QPEAK (cms) = 12.17
 {} ID= 2 (0030) {} QPEAK (cms) = 12.17
 {} ID= 3 (0030) {} QPEAK (cms) = 12.17

{} INFLOW (cms) = 47.690
 {} OUTFLOW (cms) = 47.690
 {} STORAGE (ha-m) = 47.690
 {} PEAK FLOW (cms) = 47.690
 {} PEAK TIME (hrs) = 12.17
 {} PEAK VOLUME (mm) = 21.918
 {} TOTAL RAINFALL (mm) = 59.300
 {} RUNOFF COEFFICIENT = 0.370

{} PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



COLE ENGINEERING

Manholes n = 0.013
 Max. Eff. Inbar. (cm/hz) = 65.47
 over (min) = 5.00
 Storage Coeff. (min) = 15.00
 Unit Hyd. Spk (min) = 3.62 (II)
 Unit Hyd. Spk (max) = 5.00
 Unit Hyd. Spk (avg) = 4.25
 PEAK FLOW (cms) = 0.00
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 27.90
 TOTAL RAINFALL (mm) = 59.30
 RUNOFF COEFFICIENT = 0.98
 TOTALS
 0.175 (III)
 12.17
 28.01
 59.30
 0.47

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

(I) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 (II) TIME STEP (TP) SHOULD BE SMALLER OR EQUAL
 TO THE STORAGE COEFFICIENT.
 (III) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLB Area (ha) = 0.39
 STANBYD (0044) Total Imp (ft) = 35.00 Dir. Com. (ft) = 4.00
 ID= 1 DT= 5.0 min

INTERVENCION PERVIOUS (I)
 Surface Area (ha) = 0.20
 Dep. Storage (mm) = 1.50
 Average Slope (ft) = 1.00
 Length (m) = 62.18
 Manning's n = 0.013
 Max. Eff. Inbar. (cm/hz) = 65.47
 over (min) = 5.00
 Storage Coeff. (min) = 0.89 (II)
 Unit Hyd. Spk (min) = 5.00
 Unit Hyd. Spk (max) = 5.00
 Unit Hyd. Spk (avg) = 0.98
 PEAK FLOW (cms) = 0.00
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 58.30
 TOTAL RAINFALL (mm) = 59.30
 RUNOFF COEFFICIENT = 0.98
 TOTALS
 0.042 (III)
 12.17
 31.29
 59.30
 0.53

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

(I) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 (II) TIME STEP (TP) SHOULD BE SMALLER OR EQUAL
 TO THE STORAGE COEFFICIENT.
 (III) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLB Area (ha) = 3.04
 STANBYD (0040) Total Imp (ft) = 86.00 Dir. Com. (ft) = 49.00
 ID= 1 DT= 5.0 min

INTERVENCION PERVIOUS (I)
 Surface Area (ha) = 2.85
 Dep. Storage (mm) = 1.50
 Average Slope (ft) = 1.00
 Length (m) = 143.29
 Manning's n = 0.013
 Max. Eff. Inbar. (cm/hz) = 65.47
 over (min) = 5.00
 Storage Coeff. (min) = 3.76 (II)
 Unit Hyd. Spk (min) = 5.00
 Unit Hyd. Spk (max) = 10.00

ADD HYD (0020) |
 1 + 2 = 3 |
 AREA OPEAK WPEAK U.V. |
 (ha) (cms) (hrs) (cm) |
 ID= 1 (0008): 47.69 0.635 13.08 38.34 |
 + ID2= 2 (0014): 3.44 0.141 12.25 21.31 |
 ID= 3 (0020): 51.13 0.679 12.93 37.24 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALLB Area (ha) = 35.98 Curve Number (CN) = 76.0
 STANBYD (0015) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min U.H. Tp (hrs) = 0.51

Unit Hyd Spk (cms) = 2.691
 PEAK FLOW (cms) = 1.021 (I)
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 21.313
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370
 (I) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLB Area (ha) = 0.53 Curve Number (CN) = 76.0
 STANBYD (0045) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min U.H. Tp (hrs) = 0.17

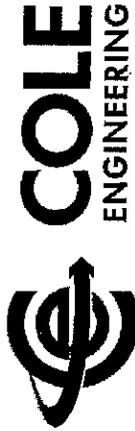
Unit Hyd Spk (cms) = 0.119
 PEAK FLOW (cms) = 0.090 (I)
 TIME TO PEAK (hrs) = 12.083
 RUNOFF VOLUME (mm) = 21.841
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.369
 (I) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLB Area (ha) = 5.74 Curve Number (CN) = 76.0
 STANBYD (0054) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DT= 5.0 min U.H. Tp (hrs) = 0.38

Unit Hyd Spk (cms) = 0.577
 PEAK FLOW (cms) = 0.200 (I)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 21.917
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.370
 (I) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLB Area (ha) = 2.73 Curve Number (CN) = 76.0
 STANBYD (0031) Total Imp (ft) = 22.00 Dir. Com. (ft) = 0.10
 ID= 1 DT= 5.0 min

INTERVENCION PERVIOUS (I)
 Surface Area (ha) = 0.00
 Dep. Storage (mm) = 1.50
 Average Slope (ft) = 1.00
 Length (m) = 134.91
 Max. Eff. Inbar. (cm/hz) = 65.47
 over (min) = 5.00
 Storage Coeff. (min) = 2.00
 Unit Hyd. Spk (min) = 40.00



Unit Hyd. Peak (cms) = 0.25 0.12
 PEAK FLOW (cms) = 0.27 0.19
 TIME TO PEAK (hrs) = 12.08 12.06 (111)
 RUNOFF VOLUME (mm) = 58.30 42.06
 TOTAL RAINFALL (mm) = 59.30 50.42
 RUNOFF COEFFICIENT = 0.98 0.72

**** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES!
 CN = 76.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021)	AREA (ha)	QPEAK (cms)	TPPEAK (hrs)	R.V. (mm)
1	35.29	1.011	12.51	21.93
2	2.73	0.175	12.17	28.01
3	38.66	1.101	12.42	22.35

ADD HYD (0021)	AREA (ha)	QPEAK (cms)	TPPEAK (hrs)	R.V. (mm)
1	38.66	1.101	12.42	22.35
2	3.08	0.459	12.06	50.42
3	41.74	1.199	12.33	24.42

ADD HYD (0021)	AREA (ha)	QPEAK (cms)	TPPEAK (hrs)	R.V. (mm)
1	41.74	1.199	12.33	24.42
2	0.58	0.042	12.17	31.25
3	42.32	1.427	12.25	24.51

ADD HYD (0021)	AREA (ha)	QPEAK (cms)	TPPEAK (hrs)	R.V. (mm)
1	42.32	1.227	12.25	24.51
2	0.045	0.003	12.06	50.42
3	42.05	1.251	12.25	24.48

ADD HYD (0021)	AREA (ha)	QPEAK (cms)	TPPEAK (hrs)	R.V. (mm)
1	42.05	1.251	12.25	24.48
2	5.74	0.260	12.43	21.92

ID = 3 (0021): 49.59 1.445 12.25 24.18
 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	STANDARD (0034)	Area (ha)	Imp (ft)	Dix. Conn. (ft)	50.00
1	1	50.00	50.00	50.00	50.00

Surface Area (ha)	Dep. Storage (mm)	Average Slope (ft)	Manning's n
0.44	1.00	2.00	0.415
1.00	1.00	2.00	0.415
40.00	1.00	2.00	0.415

Max. Eff. Inten. (mm/hr)	Storage Coeff. (min)	Unit Hyd. Peak (cms)	Unit Hyd. Peak (cms)
65.47	5.00	0.25	0.08
5.00	2.58 (11)	0.06	0.02
33.95 (11)	5.00	12.08	12.17
25.08	5.00	58.30	59.30
0.08	0.25	59.30	59.30

PEAK FLOW (cms)	TIME TO PEAK (hrs)	RUNOFF VOLUME (mm)	TOTAL RAINFALL (mm)	RUNOFF COEFFICIENT
0.02	12.08	58.30	59.30	0.98
0.06	12.06	42.06	50.42	0.98
1.00	12.25	59.30	59.30	0.98
1.101	12.42	59.30	59.30	0.98

**** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES!
 CN = 76.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	STANDARD (0034)	Area (ha)	Imp (ft)	Dix. Conn. (ft)	70.00
1	1	70.00	70.00	70.00	70.00

Surface Area (ha)	Dep. Storage (mm)	Average Slope (ft)	Manning's n
0.44	1.00	2.00	0.415
1.00	1.00	2.00	0.415
40.00	1.00	2.00	0.415

Max. Eff. Inten. (mm/hr)	Storage Coeff. (min)	Unit Hyd. Peak (cms)	Unit Hyd. Peak (cms)
65.47	5.00	0.25	0.08
5.00	2.58 (11)	0.06	0.02
33.95 (11)	5.00	12.08	12.17
25.08	5.00	58.30	59.30
0.08	0.25	59.30	59.30

PEAK FLOW (cms)	TIME TO PEAK (hrs)	RUNOFF VOLUME (mm)	TOTAL RAINFALL (mm)	RUNOFF COEFFICIENT
0.02	12.08	58.30	59.30	0.98
0.06	12.06	42.06	50.42	0.98
1.00	12.25	59.30	59.30	0.98
1.101	12.42	59.30	59.30	0.98

**** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES!
 CN = 76.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0035)	AREA (ha)	QPEAK (cms)	TPPEAK (hrs)	R.V. (mm)
1	42.05	1.251	12.25	24.48
2	5.74	0.260	12.43	21.92



COLE ENGINEERING

| CALIB |
 | STANBYD (0036) | Area (ha) = 1.09 |
 | ID# 1 DT= 5.0 min | Total Imp(%) = 96.00 | Df. Coeff. (%) = 50.00 |

IMPERVIOUS REMOVALS (t)
 Surface Area (ha) = 0.55 |
 Dep. Storage (mm) = 1.50 |
 Average Slope (t) = 1.00 |
 Length (m) = 95.24 |
 Mannings n = 0.013 |
 Max. Eff. Inten. (mm/hr) = 65.47 |
 over (mm) = 5.00 |
 Storage Coeff. (mm) = 2.75 (t) |
 Unit Hyd. Peak (mm) = 3.98 |
 (mm) = 0.26 |
 PEAK FLOW (cms) = 0.10 |
 TIME TO PEAK (hrs) = 12.08 |
 RUNOFF VOLUME (mm) = 58.30 |
 TOTAL RAINFALL (mm) = 59.30 |
 RUNOFF COEFFICIENT = 0.96 |
 TOTALS
 (t) = 0.12 (t) |
 (mm) = 12.08 |
 (mm) = 59.30 |
 (mm) = 0.70 |

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (t) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 CH* = 76.0 |
 (t) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (t) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
 | STANBYD (0005) | Area (ha) = 4.60 |
 | ID# 1 DT= 5.0 min | Total Imp(%) = 71.00 | Df. Coeff. (%) = 29.00 |

IMPERVIOUS REMOVALS (t)
 Surface Area (ha) = 3.27 |
 Dep. Storage (mm) = 1.00 |
 Average Slope (t) = 1.00 |
 Length (m) = 175.12 |
 Mannings n = 0.013 |
 Max. Eff. Inten. (mm/hr) = 55.47 |
 over (mm) = 5.00 |
 Storage Coeff. (mm) = 4.24 (t) |
 Unit Hyd. Peak (mm) = 5.00 |
 (mm) = 0.24 |
 PEAK FLOW (cms) = 0.24 |
 TIME TO PEAK (hrs) = 12.08 |
 RUNOFF VOLUME (mm) = 37.66 |
 TOTAL RAINFALL (mm) = 59.30 |
 RUNOFF COEFFICIENT = 0.96 |
 TOTALS
 (t) = 0.31 |
 (mm) = 12.08 |
 (mm) = 43.65 |
 (mm) = 59.30 |
 (mm) = 0.74 |

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (t) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 CH* = 76.0 |
 (t) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (t) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
 | NASHYD (0052) | Area (ha) = 4.15 | Curve Number (CN) = 76.0 |
 | ID# 1 DT= 5.0 min | Ia (mm) = 5.00 | # of Linear Res. (N) = 3.00 |
 | U.K. Tp (hrs) = 0.42 |

Unit Hyd. Peak (cms) = 0.377 |
 PEAK FLOW (cms) = 0.134 (t) |
 TIME TO PEAK (hrs) = 12.383 |
 RUNOFF VOLUME (mm) = 21.519 |

ID# 1 (0004): 10.12 1.133 12.08 12.08 43.91
 + ID# 2 (0034): 0.88 0.100 12.08 12.08 41.25
 ID# 3 (0035): 11.00 1.233 12.08 12.08 43.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR (0010) |
 | DT= 5.0 min |
 | ID# 2 -> CUR# 1 |
 | ID# 3 -> CUR# 1 |
 | ID# 4 -> CUR# 1 |
 | ID# 5 -> CUR# 1 |
 | ID# 6 -> CUR# 1 |
 | ID# 7 -> CUR# 1 |
 | ID# 8 -> CUR# 1 |
 | ID# 9 -> CUR# 1 |
 | ID# 10 -> CUR# 1 |
 | ID# 11 -> CUR# 1 |
 | ID# 12 -> CUR# 1 |
 | ID# 13 -> CUR# 1 |
 | ID# 14 -> CUR# 1 |
 | ID# 15 -> CUR# 1 |
 | ID# 16 -> CUR# 1 |
 | ID# 17 -> CUR# 1 |
 | ID# 18 -> CUR# 1 |
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 | ID# 97 -> CUR# 1 |
 | ID# 98 -> CUR# 1 |
 | ID# 99 -> CUR# 1 |
 | ID# 100 -> CUR# 1 |

INFLOW: ID# 2 (0013) |
 | ID# 3 (0014) |
 | ID# 4 (0015) |
 | ID# 5 (0016) |
 | ID# 6 (0017) |
 | ID# 7 (0018) |
 | ID# 8 (0019) |
 | ID# 9 (0020) |
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 | ID# 84 (0095) |
 | ID# 85 (0096) |
 | ID# 86 (0097) |
 | ID# 87 (0098) |
 | ID# 88 (0099) |
 | ID# 90 (0100) |

AREA (ha) = 20.14 | Curve Number (CN) = 76.0 |
 Ia (mm) = 5.00 | # of Linear Res. (N) = 3.00 |
 U.K. Tp (hrs) = 0.31 |

Unit Hyd. Peak (cms) = 2.481 |
 PEAK FLOW (cms) = 0.810 (t) |
 TIME TO PEAK (hrs) = 12.250 |
 RUNOFF VOLUME (mm) = 21.913 |
 TOTAL RAINFALL (mm) = 59.370 |
 RUNOFF COEFFICIENT = 0.370 |

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

| AND HYD (0022) |
 | ID# 1 DT= 5.0 min |
 | ID# 2 DT= 5.0 min |
 | ID# 3 DT= 5.0 min |
 | ID# 4 DT= 5.0 min |
 | ID# 5 DT= 5.0 min |
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 | ID# 96 DT= 5.0 min |
 | ID# 97 DT= 5.0 min |
 | ID# 98 DT= 5.0 min |
 | ID# 99 DT= 5.0 min |
 | ID# 100 DT= 5.0 min |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
 | NASHYD (0017) | Area (ha) = 17.97 | Curve Number (CN) = 76.0 |
 | ID# 1 DT= 5.0 min | Ia (mm) = 5.00 | # of Linear Res. (N) = 3.00 |
 | U.K. Tp (hrs) = 0.30 |

Unit Hyd. Peak (cms) = 2.288 |
 PEAK FLOW (cms) = 0.759 (t) |
 TIME TO PEAK (hrs) = 12.250 |
 RUNOFF VOLUME (mm) = 21.502 |
 TOTAL RAINFALL (mm) = 59.300 |
 RUNOFF COEFFICIENT = 0.370 |

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



COLE ENGINEERING

TOTAL RAINFALL (mm) = 58.300
 RUNOFF COEFFICIENT = 0.370

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

ADD HYD (0037)	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1 + 2 = 3				
ID1 = 1 (0037)	5.69	0.641	12.08	43.19
+ ID2 = 2 (0036)	1.69	0.124	12.08	41.2
ID = 3 (0037)	5.69	0.641	12.08	43.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0037)	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1 + 2 = 3				
ID1 = 1 (0037)	5.69	0.641	12.08	43.19
+ ID2 = 2 (0032)	4.15	0.134	12.33	21.92
ID = 1 (0037)	9.84	0.723	12.08	34.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0011)	INFLOW (cms)	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	R.V. (mm)
1	5.69	0.641	12.08	43.19		
2	4.15	0.134	12.33	21.92		
3	9.84	0.723	12.08	34.22		

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CRUIB	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1	5.69	0.641	12.08	43.19
2	4.15	0.134	12.33	21.92
3	9.84	0.723	12.08	34.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CRUIB	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1	5.69	0.641	12.08	43.19
2	4.15	0.134	12.33	21.92
3	9.84	0.723	12.08	34.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CRUIB	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1	5.69	0.641	12.08	43.19
2	4.15	0.134	12.33	21.92
3	9.84	0.723	12.08	34.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CRUIB	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1	5.69	0.641	12.08	43.19
2	4.15	0.134	12.33	21.92
3	9.84	0.723	12.08	34.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

TOTAL RAINFALL (mm) = 58.300
 RUNOFF COEFFICIENT = 0.370

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

ADD HYD (0023)	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1 + 2 = 3				
ID1 = 1 (0011)	9.84	0.847	12.25	26.26
+ ID2 = 2 (0017)	17.97	0.739	12.25	21.91
ID = 3 (0023)	27.81	0.847	12.25	26.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0023)	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1 + 2 = 3				
ID1 = 3 (0023)	27.81	0.847	12.25	26.26
+ ID2 = 2 (0031)	3.32	0.139	12.25	21.91
ID = 1 (0023)	31.33	0.966	12.25	25.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0023)	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1 + 2 = 3				
ID1 = 1 (0023)	31.13	0.966	12.25	25.79
+ ID2 = 2 (0058)	1.99	0.080	12.25	21.91
ID = 3 (0023)	33.08	1.066	12.25	25.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CRUIB	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1	31.13	0.966	12.25	25.79
2	1.99	0.080	12.25	21.91
3	33.08	1.066	12.25	25.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CRUIB	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1	31.13	0.966	12.25	25.79
2	1.99	0.080	12.25	21.91
3	33.08	1.066	12.25	25.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CRUIB	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1	31.13	0.966	12.25	25.79
2	1.99	0.080	12.25	21.91
3	33.08	1.066	12.25	25.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CRUIB	AREA (ha)	QPEAK (cms)	TP (hrs)	R.V. (mm)
1	31.13	0.966	12.25	25.79
2	1.99	0.080	12.25	21.91
3	33.08	1.066	12.25	25.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOGS.



CH* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

AREA (ha)= 3.03	PERVIOUS (1)	DIR. CONN. (S)= 24.00
SOIL INF(%)= 34.00		
IMPERVIOUS		
Surface Area (ha)= 1.03	2.00	
Dep. Storage (mm)= 1.00	1.50	
Average Slope (%)= 1.00	2.00	
Length (m)= 142.13	40.00	
Manning's n = 0.013	0.250	
Max. Eff. Incep. (mm/hr)= 65.47	38.16	
coef (hr)= 5.00	14.10	
Storage Coeff. (min)= 3.74 (11)	14.71 (11)	
Unit Hyd. Peak (mm)= 5.00	15.00	
Unit Hyd. Peak (cms)= 0.25	6.08	*TOTALS*
PEAK FLOW (cms)= 0.13	0.13	0.248 (111)
TIME TO PEAK (hrs)= 12.08	12.17	
RUNOFF VOLUME (mm)= 58.30	26.35	34.02
TOTAL RAINFALL (mm)= 59.30	59.30	
RUNOFF COEFFICIENT = 0.39	0.44	0.57

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON ENCLOSURE SELECTED FOR PREVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

AREA (ha)= 0.96	CURVE NUMBER (CN)= 76.0
SOIL INF(%)= 5.00	# of Linear Res. (N)= 3.00
U.R. Tp(hrs)= 0.16	
Unit Hyd Peak (cms)= 0.229	
PEAK FLOW (cms)= 0.059 (1)	
TIME TO PEAK (hrs)= 12.083	
RUNOFF VOLUME (mm)= 58.301	
TOTAL RAINFALL (mm)= 59.301	
RUNOFF COEFFICIENT = 0.368	

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

AREA (ha)= 3.03	PEAK (cms)	TPEAK (hrs)	R.V. (mm)
SOIL INF(%)= 34.00	0.248	12.08	34.02
U.R. Tp(hrs)= 0.16	0.134	12.08	41.25
Unit Hyd Peak (cms)= 0.229			
PEAK FLOW (cms)= 0.059 (1)			
TIME TO PEAK (hrs)= 12.083			
RUNOFF VOLUME (mm)= 58.301			
TOTAL RAINFALL (mm)= 59.301			
RUNOFF COEFFICIENT = 0.368			

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

ID = 1 (0020): 5.17 0.440 12.08 33.40
 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0007)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
ID= 2 --> OUT= 1	0.0000	0.0750	0.1550
ID= 5.0 min	0.0150	0.0890	0.1750
	0.0400	0.1000	0.1950
	0.0820	0.1000	0.6000
	AREA (ha)	CPEAK (cms)	R.V. (mm)
	5.170	0.440	33.40
	INFLOW: ID= 2 (0028)	5.170	0.025
	OUTFLOW: ID= 1 (0007)	0.440	12.08
		0.025	14.92
			33.09

PEAK FLOW REDUCTION [out/In] (%) = 5.77
 TIME SHIFT OF PEAK FLOW (min) = 140.00
 MAXIMUM STORAGE USED (ha.m.) = 0.1096
 Unit Hyd Peak (cms) = 0.108
 PEAK FLOW (cms) = 0.034 (1)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 21.908
 TOTAL RAINFALL (mm) = 59.300
 RUNOFF COEFFICIENT = 0.369
 Area (ha) = 0.79 Curve Number (CN) = 76.0
 Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 U.R. Tp(hrs) = 0.28

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

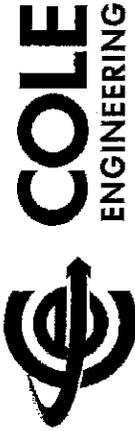
CAUSE (0049)	AREA (ha)	CURVE NUMBER (CN)
BASEFLO (0049)	12.39	76.0
ID= 1 DT= 5.0 min	5.00	3.00
U.R. Tp(hrs) = 0.61		
Unit Hyd Peak (cms) = 0.775		
PEAK FLOW (cms) = 0.307 (1)		
TIME TO PEAK (hrs) = 21.833		
RUNOFF VOLUME (mm) = 59.300		
TOTAL RAINFALL (mm) = 59.300		
RUNOFF COEFFICIENT = 0.370		

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

ADD HYD (0026)	AREA (ha)	PEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	5.17	0.025	14.42	33.09
ID= 1 (0007)	0.79	0.034	12.25	21.91
+ ID= 2 (0025)				
ID = 3 (0026)	5.96	0.046	12.25	31.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0026)



3 + 2 = 1
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (ft) (ft)
 ID# 1 (0026): 1.75 7.92 1.35 13.92 20.00
 + ID# 2 (0029): 1.82 8.00 1.35 14.00 20.17
 ID# 1 (0028): 1.98 8.17 1.82 14.25 20.33
 ID# 1 (0026): 2.08 8.25 1.82 14.35 20.42
 ID# 1 (0026): 2.33 8.42 1.82 14.52 20.58
 ID# 1 (0026): 2.42 8.50 1.82 14.58 20.67
 ID# 1 (0026): 2.38 8.57 1.82 14.67 20.75
 ID# 1 (0026): 2.67 8.75 1.82 14.83 20.82
 ID# 1 (0026): 2.75 8.83 1.82 14.92 20.92
 ID# 1 (0026): 2.82 8.92 1.82 15.00 21.08
 ID# 1 (0026): 2.92 9.00 1.82 15.06 21.17
 ID# 1 (0026): 3.08 9.19 1.82 15.17 21.24
 ID# 1 (0026): 3.17 9.25 2.15 15.33 21.42
 ID# 1 (0026): 3.25 9.33 2.15 15.42 21.56
 ID# 1 (0026): 3.42 9.42 2.15 15.50 21.67
 ID# 1 (0026): 3.50 9.50 2.15 15.58 21.75
 ID# 1 (0026): 3.58 9.57 2.42 15.75 21.83
 ID# 1 (0026): 3.67 9.75 2.42 15.83 21.92
 ID# 1 (0026): 3.73 9.83 2.42 15.92 22.00
 ID# 1 (0026): 3.82 9.92 2.42 16.00 22.07
 ID# 1 (0026): 4.09 10.08 2.42 16.17 22.23
 ID# 1 (0026): 4.17 10.17 3.10 16.25 22.39
 ID# 1 (0026): 4.23 10.25 3.10 16.33 22.42
 ID# 1 (0026): 4.33 10.33 3.10 16.42 22.59
 ID# 1 (0026): 4.42 10.42 3.10 16.50 22.67
 ID# 1 (0026): 4.50 10.50 3.10 16.58 22.87
 ID# 1 (0026): 4.58 10.58 3.10 16.67 22.93
 ID# 1 (0026): 4.67 10.67 3.10 16.75 23.08
 ID# 1 (0026): 4.75 10.75 3.10 16.83 23.17
 ID# 1 (0026): 4.83 10.83 3.10 16.92 23.25
 ID# 1 (0026): 4.92 10.92 3.10 17.00 23.33
 ID# 1 (0026): 5.00 11.00 3.10 17.08 23.42
 ID# 1 (0026): 5.08 11.08 3.10 17.17 23.58
 ID# 1 (0026): 5.17 11.17 3.10 17.25 23.67
 ID# 1 (0026): 5.25 11.25 3.10 17.33 23.82
 ID# 1 (0026): 5.33 11.33 3.10 17.42 23.92
 ID# 1 (0026): 5.42 11.42 3.10 17.50 24.08
 ID# 1 (0026): 5.50 11.50 3.10 17.58 24.17
 ID# 1 (0026): 5.58 11.58 3.10 17.67 24.23
 ID# 1 (0026): 5.67 11.67 3.10 17.75 24.33
 ID# 1 (0026): 5.75 11.75 3.10 17.83 24.42
 ID# 1 (0026): 5.83 11.83 3.10 17.92 24.58
 ID# 1 (0026): 5.92 11.92 3.10 18.00 24.67
 ID# 1 (0026): 6.00 12.00 3.10 18.08 24.82
 ID# 1 (0026): 6.08 12.08 3.10 18.17 24.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

AREA (ha) = 9.28
 TOTAL EMP(%) = 27.00
 DIF. CORR. (%) = 27.00

IMPERVIOUS PERVIOUS (ft)
 Surface Area (ha) = 0.89
 Dep. Storage (cms) = 1.00
 Average Slope (%) = 1.00
 Length (m) = 147.97
 Manning's n = 0.013
 Max. Eff. Inlet (mm/hr) = 55.47
 Storage Coeff. (ft) = 3.69
 Unit Rvd. Peak (cms) = 5.00
 Unit Rvd. Peak (cms) = 0.25

TOTALS
 PEAK FLOW (cms) = 0.16
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 58.30
 TOTAL RAINFALL (mm) = 59.30
 RUNOFF COEFFICIENT = 0.98
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (ft) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES!
 (ft) CH# = 76.0 Is = Dep. Storage (Above)
 (ft) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (ft) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

*** SIMULATION WORKSHEET ***

FILENAME: C:\WinTemp\638
 6604-7c11-4394-8c44-84261e2525b\6
 66766dd-7220-4342-863b-dc16f0e31b5e
 Comments: Meaford 10 year 24 Hour SCS Type II stor

TIME	RAIN	TIME	RAIN	TIME	RAIN
HR:MM	IN/HR	HR:MM	IN/HR	HR:MM	IN/HR
0:00	0.10	6:17	1.35	12:25	5.65
0:08	0.74	6:25	1.35	12:33	5.65
0:17	0.74	6:33	1.35	12:42	5.65
0:25	0.74	6:42	1.35	12:50	5.65
0:33	0.74	6:50	1.35	12:58	5.65
0:42	0.74	6:58	1.35	13:07	5.65
0:50	0.74	7:07	1.35	13:15	5.65
0:58	0.74	7:15	1.35	13:24	5.65
0:67	0.74	7:24	1.35	13:32	5.65
0:75	0.74	7:32	1.35	13:41	5.65
0:83	0.74	7:41	1.35	13:50	5.65
0:92	0.74	7:50	1.35	13:58	5.65
1:00	0.74	7:58	1.35	14:07	5.65
1:08	0.74	8:07	1.35	14:16	5.65
1:17	0.74	8:15	1.35	14:24	5.65
1:25	0.74	8:24	1.35	14:33	5.65
1:33	0.74	8:32	1.35	14:42	5.65
1:42	0.74	8:41	1.35	14:50	5.65
1:50	0.74	8:49	1.35	14:59	5.65
1:58	0.74	8:58	1.35	15:07	5.65
1:67	0.74	9:06	1.35	15:16	5.65
1:75	0.74	9:15	1.35	15:24	5.65
1:83	0.74	9:23	1.35	15:33	5.65
1:92	0.74	9:32	1.35	15:41	5.65
2:00	0.74	9:40	1.35	15:50	5.65
2:08	0.74	9:49	1.35	15:58	5.65
2:17	0.74	9:57	1.35	16:07	5.65
2:25	0.74	10:06	1.35	16:15	5.65
2:33	0.74	10:14	1.35	16:24	5.65
2:42	0.74	10:23	1.35	16:32	5.65
2:50	0.74	10:31	1.35	16:41	5.65
2:58	0.74	10:40	1.35	16:49	5.65
3:07	0.74	10:48	1.35	16:58	5.65
3:15	0.74	10:57	1.35	17:06	5.65
3:23	0.74	11:05	1.35	17:15	5.65
3:32	0.74	11:14	1.35	17:23	5.65
3:40	0.74	11:22	1.35	17:32	5.65
3:48	0.74	11:31	1.35	17:40	5.65
3:57	0.74	11:39	1.35	17:49	5.65
4:05	0.74	11:48	1.35	17:57	5.65
4:13	0.74	11:56	1.35	18:06	5.65
4:22	0.74	12:05	1.35	18:14	5.65
4:30	0.74	12:13	1.35	18:23	5.65
4:38	0.74	12:22	1.35	18:31	5.65
4:47	0.74	12:30	1.35	18:40	5.65
4:55	0.74	12:39	1.35	18:48	5.65
5:03	0.74	12:47	1.35	18:57	5.65
5:12	0.74	12:56	1.35	19:05	5.65
5:20	0.74	13:04	1.35	19:14	5.65
5:28	0.74	13:13	1.35	19:22	5.65
5:37	0.74	13:21	1.35	19:31	5.65
5:45	0.74	13:30	1.35	19:39	5.65
5:53	0.74	13:38	1.35	19:48	5.65
6:02	0.74	13:47	1.35	19:56	5.65
6:10	0.74	13:55	1.35	20:05	5.65
6:18	0.74	14:04	1.35	20:13	5.65
6:27	0.74	14:12	1.35	20:22	5.65
6:35	0.74	14:21	1.35	20:30	5.65
6:43	0.74	14:29	1.35	20:39	5.65
6:52	0.74	14:38	1.35	20:47	5.65
7:00	0.74	14:46	1.35	20:56	5.65
7:08	0.74	14:55	1.35	21:04	5.65
7:17	0.74	15:03	1.35	21:13	5.65
7:25	0.74	15:12	1.35	21:21	5.65
7:33	0.74	15:20	1.35	21:30	5.65
7:42	0.74	15:29	1.35	21:38	5.65
7:50	0.74	15:37	1.35	21:47	5.65
7:58	0.74	15:46	1.35	21:55	5.65
8:07	0.74	15:54	1.35	22:04	5.65
8:15	0.74	16:03	1.35	22:12	5.65
8:23	0.74	16:11	1.35	22:21	5.65
8:32	0.74	16:20	1.35	22:29	5.65
8:40	0.74	16:28	1.35	22:38	5.65
8:48	0.74	16:37	1.35	22:46	5.65
8:57	0.74	16:45	1.35	22:55	5.65
9:05	0.74	16:54	1.35	23:03	5.65
9:13	0.74	17:02	1.35	23:12	5.65
9:22	0.74	17:11	1.35	23:20	5.65
9:30	0.74	17:19	1.35	23:29	5.65
9:38	0.74	17:28	1.35	23:37	5.65
9:47	0.74	17:36	1.35	23:46	5.65
9:55	0.74	17:45	1.35	23:54	5.65
10:03	0.74	17:53	1.35	24:03	5.65
10:12	0.74	18:02	1.35	24:11	5.65
10:20	0.74	18:10	1.35	24:20	5.65
10:28	0.74	18:19	1.35	24:28	5.65
10:37	0.74	18:27	1.35	24:37	5.65
10:45	0.74	18:36	1.35	24:45	5.65
10:53	0.74	18:44	1.35	24:54	5.65
11:02	0.74	18:53	1.35	25:02	5.65
11:10	0.74	19:01	1.35	25:11	5.65
11:18	0.74	19:10	1.35	25:19	5.65
11:27	0.74	19:18	1.35	25:28	5.65
11:35	0.74	19:27	1.35	25:36	5.65
11:43	0.74	19:35	1.35	25:45	5.65
11:52	0.74	19:44	1.35	25:53	5.65
12:00	0.74	19:52	1.35	26:02	5.65
12:08	0.74	20:01	1.35	26:10	5.65
12:17	0.74	20:09	1.35	26:19	5.65
12:25	0.74	20:18	1.35	26:27	5.65
12:33	0.74	20:26	1.35	26:36	5.65
12:42	0.74	20:35	1.35	26:44	5.65
12:50	0.74	20:43	1.35	26:53	5.65
12:58	0.74	20:52	1.35	27:01	5.65
13:07	0.74	21:00	1.35	27:10	5.65
13:15	0.74	21:09	1.35	27:18	5.65
13:23	0.74	21:17	1.35	27:27	5.65
13:32	0.74	21:26	1.35	27:35	5.65
13:40	0.74	21:34	1.35	27:44	5.65
13:48	0.74	21:43	1.35	27:52	5.65
13:57	0.74	21:51	1.35	28:01	5.65
14:05	0.74	22:00	1.35	28:09	5.65
14:13	0.74	22:08	1.35	28:18	5.65
14:22	0.74	22:17	1.35	28:26	5.65
14:30	0.74	22:25	1.35	28:35	5.65
14:38	0.74	22:34	1.35	28:43	5.65
14:47	0.74	22:42	1.35	28:52	5.65
14:55	0.74	22:51	1.35	29:00	5.65
15:03	0.74	23:00	1.35	29:09	5.65
15:12	0.74	23:08	1.35	29:17	5.65
15:20	0.74	23:17	1.35	29:26	5.65
15:28	0.74	23:25	1.35	29:34	5.65
15:37	0.74	23:34	1.35	29:43	5.65
15:45	0.74	23:42	1.35	29:51	5.65
15:53	0.74	23:51	1.35	30:00	5.65
16:02	0.74	23:59	1.35	30:08	5.65
16:10	0.74	24:08	1.35	30:17	5.65
16:18	0.74	24:16	1.35	30:25	5.65
16:27	0.74	24:25	1.35	30:34	5.65
16:35	0.74	24:33	1.35	30:42	5.65
16:43	0.74	24:42	1.35	30:51	5.65
16:52	0.74	24:50	1.35	31:00	5.65
17:00	0.74	24:59	1.35	31:08	5.65
17:08	0.74	25:07	1.35	31:17	5.65
17:17	0.74	25:16	1.35	31:25	5.65
17:25	0.74	25:24	1.35	31:34	5.65
17:33	0.74	25:33	1.35	31:42	5.65
17:42	0.74	25:41	1.35	31:51	5.65
17:50	0.74	25:50	1.35	32:00	5.65
17:58	0.74	25:58	1.35	32:08	5.65
18:07	0.74	26:07	1.35	32:17	5.65
18:15	0.74	26:15	1.35	32:25	5.65
18:23	0.74	26:24	1.35	32:34	5.65
18:32	0.74	26:32	1.35	32:42	5.65
18:40	0.74	26:41	1.35	32:51	5.65
18:48	0.74	26:49	1.35	33:00	5.65
18:57	0.74	26:58	1.35	33:08	5.65
19:05	0.74	27:06	1.35	33:17	5.65
19:13	0.74	27:15	1.35	33:25	5.65
19:22	0.74	27:23	1.35	33:34	5.65
19:30	0.74	27:32	1.35	33:42	5.65
19:38	0.74	27:40	1.35	33:51	5.65
19:47	0.74	27:49	1.35	34:00	5.65
19:55	0.74	27:57	1.35	34:08	5.65
20:03	0.74	28:06	1.35	34:17	



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MAXIMUM STORAGE USED (ha.in.) = 1.0248

ADD HYD (0020) | AREA OPEAK R.V. |
 1 + 2 = 3 | (ha) (cms) (hrs) (mm) |
 ID2 = 1 (0008): 47.69 0.868 12.52 45.12 |
 + ID3 = 2 (0014): 3.44 0.177 12.25 27.22 |
 ID = 3 (0020): 51.13 0.931 12.75 43.91 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB | Area (ha) = 35.93 Curve Number (CN) = 76.0 |
 WASHD (0015) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00 |
 ID = 1 DF = 5.0 min | U.H. Tp (hrs) = 0.81 |

Unit Hyd Opeak (cms) = 2.694
 PEAK FLOW (cms) = 1.266 (1)
 TIME TO PEAK (hrs) = 12.500
 RUNOFF VOLUME (mm) = 27.234
 TOTAL RAINFALL (mm) = 67.300
 RUNOFF COEFFICIENT = 0.405

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

CALIB | Area (ha) = 0.53 Curve Number (CN) = 76.0 |
 WASHD (0045) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00 |
 ID = 1 DF = 5.0 min | U.H. Tp (hrs) = 0.17 |

Unit Hyd Opeak (cms) = 0.119
 PEAK FLOW (cms) = 0.038 (1)
 TIME TO PEAK (hrs) = 12.083
 RUNOFF VOLUME (mm) = 27.137
 TOTAL RAINFALL (mm) = 67.300
 RUNOFF COEFFICIENT = 0.405

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

CALIB | Area (ha) = 5.74 Curve Number (CN) = 76.0 |
 WASHD (0054) | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00 |
 ID = 1 DF = 5.0 min | U.H. Tp (hrs) = 0.38 |

Unit Hyd Opeak (cms) = 0.577
 PEAK FLOW (cms) = 0.250 (1)
 TIME TO PEAK (hrs) = 12.323
 RUNOFF VOLUME (mm) = 27.231
 TOTAL RAINFALL (mm) = 67.300
 RUNOFF COEFFICIENT = 0.405

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

CALIB | Area (ha) = 2.73 D.L. Conn. (ft) = 0.10 |
 WASHD (0031) | ID = 1 DF = 5.0 min | Total Imp (ft) = 22.00 |

Surface Area (ha) = 0.00 IMPERVIOUS PERVIOUS (1)
 Dep. Storage (mm) = 1.00 2.13
 Average Slope (ft) = 1.00 2.00

Length (m) = 134.51 40.00
 Manning's n = 0.013 0.250
 Max. Eff. Inten. (mm/hr) = 74.30 57.61
 over (min) = 5.00 15.00
 Storage Coeff. (min) = 3.44 (11) 12.24 (11)
 Unit Hyd. Peak (mm) = 5.00 15.00
 Unit Hyd. Peak (cms) = 0.26 0.09
 PEAK FLOW (cms) = 0.00 0.22
 TIME TO PEAK (hrs) = 12.08 12.17
 RUNOFF VOLUME (mm) = 66.30 33.99
 TOTAL RAINFALL (mm) = 67.30 67.30
 RUNOFF COEFFICIENT = 0.99 0.50
 TOTALS
 0.219 (11)
 12.17
 33.99
 67.30
 0.51

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

- (1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES!
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB | Area (ha) = 0.58 D.L. Conn. (ft) = 4.00 |
 WASHD (0044) | ID = 1 DF = 5.0 min | Total Imp (ft) = 35.00 |

Surface Area (ha) = 0.20 IMPERVIOUS PERVIOUS (1)
 Dep. Storage (mm) = 1.00 1.50
 Average Slope (ft) = 1.00 2.00
 Length (ha) = 62.18 40.00
 Manning's n = 0.013 0.250
 Max. Eff. Inten. (mm/hr) = 74.30 71.09
 over (min) = 5.00 15.00
 Storage Coeff. (min) = 2.15 (11) 10.25 (11)
 Unit Hyd. Peak (mm) = 5.00 15.00
 Unit Hyd. Peak (cms) = 0.26 0.09
 PEAK FLOW (cms) = 0.00 0.05
 TIME TO PEAK (hrs) = 12.08 12.17
 RUNOFF VOLUME (mm) = 66.30 33.99
 TOTAL RAINFALL (mm) = 67.30 67.30
 RUNOFF COEFFICIENT = 0.99 0.51

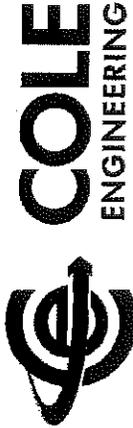
TOTALS
 0.052 (11)
 12.17
 33.99
 67.30
 0.51

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

- (1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES!
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB | Area (ha) = 5.08 D.L. Conn. (ft) = 49.00 |
 WASHD (0040) | ID = 1 DF = 5.0 min | Total Imp (ft) = 95.00 |

Surface Area (ha) = 2.65 IMPERVIOUS PERVIOUS (1)
 Dep. Storage (mm) = 1.00 1.50
 Average Slope (ft) = 1.00 2.00
 Length (ha) = 143.29 40.00
 Manning's n = 0.013 0.250
 Max. Eff. Inten. (mm/hr) = 74.30 233.86
 over (min) = 5.00 10.00
 Storage Coeff. (min) = 3.37 (11) 8.39 (11)



+ ID# = 2 (0034): 5.74 0.250 12.33 27.23
 ID# = 3 (0021): 48.59 1.751 12.25 29.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALCULATED AREA (ha) = 0.86
 STORMFLOW (0034) Total Imp (ft) = 50.00 DLR. Com. (ft) = 50.00
 ID# = 1 DT = 5.0 min.

IMPERVIOUS	PERVIOUS (I)
Surface Area (ha) = 0.44	0.44
Dep. Storage (mm) = 1.00	1.00
Runoff Slope (ft) = 46.00	46.00
Length (ft) = 76.59	76.59
Manning's n = 0.013	0.013
Max. Eff. Inten. (mm/hr) = 74.30	74.30
Storage Coeff. over (min) = 5.00	15.00
Unit Hyd. Peak (mm) = 2.45 (I1)	12.92 (I1)
Unit Hyd. Peak (cms) = 5.00	15.00
Unit Hyd. Peak (cms) = 0.50	0.08
PEAK FLOW (cms) = 0.09	0.03
TIME TO PEAK (hrs) = 12.68	12.17
RUNOFF VOLUME (mm) = 66.30	29.65
TOTAL RAINFALL (mm) = 67.30	67.30
RUNOFF COEFFICIENT = 0.99	0.44

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

(I) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 I# = Dep. Storage (Above)
 (I1) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (I11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALCULATED AREA (ha) = 10.12
 STORMFLOW (0004) Total Imp (ft) = 70.00 DLR. Com. (ft) = 37.00
 ID# = 1 DT = 5.0 min.

IMPERVIOUS	PERVIOUS (I)
Surface Area (ha) = 7.08	3.04
Dep. Storage (mm) = 1.00	1.00
Average Slope (ft) = 1.00	2.00
Length (ft) = 258.74	40.00
Manning's n = 0.013	0.250
Max. Eff. Inten. (mm/hr) = 74.30	116.26
Storage Coeff. over (min) = 5.00 (I1)	15.00 (I1)
Unit Hyd. Peak (mm) = 5.00	15.00
Unit Hyd. Peak (cms) = 0.21	0.69
PEAK FLOW (cms) = 0.75	0.65
TIME TO PEAK (hrs) = 12.08	12.17
RUNOFF VOLUME (mm) = 66.30	42.31
TOTAL RAINFALL (mm) = 67.30	67.30
RUNOFF COEFFICIENT = 0.99	0.63

(I) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 I# = Dep. Storage (Above)
 (I1) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (I11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0034) AREA QPEAK TPEAK R.V.
 1 + 2 = 3

Unit Hyd. Peak (min) = 5.00 10.00
 Unit Hyd. Peak (cms) = 0.26 0.12
 PEAK FLOW (cms) = 0.31 0.23
 TIME TO PEAK (hrs) = 12.08 12.08
 RUNOFF VOLUME (mm) = 66.30 50.32
 TOTAL RAINFALL (mm) = 67.30 67.30
 RUNOFF COEFFICIENT = 0.99 0.75

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

(I) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 I# = Dep. Storage (Above)
 (I1) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (I11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

AREA	QPEAK	TPEAK	R.V.
(ha)	(cms)	(hrs)	(mm)
ID# = 1 (0015): 35.93	1.246	12.50	27.23
+ ID# = 2 (0031): 2.73	0.219	12.17	53.99
ID# = 3 (0021): 38.66	1.374	12.42	27.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

AREA	QPEAK	TPEAK	R.V.
(ha)	(cms)	(hrs)	(mm)
ID# = 3 (0021): 38.66	1.374	12.42	27.71
+ ID# = 2 (0049): 3.08	0.535	12.08	58.15
ID# = 1 (0021): 41.74	1.484	12.31	29.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

AREA	QPEAK	TPEAK	R.V.
(ha)	(cms)	(hrs)	(mm)
ID# = 1 (0021): 41.74	1.484	12.33	29.96
+ ID# = 2 (0049): 0.58	0.052	12.17	37.82
ID# = 3 (0021): 42.32	1.519	12.25	30.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

AREA	QPEAK	TPEAK	R.V.
(ha)	(cms)	(hrs)	(mm)
ID# = 3 (0021): 42.32	1.519	12.25	30.06
+ ID# = 2 (0045): 0.53	0.038	13.08	27.14
ID# = 1 (0021): 42.85	1.548	12.25	30.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

AREA	QPEAK	TPEAK	R.V.
(ha)	(cms)	(hrs)	(mm)
ID# = 1 (0021): 42.85	1.548	12.25	30.03



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ID= 1 (00041): 10.12 (cms) 12.98 (hrs) (mm)
 + ID= 2 (00041): 1.336 12.98 51.19
 + ID= 3 (00041): 0.39 0.117 32.08 47.97
 ID= 1 (00041): 11.08 1.453 12.98 50.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0010)
 ID= 2 -> OUT= 1
 ID= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m)	OUTFLOW (cms)	STORAGE (ha.m)
0.000	0.000	0.000	0.000
0.100	0.200	0.000	0.000
0.250	0.250	0.000	0.400
0.350	0.270	1.200	0.600

AREA (ha) TPEAK (cms)
 11.080 1.453
 11.080 1.453 12.98 50.93
 11.080 1.453 12.98 50.93

PEAK FLOW REDUCTION (cms/ft) = 23.15
 TIME TO PEAK (hrs) = 12.98
 MAXIMUM STORAGE (ha.m) = 0.2674

CALLB (ha) = 20.14 Curve Number (CN) = 76.0
 NASHVD (0016) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DF= 5.0 min U.B. Tp (hrs) = 0.31

Unit Hyd Qpeak (cms) = 2.481
 PEAK FLOW (cms) = 1.013 (1)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 27.226
 TOTAL RAINFALL (mm) = 67.300
 RUNOFF COEFFICIENT = 0.405

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

ADD BVD (0022)
 1 + 2 = 3

AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
 11.00 0.336 12.58 50.88
 + ID= 2 (0016): 20.14 1.013 12.25 27.23
 ID= 3 (0022): 31.14 1.248 12.33 35.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALLB (ha) = 17.97 Curve Number (CN) = 76.0
 NASHVD (0017) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DF= 5.0 min U.B. Tp (hrs) = 0.30

Unit Hyd Qpeak (cms) = 2.268
 PEAK FLOW (cms) = 0.324 (1)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 27.224
 TOTAL RAINFALL (mm) = 67.300
 RUNOFF COEFFICIENT = 0.405

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

CALLB (ha) = 1.09 Area (ha) = 1.09
 NASHVD (0036) Total Imp(%) = 50.00 D.L. Coeff. (C) = 50.00
 ID= 1 DF= 5.0 min

IMPERVIOUS PERCENTAGE (%)
0.50
1.50
1.00
2.00
40.00
0.013

Surface Area (ha)	Dep. Storage (mm)	Average Slope (ft)	Length (ft)	Manning's n	Max. Inlet (mm/hr)	Storage Coeff. (over)	Unit Hyd. Peak (cms)	PEAK FLOW (cms)	TIME TO PEAK (hrs)	TOTAL RAINFALL (mm)	RUNOFF COEFFICIENT
74.30	1.00	85.84	40.00	0.013	74.30	5.00	0.29	0.11	12.17	67.30	0.44
15.00	2.61 (11)	13.09 (11)	13.00	0.09	15.00	2.61 (11)	0.29	0.04	12.17	67.30	0.44
13.00	0.00	0.00	0.00	0.00	13.00	0.00	0.29	0.04	12.17	67.30	0.44
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.04	12.17	67.30	0.44

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

(1) ON PROCEDURE SELECTED FOR FERVIOUS LASSES:
 CN* = 76.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.

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

CALLB (ha) = 4.60 Area (ha) = 4.60
 NASHVD (0005) Total Imp(%) = 71.00 D.L. Coeff. (C) = 29.00
 ID= 1 DF= 5.0 min

IMPERVIOUS PERCENTAGE (%)
1.00
1.00
2.00
40.00
0.023

Surface Area (ha)	Dep. Storage (mm)	Average Slope (ft)	Length (ft)	Manning's n	Max. Inlet (mm/hr)	Storage Coeff. (over)	Unit Hyd. Peak (cms)	PEAK FLOW (cms)	TIME TO PEAK (hrs)	TOTAL RAINFALL (mm)	RUNOFF COEFFICIENT
74.30	1.00	175.12	40.00	0.023	74.30	5.00	0.24	0.27	12.08	67.30	0.56
15.00	2.61 (11)	13.09 (11)	13.00	0.10	15.00	2.61 (11)	0.24	0.27	12.08	67.30	0.56
13.00	0.00	0.00	0.00	0.00	13.00	0.00	0.24	0.27	12.08	67.30	0.56
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.27	12.08	67.30	0.56

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

(1) ON PROCEDURE SELECTED FOR FERVIOUS LASSES:
 CN* = 76.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.

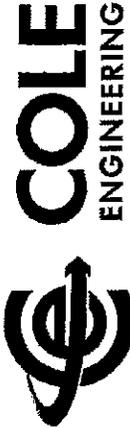
(111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLB (ha) = 4.15 Area (ha) = 4.15 Curve Number (CN) = 76.0
 NASHVD (0052) Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 ID= 1 DF= 5.0 min U.B. Tp (hrs) = 0.42

Unit Hyd Qpeak (cms) = 0.377

PEAK FLOW (cms) = 0.167 (1)
 TIME TO PEAK (hrs) = 12.355

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



(1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 6.0 Lbs Dry Storage (Above)
 (11) TIME STEP (TS) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CMWBH	Area (ha) = 3.03	DIF. Coma. (ft) = 24.00
STANDARD (0001)	Total Imp (ft) = 34.00	
ID= 1 DF= 5.0 min		
Surface Area	(ha) =	PERVIOUS (1)
Dry Storage	(mm) =	2.00
Average Slope	(ft) =	1.00
Length	(m) =	2.00
Manings n	=	142.13
	=	40.00
	=	0.250
Max Eff. Intra. (mm/hr) =	74.30	49.03
Storage Coeff. (man) =	5.00	15.00
Unit Hyd. Peak (mm) =	3.55 (11)	12.94 (11)
	5.00	15.00
	0.26	0.08
PEAK FLOW (cms) =	0.15	0.17
TIME TO PEAK (hrs) =	12.08	12.17
RUNOFF VOLUME (mm) =	66.30	32.11
TOTAL RAINFALL (mm) =	67.30	67.30
RUNOFF COEFFICIENT =	0.89	0.48
		0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 6.0 Lbs Dry Storage (Above)
 (11) TIME STEP (TS) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CMWBH	Area (ha) = 0.95	Curve Number (CN) = 76.0
STANDARD (0050)	Total Imp (ft) = 5.00	# of Linear Res. (N) = 3.00
ID= 1 DF= 5.0 min	U.H. Tp (hrs) = 0.15	
Unit Hyd. Peak (cms) =	0.229	
PEAK FLOW (cms) =	0.072 (1)	
TIME TO PEAK (hrs) =	12.063	
RUNOFF VOLUME (mm) =	27.112	
TOTAL RAINFALL (mm) =	67.300	
RUNOFF COEFFICIENT =	0.403	

(1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
 ADD HYD (0028)
 1 + 2 = 3
 AREA OPERA TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID= 1 (0001): 3.03 0.239 12.08 40.31
 + ID= 2 (0027): 1.19 0.156 12.08 47.97
 ID= 3 (0028): 4.21 0.456 12.08 42.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
 ADD HYD (0028)
 3 + 2 = 1
 AREA OPERA TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID= 3 (0028): 4.21 0.456 12.08 42.46

+ ID= 2 (0059): 0.96 0.072 12.08 27.11
 ID= 1 (0028): 5.17 0.527 12.08 39.61
 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0007)	STORAGE (ha-hr)	OUTFLOW (cms)	STORAGE (ha-hr)	OUTFLOW (cms)
IN= 2 -> OUT= 1	0.0000	0.0000	0.1850	0.0750
DF= 5.0 min	0.0150	0.0850	0.1750	0.0800
	0.0400	0.1300	0.1950	0.0950
	0.0525	0.1400	0.1900	0.1000
			0.6000	
			R.V.	
	AREA (ha)	OPERA (cms)	TPEAK (hrs)	R.V. (mm)
	5.170	0.527	12.08	39.61
	5.170	0.636	13.25	39.30

PEAK FLOW REDUCTION (Qpeak/Qt) = 5.87
 TIME STEP OF PEAK FLOW (min) = 70.00
 MAXIMUM STORAGE USED (ha-hr) = 0.1248

CALLS
 WASHD (0025)
 ID= 1 DF= 5.0 min
 Area (ha) = 0.79
 Curve Number (CN) = 76.0
 Ia (mm) = 5.00
 # of Linear Res. (N) = 3.00
 U.H. Tp (hrs) = 0.28
 Unit Hyd. Peak (cms) = 0.108
 PEAK FLOW (cms) = 0.042 (1)
 TIME TO PEAK (hrs) = 12.230
 RUNOFF VOLUME (mm) = 27.521
 TOTAL RAINFALL (mm) = 67.300
 RUNOFF COEFFICIENT = 0.404

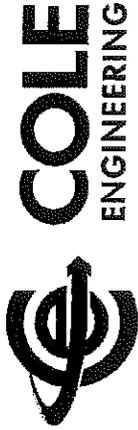
(1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS	Area (ha) = 12.59	Curve Number (CN) = 76.0
WASHD (0046)	Total Imp (ft) = 5.00	# of Linear Res. (N) = 3.00
ID= 1 DF= 5.0 min	U.H. Tp (hrs) = 0.61	
Unit Hyd. Peak (cms) =	0.1776	
PEAK FLOW (cms) =	0.385 (1)	
TIME TO PEAK (hrs) =	12.593	
RUNOFF VOLUME (mm) =	27.234	
TOTAL RAINFALL (mm) =	67.300	
RUNOFF COEFFICIENT =	0.403	

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

ADD HYD (0028)	AREA OPERA TPEAK R.V.
1 + 2 = 3	(ha) (cms) (hrs) (mm)
ID= 1 (0007):	5.17 0.527 12.08 39.61
+ ID= 2 (0025):	0.79 0.042 12.25 27.23
ID= 3 (0026):	5.96 0.059 12.33 37.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



AND RFD (0026) }
 3 + 2 = 1 }
 AREA QPEAK PPEAK R.V.
 (ha) (cms) (cms) (mm)
 ID# 3 (0026): 5.96 12.33 37.70
 + ID# 2 (0049): 12.39 0.365 27.23
 ID = 1 (0026): 16.35 0.438 12.26 30.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CANAL }
 STANDING (0065) }
 (Time 1.00 min) }
 Area (ha) = 3.29 Dis. Comp. (%) = 27.00
 Total Imp(%) = 27.00

EXPANSIONS PERVIOUS (L)
 Surface Area (ha) = 0.89
 Pop. Storage (mm) = 1.00
 Average Slope (S) = 1.00
 Length (m) = 147.87
 Manning's n = 0.013
 Max. Eff. Inven. (mm/hr) = 74.30
 Peak Flow (cms) = 13.00
 Storage Coef. (mm) = 3.64 (L)
 Unit Hyd. Tpeak (mm) = 5.80
 Unit Hyd. Peak (cms) = 0.25

PEAK FLOW (cms) = 0.18
 TIME TO PEAK (hrs) = 12.08
 ROROFF VOLUME (mm) = 65.30
 TOTAL RAINFALL (mm) = 67.30
 ROROFF COEFFICIENT = 0.99

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

(L) CN PROCEDURE SELECTED FOR REMOVING BASEFLOWS.
 CN = 75.0 Ia = Dep. Storage (Above)
 (L) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (L) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

***** SIMULATION NUMBER: 4 ***

READ STORM }
 Filename: C:\WinTemp\ch8
 base4-741-4534-5c44-852e1e2322a4
 D37\F5ef-85fe-4b55-8055-7d210b956ec1
 Profile = 77.40 mm } Comments: Westford 25 Year 24 Hour SCS Type II Storm

TIME	RAIN	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	mm	hrs	mm/hr	mm	hrs
0.08	0.00	6.17	1.55	12.25	11.15	18.33
0.17	0.85	6.25	1.55	12.83	11.15	18.42
0.23	0.95	6.33	1.55	12.42	11.15	18.50
0.33	0.95	6.42	1.55	12.50	11.15	18.58
0.42	0.85	6.50	1.55	12.58	11.15	18.67
0.50	0.85	6.59	1.55	12.67	5.72	18.75
0.58	0.85	6.67	1.55	12.75	5.72	18.83
0.67	0.85	6.75	1.55	12.83	5.72	18.92
0.75	0.85	6.83	1.55	12.92	5.72	19.00
0.83	0.85	6.92	1.55	13.00	5.72	19.08
0.92	0.85	7.00	1.55	13.08	5.72	19.17
1.00	0.85	7.08	1.55	13.17	1.08	19.25
1.08	0.85	7.17	1.55	13.25	1.08	19.33
1.17	0.85	7.25	1.55	13.33	1.08	19.42
1.25	0.85	7.33	1.55	13.42	1.08	19.50
1.33	0.85	7.42	1.55	13.50	1.08	19.58
1.42	0.85	7.50	1.55	13.59	1.08	19.67
1.50	0.85	7.59	1.55	13.67	1.08	19.75
1.58	0.85	7.67	1.55	13.75	6.35	19.83

1.67	0.85	7.75	1.58	13.83	6.35	19.92
1.75	0.85	7.83	1.55	13.92	6.35	20.00
1.83	0.85	7.92	1.55	14.00	6.35	20.08
1.92	0.85	8.00	1.55	14.08	6.35	20.17
2.00	0.85	8.08	1.55	14.17	2.32	20.25
2.08	0.85	8.17	2.05	14.25	2.32	20.33
2.17	1.01	8.25	2.05	14.33	2.32	20.42
2.23	1.01	8.33	2.05	14.42	2.32	20.50
2.32	1.01	8.42	2.05	14.50	2.32	20.58
2.40	1.01	8.50	2.05	14.58	2.32	20.67
2.50	1.01	8.58	2.05	14.67	2.32	20.75
2.58	1.01	8.67	2.05	14.75	2.32	20.83
2.67	1.01	8.75	2.05	14.83	2.32	20.92
2.75	1.01	8.83	2.05	14.92	2.32	21.00
2.83	1.01	8.92	2.05	15.00	2.32	21.08
2.92	1.01	9.00	2.05	15.08	2.32	21.17
3.00	1.01	9.08	2.05	15.17	2.32	21.25
3.08	1.01	9.17	2.48	15.25	2.32	21.33
3.15	1.01	9.25	2.48	15.33	2.32	21.42
3.23	1.01	9.33	2.48	15.42	2.32	21.50
3.32	1.01	9.42	2.48	15.50	2.32	21.58
3.40	1.01	9.50	2.48	15.58	2.32	21.67
3.50	1.01	9.58	2.48	15.67	2.32	21.75
3.58	1.01	9.67	2.79	15.75	2.32	21.83
3.67	1.01	9.75	2.79	15.83	2.32	21.92
3.75	1.01	9.83	2.79	15.92	2.32	22.00
3.83	1.01	9.92	2.79	16.00	2.32	22.08
3.92	1.01	10.00	2.79	16.08	2.32	22.17
4.00	1.01	10.08	3.56	16.17	1.39	22.25
4.08	1.01	10.17	3.56	16.25	1.39	22.33
4.17	1.24	10.25	3.56	16.33	1.39	22.42
4.25	1.24	10.33	3.56	16.42	1.39	22.50
4.33	1.24	10.42	3.56	16.50	1.39	22.58
4.42	1.24	10.50	3.56	16.58	1.39	22.67
4.50	1.24	10.58	3.56	16.67	1.39	22.75
4.58	1.24	10.67	4.80	16.75	1.39	22.83
4.67	1.24	10.75	4.80	16.83	1.39	22.92
4.75	1.24	10.83	4.80	16.92	1.39	23.00
4.83	1.24	10.92	4.80	17.00	1.39	23.08
4.92	1.24	11.00	4.80	17.08	1.39	23.17
5.00	1.24	11.08	4.80	17.17	1.39	23.25
5.08	1.24	11.17	7.43	17.25	1.39	23.33
5.17	1.24	11.25	7.43	17.33	1.39	23.42
5.25	1.24	11.33	7.43	17.42	1.39	23.50
5.33	1.24	11.42	7.43	17.50	1.39	23.58
5.42	1.24	11.50	7.43	17.58	1.39	23.67
5.50	1.24	11.58	7.43	17.67	1.39	23.75
5.58	1.24	11.67	32.28	17.75	1.39	23.83
5.67	1.24	11.75	32.28	17.83	1.39	23.92
5.75	1.24	11.83	35.45	18.00	1.39	24.00
5.83	1.24	11.92	35.45	18.08	1.39	24.08
5.92	1.24	12.00	85.45	18.17	1.39	24.17
6.00	1.24	12.08	85.45	18.25	1.39	24.25
6.08	1.24	12.17	11.15	18.33	1.39	24.33

CELLER (0014) Area (ha) = 3.44 Curva Number (CN) = 76.0
 MAHYD (0014) Ia (mm) = 5.00 # of Linear Res (R) = 3.00
 Kp = 1 Wp = 5.0 min U.H. Sp(hrs) = 0.30
 Unit Hyd Gpeak (cms) = 0.438
 PEAK FLOW (cms) = 0.225 (L)
 TIME TO PEAK (hrs) = 12.250
 ROROFF VOLUME (mm) = 22.250
 TOTAL RAINFALL (mm) = 77.400
 ROROFF COEFFICIENT = 0.444
 (L) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CANAL



STANDARD (0002) | Area (ha) = 37.83
 ID = 1 DT = 5.0 min | Total Imp(%) = 62.00 DLF, Conn. (%) = 32.00

PREVIOUS (1)
 Surface Area (ha) = 23.48
 Storage (mm) = 14.36
 Average Slope (%) = 1.00
 Length (km) = 502.20
 Manning's n = 0.019
 Max. Eff. Inten. (mm/hr) = 85.45
 over (mm) = 5.00
 Storage Coeff. (min) = 7.16 (11)
 Unit Hyd. Peak (mm) = 5.00
 Unit Hyd. Peak (cms) = 0.17
 PEAK FLOW (cms) = 2.64
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 75.40
 TOTAL RAINFALL (mm) = 77.40
 RUNOFF COEFFICIENT = 0.93

(1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSER:
 CH = 76.0 Is = Dep. Storage (Above)
 (11) THIS STEP SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLER | Area (ha) = 2.89
 STANDARD (0032) | Total Imp(%) = 30.00 DLF, Conn. (%) = 50.00
 ID = 1 DT = 5.0 min

PREVIOUS (1)
 Surface Area (ha) = 1.45
 Storage (mm) = 4.45
 Average Slope (%) = 1.00
 Length (km) = 138.80
 Manning's n = 0.019
 Max. Eff. Inten. (mm/hr) = 85.45
 over (mm) = 5.00
 Storage Coeff. (min) = 3.81 (11)
 Unit Hyd. Peak (mm) = 5.00
 Unit Hyd. Peak (cms) = 0.26
 PEAK FLOW (cms) = 0.54
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 76.40
 TOTAL RAINFALL (mm) = 77.40
 RUNOFF COEFFICIENT = 0.99

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSER:
 CH = Storage (Above)
 (11) THIS STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLER | Area (ha) = 0.66
 STANDARD (0041) | Total Imp(%) = 0.66 Curve Number (CN) = 76.0
 ID = 1 DT = 5.0 min | U.H. Imp(hrs) = 0.56 # of Linear Res. (N) = 3.00

Unit Hyd Peak (cms) = 0.060
 PEAK FLOW (cms) = 0.037 (1)
 TIME TO PEAK (hrs) = 12.00
 RUNOFF VOLUME (mm) = 34.345
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

CALLER | Area (ha) = 6.09 Curve Number (CN) = 76.0
 STANDARD (0051) | Total Imp(%) = 5.00 # of Linear Res. (N) = 3.00
 ID = 1 DT = 5.0 min | U.H. Imp(hrs) = 0.42

Unit Hyd Peak (cms) = 0.554
 PEAK FLOW (cms) = 0.313 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 34.344
 TOTAL RAINFALL (mm) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

ADD HYD (0030) | AREA OPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID = 1 (0032): 37.83 5.154 12.08 57.29
 + ID = 2 (0032): 2.89 0.450 12.08 56.65
 ID = 3 (0030): 40.72 5.604 12.08 57.24

NOTE: PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0030) | AREA OPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID = 3 (0030): 41.60 5.622 12.08 56.76
 + ID = 2 (0041): 0.18 0.822 12.08 56.76

NOTE: PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0030) | AREA OPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID = 1 (0030): 41.60 5.622 12.08 56.76
 + ID = 2 (0051): 6.09 0.313 12.33 34.34
 ID = 3 (0030): 47.69 5.819 12.08 53.89

NOTE: PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR (0008) | GUTFLOW STORAGE | OUTFLOW STORAGE
 ID = 2 ---> CH = 1 | (cms) (ha-ft.) (cms) (ha-ft.)
 ID = 5.0 min | 0.0000 0.0000 | 0.0000 1.1500
 0.4500 0.6600 | 1.4500 1.4500
 1.0000 0.5000 | 2.4500 2.4500
 1.0000 1.1000 | 2.4500 2.4500

INFLOW: ID = 2 (0030) | AREA OPEAK TPEAK R.V. (mm) (mm)
 OUTFLOW: ID = 1 (0008) | 47.690 5.818 12.08 53.89
 47.690 1.102 12.33 53.89

PEAK FLOW REDUCTION (out/In) (%) = 18.52



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TIME SHEET OF PEAK FLOW
MAXIMUM STORAGE USED (hain) = 45.00
(hain) = 1.2016

ADD HYD (0026)	AREA (ha)	QPEAK (cms)	TEPEAK (hrs)	R.V. (mm)
1 + 2 = 3	47.69	1.101	12.83	55.89
+ 4	3.44	0.228	12.25	34.33
ID= 1 (0008)	51.13	1.203	12.50	92.57
ID= 2 (0014)				
ID= 3 (0020)				

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALZB (0015)	Area (ha)	Curve Number (CN)	Curve Number (CN)	Curve Number (CN)
WASHED (0015)	35.85	5.00	5.00	5.00
IMP= 1 DT= 5.0 min	U.H. Tp (hrs) = 0.51			

Unit Hyd Qpeak (cms) = 2.651

PEAK FLOW (cms) = 1.508 (1)
TIME TO PEAK (hrs) = 12.500
RUNOFF VOLUME (mm) = 34.346
TOTAL RAINFALL (mm) = 77.400
RUNOFF COEFFICIENT = 0.444

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

CALZB (0045)	Area (ha)	Curve Number (CN)	Curve Number (CN)	Curve Number (CN)
WASHED (0045)	0.53	5.00	5.00	5.00
IMP= 1 DT= 5.0 min	U.H. Tp (hrs) = 0.17			

Unit Hyd Qpeak (cms) = 0.119

PEAK FLOW (cms) = 0.048 (1)
TIME TO PEAK (hrs) = 12.093
RUNOFF VOLUME (mm) = 34.224
TOTAL RAINFALL (mm) = 77.400
RUNOFF COEFFICIENT = 0.442

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

CALZB (0054)	Area (ha)	Curve Number (CN)	Curve Number (CN)	Curve Number (CN)
WASHED (0054)	5.74	5.00	5.00	5.00
IMP= 1 DT= 5.0 min	U.H. Tp (hrs) = 0.38			

Unit Hyd Qpeak (cms) = 0.577

PEAK FLOW (cms) = 0.318 (1)
TIME TO PEAK (hrs) = 12.093
RUNOFF VOLUME (mm) = 34.224
TOTAL RAINFALL (mm) = 77.400
RUNOFF COEFFICIENT = 0.444

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

CALZB (0021)	Area (ha)	Curve Number (CN)	Curve Number (CN)	Curve Number (CN)
WASHED (0021)	2.73	22.00	22.00	22.00
IMP= 1 DT= 5.0 min	Total Imp (%) = 0.10			

Surface Area (ha) = 0.60

Impervious (mm) = 1.00

Peak Storage (mm) = 2.13

Impervious (mm) = 1.50

Average Slope (%) = 1.00	Length (m) = 134.91	Manning's n = 0.015	Max. Eff. Inten. (mm/hr) = 85.45	Storage Coeff. (mm) = 2.00	Unit Hyd. Peak (cms) = 0.27	PEAK FLOW (cms) = 0.00	TIME TO PEAK (hrs) = 12.08	RUNOFF VOLUME (mm) = 76.40	TOTAL RAINFALL (mm) = 77.40	RUNOFF COEFFICIENT = 0.99
Area (ha) = 0.278 (all)	Length (m) = 13.00	Manning's n = 0.015	Storage Coeff. (mm) = 2.00	Unit Hyd. Peak (cms) = 0.08	PEAK FLOW (cms) = 0.278 (all)	TIME TO PEAK (hrs) = 12.17	RUNOFF VOLUME (mm) = 41.88	TOTAL RAINFALL (mm) = 77.40	RUNOFF COEFFICIENT = 0.54	

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

(1) CN PROCEDURE SELECTED FOR IMPERVIOUS LOSSES:
CN* = 76.0 Is = Dep. Storage (Above)
(11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALZB (0044)	Area (ha)	Curve Number (CN)	Curve Number (CN)	Curve Number (CN)
WASHED (0044)	35.00	5.00	5.00	5.00
IMP= 1 DT= 5.0 min	Total Imp (%) = 4.00			

Surface Area (ha) = 0.20
Imp. Storage (mm) = 1.00
Average Slope (%) = 62.18
Manning's n = 0.013

Max. Eff. Inten. (mm/hr) = 85.45
Storage Coeff. (mm) = 2.05 (all)
Unit Hyd. Peak (cms) = 0.31
PEAK FLOW (cms) = 0.01
TIME TO PEAK (hrs) = 12.08
RUNOFF VOLUME (mm) = 76.40
TOTAL RAINFALL (mm) = 77.40
RUNOFF COEFFICIENT = 0.99

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

(1) CN PROCEDURE SELECTED FOR IMPERVIOUS LOSSES:
CN* = 76.0 Is = Dep. Storage (Above)
(11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALZB (0040)	Area (ha)	Curve Number (CN)	Curve Number (CN)	Curve Number (CN)
WASHED (0040)	86.00	5.00	5.00	5.00
IMP= 1 DT= 5.0 min	Total Imp (%) = 49.00			

Surface Area (ha) = 2.65
Imp. Storage (mm) = 1.00
Average Slope (%) = 1.00
Manning's n = 143.29

Max. Eff. Inten. (mm/hr) = 85.45
Storage Coeff. (mm) = 5.00

Impervious (mm) = 2.43
PEAK FLOW (cms) = 0.43
TIME TO PEAK (hrs) = 1.50
RUNOFF VOLUME (mm) = 2.00
TOTAL RAINFALL (mm) = 40.00
RUNOFF COEFFICIENT = 0.250

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

(1) CN PROCEDURE SELECTED FOR IMPERVIOUS LOSSES:
CN* = 76.0 Is = Dep. Storage (Above)
(11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



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STORAGE COEFF. (min) = 3.38 (11)
 UNIT HYD. PEAK (min) = 10.88
 UNIT HYD. PEAK (cms) = 0.24
 PEAK FLOW (cms) = 0.36
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 76.40
 TOTAL RAINFALL (mm) = 77.40
 RUNOFF COEFFICIENT = 0.99

TOTALS

PEAK FLOW (cms) = 0.27
 TIME TO PEAK (hrs) = 12.08 (11)
 RUNOFF VOLUME (mm) = 67.97
 TOTAL RAINFALL (mm) = 77.40
 RUNOFF COEFFICIENT = 0.88

ID# = 1 (0021): 42.85 1.952 12.25 37.40
 + ID# = 2 (0054): 5.74 0.316 12.33 34.34
 ID = 3 (0021): 48.59 2.262 12.25 37.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CAULB | STAIRWELL (0034) | Area (ha) = 0.88 | D.I.R. Comm. (%) = 50.00
 ID# = 1 DT# = 5.0 min | Total Imp (%) = 50.00

Surface Area (ha) = 0.44 IMPERVIOUS PERVIOUS (1)
 Dep. Storage (mm) = 1.00 1.00
 Length Slope (%) = 76.50 40.00
 Manning's n = 0.013 0.250

Max. Eff. Inflow (mm/hr) = 65.45 48.93
 Storage Coeff. (min) = 5.00 15.00
 Unit Hyd. Peak (mm) = 2.32 (11) 11.71 (11)
 Unit Hyd. Peak (cms) = 0.30 0.09

PEAK FLOW (cms) = 0.10 0.04 *TOTALS*
 TIME TO PEAK (hrs) = 12.08 12.17 12.08 (11)
 RUNOFF VOLUME (mm) = 76.40 36.90 56.94
 TOTAL RAINFALL (mm) = 77.40 77.40 77.40
 RUNOFF COEFFICIENT = 0.99 0.48 0.73

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

(1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CAULB | STAIRWELL (0044) | Area (ha) = 10.12 | D.I.R. Comm. (%) = 37.00
 ID# = 1 DT# = 3.0 min | Total Imp (%) = 70.00

Surface Area (ha) = 7.06 IMPERVIOUS PERVIOUS (1)
 Dep. Storage (mm) = 1.00 1.50
 Average Slope (%) = 1.00 2.00
 Length (m) = 259.74 40.00
 Manning's n = 0.013 0.250

Max. Eff. Inflow (mm/hr) = 95.45 139.90
 Storage Coeff. (min) = 5.00 15.00
 Unit Hyd. Peak (mm) = 5.40 (11) 15.26 (11)
 Unit Hyd. Peak (cms) = 0.22 0.09

PEAK FLOW (cms) = 0.06 0.81 *TOTALS*
 TIME TO PEAK (hrs) = 12.08 12.17 12.08 (11)
 RUNOFF VOLUME (mm) = 76.40 51.15 61.52
 TOTAL RAINFALL (mm) = 77.40 77.40 77.40
 RUNOFF COEFFICIENT = 0.99 0.66 0.78

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

(1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

STORAGE COEFF. (min) = 3.38 (11)
 UNIT HYD. PEAK (min) = 10.88
 UNIT HYD. PEAK (cms) = 0.24
 PEAK FLOW (cms) = 0.36
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 76.40
 TOTAL RAINFALL (mm) = 77.40
 RUNOFF COEFFICIENT = 0.99

TOTALS

PEAK FLOW (cms) = 0.27
 TIME TO PEAK (hrs) = 12.08 (11)
 RUNOFF VOLUME (mm) = 67.97
 TOTAL RAINFALL (mm) = 77.40
 RUNOFF COEFFICIENT = 0.88

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

(1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA | QPEAK | TPEAK | R.V. |
 1 + 2 = 3 | (ha) | (cms) | (hrs) | (mm) |
 ID# = 1 (0015): 38.66 1.740 12.42 34.88
 + ID# = 2 (0031): 2.73 0.278 12.17 41.88

ID = 3 (0021): 38.66 1.740 12.42 34.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021) | AREA | QPEAK | TPEAK | R.V. |
 3 + 2 = 4 | (ha) | (cms) | (hrs) | (mm) |
 ID# = 3 (0021): 38.66 1.740 12.42 34.88
 + ID# = 2 (0040): 2.08 0.628 12.08 67.97

ID = 1 (0021): 41.74 1.866 12.33 37.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021) | AREA | QPEAK | TPEAK | R.V. |
 1 + 2 = 3 | (ha) | (cms) | (hrs) | (mm) |
 ID# = 1 (0021): 41.74 1.866 12.33 37.32
 + ID# = 2 (0044): 0.58 0.074 12.08 45.90

ID = 3 (0021): 42.32 1.899 12.33 37.64

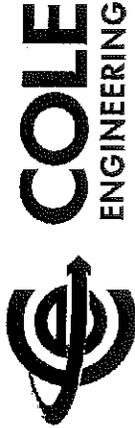
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021) | AREA | QPEAK | TPEAK | R.V. |
 3 + 2 = 4 | (ha) | (cms) | (hrs) | (mm) |
 ID# = 1 (0021): 42.32 1.899 12.33 37.64
 + ID# = 2 (0045): 0.44 0.056 12.08 58.22

ID = 1 (0021): 42.85 1.932 12.23 37.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021) | AREA | QPEAK | TPEAK | R.V. |
 1 + 2 = 3 | (ha) | (cms) | (hrs) | (mm) |



1 AND HYD (0035)	AREA	OPENK	TRFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(cms)	(cms)
ID= 1 (0004):	10.12	1.600	12.98	60.52
+ ID= 2 (0034):	0.96	0.139	12.08	56.64
ID = 3 (0035):	11.08	1.739	12.98	60.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

1 RESERVOIR (0010)	AREA	OPENK	TRFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(cms)	(cms)
ID= 1 (0010):	11.08	1.739	12.98	60.21

OUTFLOW	STORAGE	OUTFLOW	STORAGE
(cms)	(ha-m)	(cms)	(ha-m)
0.0000	0.0000	0.4000	0.3500
0.1000	0.2000	0.5000	0.4500
0.2500	0.2500	0.6000	0.4800
0.3500	0.2100	1.2000	0.6000

INFLOW : ID= 2 (0035) 11.080 1.739 12.98 60.21
 OUTFLOW: ID= 1 (0010) 11.080 0.139 12.08 60.18

PEAK FLOW REDUCTION (cont/qbt)(%) = 21.59
 TIME SHIFT OF PEAK FLOW (min) = 30.00
 MAXIMUM STORAGE USED (ha-m) = 0.3112

1 CALIB	AREA	OPENK	TRFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(cms)	(cms)
ID= 1 (0016):	20.14	3.075	12.58	60.26
+ ID= 2 (0016):	20.14	1.257	12.25	34.34
ID = 3 (0022):	31.14	1.645	12.25	43.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

1 AND HYD (0022)	AREA	OPENK	TRFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(cms)	(cms)
ID= 1 (0010):	11.08	0.375	12.58	60.26
+ ID= 2 (0016):	20.14	1.257	12.25	34.34
ID = 3 (0022):	31.14	1.645	12.25	43.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

1 CALIB	AREA	OPENK	TRFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(cms)	(cms)
ID= 1 (0017):	17.97	1.977	12.58	60.26
+ ID= 2 (0017):	17.97	0.500	12.25	34.34
ID = 3 (0022):	31.14	1.645	12.25	43.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

1 AND HYD (0035)	AREA	OPENK	TRFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(cms)	(cms)
ID= 1 (0004):	10.12	1.600	12.98	60.52
+ ID= 2 (0034):	0.96	0.139	12.08	56.64
ID = 3 (0035):	11.08	1.739	12.98	60.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

1 RESERVOIR (0010)	AREA	OPENK	TRFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(cms)	(cms)
ID= 1 (0010):	11.08	1.739	12.98	60.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

1 AND HYD (0035)	AREA	OPENK	TRFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(cms)	(cms)
ID= 1 (0004):	10.12	1.600	12.98	60.52
+ ID= 2 (0034):	0.96	0.139	12.08	56.64
ID = 3 (0035):	11.08	1.739	12.98	60.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

1 CALIB	AREA	OPENK	TRFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(cms)	(cms)
ID= 1 (0016):	20.14	3.075	12.58	60.26
+ ID= 2 (0016):	20.14	1.257	12.25	34.34
ID = 3 (0022):	31.14	1.645	12.25	43.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

1 CALIB	AREA	OPENK	TRFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(cms)	(cms)
ID= 1 (0017):	17.97	1.977	12.58	60.26
+ ID= 2 (0017):	17.97	0.500	12.25	34.34
ID = 3 (0022):	31.14	1.645	12.25	43.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

CALIB
 STANDARD (0036)
 ID= 1 DT= 5.0 min
 Area (ha)= 1.08
 Total Imp(%)= 50.00 DLR, Conn. (%)= 50.00

MEASUREMENTS	PREVIOUS (i)
Surf Area (ha)	0.55
Dep. Storage (mm)	1.50
Average Slope (%)	2.00
Length (m)	40.00
Manning's n	0.250
Max. Eff. Inten. (mm/hr)	85.45
Over (min)	5.00
Storage Coeff. (adj)	2.47 (li)
Unit Hyd. Peak (min)	5.00
Unit Hyd. Peak (cms)	0.29

PEAK FLOW (cms)= 0.13
 TIME TO PEAK (hrs)= 12.08
 TIME TO PEAK (min)= 72.48
 TOTAL RAINFALL (mm)= 77.40
 RUNOFF COEFFICIENT = 0.39

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

- (i) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES;
- (ii) CH* = 76.0 Ia = Dep. Storage (Above)
- (iii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL TO RUNOFF COEFFICIENT.
- (iv) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
 STANDARD (0005)
 ID= 1 DT= 5.0 min
 Area (ha)= 4.60
 Total Imp(%)= 71.00 DLR, Conn. (%)= 29.00

MEASUREMENTS	PREVIOUS (i)
Surf Area (ha)	1.33
Dep. Storage (mm)	2.00
Average Slope (%)	2.00
Length (m)	40.00
Manning's n	0.250
Max. Eff. Inten. (mm/hr)	170.34
Over (min)	10.00
Storage Coeff. (adj)	9.51 (li)
Unit Hyd. Peak (min)	10.00
Unit Hyd. Peak (cms)	0.23

PEAK FLOW (cms)= 0.31
 TIME TO PEAK (hrs)= 12.08
 TIME TO PEAK (min)= 72.48
 TOTAL RAINFALL (mm)= 77.40
 RUNOFF COEFFICIENT = 0.59

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

- (i) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES;
- (ii) CH* = 76.0 Ia = Dep. Storage (Above)
- (iii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL TO RUNOFF COEFFICIENT.
- (iv) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
 STANDARD (0052)
 ID= 1 DT= 5.0 min
 Area (ha)= 4.15
 Total Imp(%)= 5.00
 DLR, Conn. (%)= 3.00
 Unit Hyd Peak (cms)= 0.377

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

- (i) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES;
- (ii) CH* = 76.0 Ia = Dep. Storage (Above)
- (iii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL TO RUNOFF COEFFICIENT.
- (iv) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



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PEAK FLOW (cms) = 0.213 (l)
 TIME TO PEAK (hrs) = 12.33
 RUNOFF VOLUME (in) = 2.333
 TOTAL RAINFALL (in) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

ADD HYD (0037) | AREA OPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (in) (mm)
 ID# 1 (0005): 4.60 0.797 12.08 60.37
 + ID# 2 (0036): 1.68 0.172 12.08 56.64
 ID = 3 (0037): 5.49 0.969 12.08 59.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0037) | AREA OPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (in) (mm)
 ID# 1 (0037): 5.69 0.969 12.08 59.66
 + ID# 2 (0036): 4.15 0.213 12.33 34.34
 ID = 1 (0037): 9.84 1.183 12.08 49.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0011) | OUTFLOW STORAGE OUTFLOW STORAGE
 ID# 2 -> OUTF 1 | (cms) (ha.m.) (cms) (ha.m.)
 D/W = 5.0 min | 0.0000 0.0000 0.2600 0.2600
 0.1100 0.1100 0.3900 0.2450
 0.1600 0.1600 0.3500 0.2700
 0.2000 0.1900 0.4000 0.6500
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (in) (mm)
 INFLOW: ID= 2 (0037) 9.840 1.103 12.08 48.98
 OUTFLOW: ID= 1 (0011) 9.840 0.241 12.83 48.98

PEAK FLOW REDUCTION (out/in) (%) = 21.66
 TIME SHIFT OF PEAK FLOW (min) = 45.00
 MAXIMUM STORAGE USED (ha.m.) = 0.2006

CALIB | Area (ha) = 3.32 Curve Number (CN) = 76.0
 ID# 1 D/W = 5.0 min | Ls (min) = 5.00 # of Linear Res. (LR) = 3.00
 U.H. Tp (hrs) = 0.29

Unit Hyd Opeak (cms) = 0.437
 PEAK FLOW (cms) = 0.221 (l)
 TIME TO PEAK (hrs) = 14.332
 RUNOFF VOLUME (in) = 34.332
 TOTAL RAINFALL (in) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

CALIB | Area (ha) = 1.95 Curve Number (CN) = 76.0
 ID# 1 D/W = 5.0 min | Ls (min) = 5.00 # of Linear Res. (LR) = 3.00

U.H. Tp (hrs) = 0.30

Unit Hyd Opeak (cms) = 0.249
 PEAK FLOW (cms) = 0.127 (l)
 TIME TO PEAK (hrs) = 12.33
 RUNOFF VOLUME (in) = 34.334
 TOTAL RAINFALL (in) = 77.400
 RUNOFF COEFFICIENT = 0.444

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

ADD HYD (0023) | AREA OPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (in) (mm)
 ID# 1 (0011): 9.84 0.241 12.83 48.96
 + ID# 2 (0017): 17.97 1.173 12.25 34.33
 ID = 3 (0023): 27.81 1.337 12.25 39.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0023) | AREA OPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (in) (mm)
 ID# 1 (0023): 27.91 1.337 12.25 39.51
 + ID# 2 (0053): 5.32 0.221 12.25 34.33
 ID = 1 (0023): 31.13 1.559 12.25 38.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0023) | AREA OPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (in) (mm)
 ID# 1 (0023): 31.13 1.559 12.25 38.96
 + ID# 2 (0053): 1.95 0.128 12.25 34.33
 ID = 3 (0023): 33.08 1.686 12.25 38.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

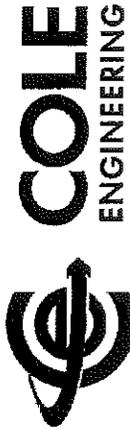
CALIB | Area (ha) = 3.16
 ID# 1 D/W = 5.0 min | Ls (min) = 5.00 DLE. Coeff. (C) = 50.00

IMPERVIOUS PERVIOUS (l)
 Surface Area (ha) = 0.99
 Dep. Storages (mm) = 1.00
 Average Slope (%) = 1.00
 Length (m) = 88.69
 Manning's n = 0.013
 Max. SEF. Inten. (imp/ft) = 85.45
 Storage Coeff. (mm) = 13.00
 Unit Hyd Opeak (in) = 2.89 (l)
 Unit Hyd. Peak (cms) = 5.00
 Unit Hyd. Peak (cms) = 0.29

PEAK FLOW (cms) = 0.14
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (in) = 76.80
 TOTAL RAINFALL (in) = 77.40
 RUNOFF COEFFICIENT = 0.99

TOTALS

0.186 (l)
 12.08
 56.53
 77.40
 0.73



CALIB (0002) Area (ha) = 37.83
 WASHRD (0002) Total Imp (ft) = 62.00 Dst. Com. (ft) = 32.00
 ID = 1 DF = 5.0 min

IMPERVIOUS PERVIOUS (ft)
 23.85 14.36
 Surface Area (ha) = 1.50
 Dep. Storage (mm) = 1.00
 Average Slope (%) = 502.20
 Length (ft) = 0.013
 Manning's n = 0.15
 Max. Eff. Inten. (mm/hr) = 128.03
 Unit Hyd. Peak (cms) = 6.90
 Storage Const. (mm) = 6.90 (11)
 Unit Hyd. Peak (cms) = 0.18
 TOTALS
 PEAK FLOW (cms) = 2.92
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 83.90
 TOTAL RAINFALL (mm) = 84.90
 RUNOFF COEFFICIENT = 0.99

(1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES.
 CN* = 76.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB (0032) Area (ha) = 3.65
 WASHRD (0032) Total Imp (ft) = 50.00 Dst. Com. (ft) = 50.00
 ID = 1 DF = 5.0 min

IMPERVIOUS PERVIOUS (ft)
 1.45 1.45
 Surface Area (ha) = 1.00
 Dep. Storage (mm) = 1.00
 Average Slope (%) = 139.80
 Length (ft) = 0.023
 Manning's n = 0.15
 Max. Eff. Inten. (mm/hr) = 99.73
 Unit Hyd. Peak (cms) = 5.00
 Storage Const. (mm) = 5.00 (11)
 Unit Hyd. Peak (cms) = 0.27
 TOTALS
 PEAK FLOW (cms) = 0.37
 TIME TO PEAK (hrs) = 12.00
 RUNOFF VOLUME (mm) = 83.90
 TOTAL RAINFALL (mm) = 84.90
 RUNOFF COEFFICIENT = 0.99

(1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES.
 CN* = 76.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB (0041) Area (ha) = 0.88
 WASHRD (0041) Total Imp (ft) = 5.00 Dst. Com. (ft) = 76.0
 ID = 1 DF = 5.0 min U.H. Tp (hrs) = 0.55

Unit Hyd. Peak (cms) = 0.060
 PEAK FLOW (cms) = 0.043 (1)
 TIME TO PEAK (hrs) = 12.500
 RUNOFF VOLUME (mm) = 39.670

TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470

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

CALIB (0051) Area (ha) = 6.09
 WASHRD (0051) Total Imp (ft) = 5.00 Dst. Com. (ft) = 76.0
 ID = 1 DF = 5.0 min U.H. Tp (hrs) = 0.42

Unit Hyd. Peak (cms) = 0.584
 PEAK FLOW (cms) = 0.385 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 84.900
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470

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

ADD HYD (0030) AREA OPEAK PEAK R.V.
 2 = (mm) (ha) (cms) (hrs) (mm)
 ID# = 1 (0002): 37.83 5.838 12.08 64.11
 + ID# = 2 (0032): 2.89 0.504 12.09 63.20
 ID = 3 (0030): 40.72 6.341 12.08 64.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0030) AREA OPEAK PEAK R.V.
 3 + 2 = 1 (mm) (ha) (cms) (hrs) (mm)
 ID# = 3 (0030): 40.72 6.341 12.08 64.06
 + ID# = 2 (0041): 0.88 0.043 12.50 39.67
 ID = 1 (0030): 41.60 6.383 12.08 63.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0030) AREA OPEAK PEAK R.V.
 1 + 2 = 3 (mm) (ha) (cms) (hrs) (mm)
 ID# = 1 (0030): 41.60 6.383 12.08 63.55
 + ID# = 2 (0041): 6.09 0.305 12.53 39.67
 ID = 3 (0030): 47.69 6.594 12.08 60.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0007) OUTFLOW STORAGE OUTFLOW STORAGE R.V.
 1 (mm) (ha) (hrs) (mm) (mm)
 ID# = 1 (0007): 0.0000 0.0000 1.1500 1.2500
 + ID# = 2 (0007): 0.4500 0.6800 1.3500 1.4000
 ID# = 3 (0007): 1.0000 1.1000 2.3500 2.8000
 AREA (ha) (mm) (hrs) (mm) (mm)
 ID# = 1 (0007): 47.690 6.594 12.08 60.53
 ID# = 2 (0007): 47.690 6.594 12.08 60.53



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PEAK FLOW REDUCTION (Out/In) (%) = 19.31
 CURVE SLOPE OF PEAK FLOW (min) = 43.00
 MAXIMUM STORAGE USED (ha.m.) = 1.3424

ADD HYD	AREA	QPEAK	TFPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID# = 1 (0000)	47.69	1.273	12.93	60.52
* ID# = 2 (0044)	3.44	0.262	12.25	59.66
ID# = 3 (0020)	51.13	1.535	12.67	59.13

NOTE! PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALLIB	Area	(ha)	Curve Number	(CN)	76.0
SPANHYD (0015)	Ia	(mm)	# of Linear Res. (N)	3.00	
ID# = 1 DT# = 5.0 min	U.H. Tp (hrs)				0.51

Unit Hyd Qpeak (cms) = 2.691

PEAK FLOW (cms) = 1.874 (1)
 TIME TO PEAK (hrs) = 12.500
 RUNOFF VOLUME (mm) = 39.871
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470

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

CALLIB	Area	(ha)	Curve Number	(CN)	76.0
SPANHYD (0045)	Ia	(mm)	# of Linear Res. (N)	3.00	
ID# = 1 DT# = 5.0 min	U.H. Tp (hrs)				0.17

Unit Hyd Qpeak (cms) = 0.119

PEAK FLOW (cms) = 0.055 (1)
 TIME TO PEAK (hrs) = 12.083
 RUNOFF VOLUME (mm) = 39.730
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.468

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

CALLIB	Area	(ha)	Curve Number	(CN)	76.0
SPANHYD (0054)	Ia	(mm)	# of Linear Res. (N)	3.00	
ID# = 1 DT# = 5.0 min	U.H. Tp (hrs)				0.38

Unit Hyd Qpeak (cms) = 0.577

PEAK FLOW (cms) = 0.370 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 39.666
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470

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

CALLIB	Area	(ha)	Dir. Expt. (%)	0.10
SPANHYD (0031)	Total Imp (%)	22.00		
ID# = 1 DT# = 5.0 min				

INTERVIOUS PERVIOUS (1)

Surface Area (ha)	0.60	2.13
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	134.91	40.00
Manning's n	0.013	0.250
Max. Eff. Inten. (mm/hr)	93.73	60.89
Storage Coeff. (mm)	5.00	15.00
Unit Hyd. Peak (mm)	3.14 (1)	10.82 (1)
Unit Hyd. Peak (cms)	5.00	15.00
PEAK FLOW (cms)	0.00	0.32
TIME TO PEAK (hrs)	12.08	12.17
RUNOFF VOLUME (mm)	83.90	47.93
TOTAL RAINFALL (mm)	94.90	94.90
RUNOFF COEFFICIENT	0.89	0.50
TOTALS		
		0.324 (1)
		12.17
		47.93
		94.90
		0.50

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

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 76.0 Ia = Dep. Storage (Above)

(1) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

TO THE STORAGE COEFFICIENT.

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

CALLIB	Area	(ha)	DLE. Coeff. (%)	4.00
SPANHYD (0044)	Total Imp (%)	35.00		
ID# = 1 DT# = 5.0 min				

INTERVIOUS PERVIOUS (1)

Surface Area (ha)
 0.60 | 2.13 |

Dep. Storage (mm)
 1.00 | 1.50 |

Average Slope (%)
 1.00 | 2.00 |

Length (m)
 62.18 | 40.00 |

Manning's n
 0.013 | 0.250 |

Max. Eff. Inten. (mm/hr)
 93.73 | 60.89 |

Storage Coeff. (mm)
 5.00 | 15.00 |

Unit Hyd. Peak (mm)
 1.97 (1) | 10.00 (1) |

Unit Hyd. Peak (cms)
 3.00 | 10.00 |

PEAK FLOW (cms)
 0.01 | 0.08 |

TIME TO PEAK (hrs)
 12.08 | 12.08 |

RUNOFF VOLUME (mm)
 83.90 | 52.23 |

TOTAL RAINFALL (mm)
 84.90 | 84.90 |

RUNOFF COEFFICIENT
 0.89 | 0.60 |

TOTALS



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Max. Eff. Inten. (mm/hr) = 93.73
 over (min) = 5.00
 Storage Coeff. (ha) = 3.25 (11)
 Unit Hyd. Peak (mm) = 5.00
 Unit Hyd. Peak (cms) = 0.27
 PEAK FLOW (cms) = 0.31
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 83.90
 TOTAL RAINFALL (mm) = 84.90
 RUNOFF COEFFICIENT = 0.79
 TOTALS
 0.658 (111)
 12.08
 75.29
 84.90
 0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES.
 CN* = 75.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

(ADD HYD (0021))
 1 + 2 = 3
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID1= 1 (0015): 35.93 1.574 12.50 39.87
 + ID2= 2 (0031): 2.73 0.324 12.17 47.93
 ID = 3 (0021): 38.66 2.024 12.42 40.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

(ADD HYD (0021))
 3 + 2 = 1
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID1= 3 (0021): 38.66 2.024 12.42 40.44
 + ID2= 2 (0040): 3.08 0.638 12.08 75.29
 ID = 1 (0021): 41.74 2.152 12.33 43.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

(ADD HYD (0021))
 1 + 2 = 3
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID1= 1 (0021): 41.74 2.152 12.33 43.01
 + ID2= 2 (0040): 0.086 0.024 12.09 52.52
 ID = 3 (0021): 42.32 2.157 12.33 43.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

(ADD HYD (0021))
 3 + 2 = 1
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID1= 3 (0021): 42.32 2.157 12.33 43.14
 + ID2= 2 (0045): 0.53 0.056 12.08 39.73
 ID = 1 (0021): 42.85 2.239 12.25 43.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

(ADD HYD (0021))

1 + 2 = 3
 AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID1= 1 (0021): 42.85 2.239 12.25 43.10
 + ID2= 2 (0054): 5.74 0.970 12.33 39.87
 ID = 3 (0021): 48.59 2.600 12.25 42.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

(CALC) (0034))
 AREA (ha) = 0.88
 Total Imp(%) = 90.00 Dir. Conn. (%) = 50.00

IMPERVIOUS PERVIOUS (1)
 (ha) (ha)
 Surface Area 0.44
 Dep. Storage 0.44
 Average Slope 1.00
 Length 76.59
 Manning's n 0.013
 Max. Eff. Inten. (mm/hr) = 93.73
 over (min) = 5.00
 Storage Coeff. (ha) = 2.23 (11)
 Unit Hyd. Peak (mm) = 5.00
 Unit Hyd. Peak (cms) = 0.30
 PEAK FLOW (cms) = 0.11
 TIME TO PEAK (hrs) = 12.17
 RUNOFF VOLUME (mm) = 83.90
 TOTAL RAINFALL (mm) = 84.90
 RUNOFF COEFFICIENT = 0.99
 TOTALS
 0.155 (111)
 12.17
 83.90
 84.90
 0.99

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

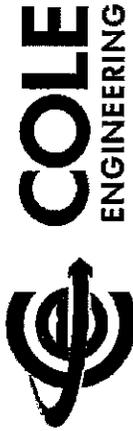
(1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES;
 CN* = 75.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

(CALC) (0041))
 AREA (ha) = 10.12
 Total Imp(%) = 76.00 Dir. Conn. (%) = 37.00

IMPERVIOUS PERVIOUS (1)
 (ha) (ha)
 Surface Area 7.68
 Dep. Storage 1.00
 Average Slope 1.00
 Length 259.74
 Manning's n 0.013
 Max. Eff. Inten. (mm/hr) = 93.73
 over (min) = 5.00
 Storage Coeff. (ha) = 4.65 (11)
 Unit Hyd. Peak (mm) = 5.00
 Unit Hyd. Peak (cms) = 0.22
 PEAK FLOW (cms) = 0.95
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 83.90
 TOTAL RAINFALL (mm) = 84.90
 RUNOFF COEFFICIENT = 0.99
 TOTALS
 3.800 (111)
 12.08
 67.53
 84.90
 0.80

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

(1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES;
 CN* = 76.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



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

| CALIB |
 | WASHED (0005) | Area (ha) = 1.09
 | ID= 1 DT= 5.0 min | Total Imp (ft) = 50.00 Max. Com. (ft) = 50.00

IMPERVIOUS PERVIOUS (1)
 Surface Area (ha) = 0.55
 Dep. Storage (mm) = 1.00
 Average Slope (%) = 1.00
 Length (m) = 85.24
 Manning n = 0.013
 Max. Eff. Inten. (mm/hr) = 95.73
 S (mm) = 5.00
 Storage Coeff. (min) = 2.38 (11)
 Unit Hyd. Peak (mm) = 5.00
 Unit Hyd. Peak (cms) = 0.30
 TOTALS
 PEAK FLOW (cms) = 0.14
 TIME TO PEAK (hrs) = 12.08
 R.V. (mm) = 12.17
 RUNOFF VOLUME (mm) = 63.90
 TOTAL RAINFALL (mm) = 84.90
 RUNOFF COEFFICIENT = 0.74

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

(1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 CN = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.

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

| CALIB |
 | WASHED (0005) | Area (ha) = 4.60
 | ID= 1 DT= 5.0 min | Total Imp (ft) = 71.00 DIL. Com. (ft) = 29.00

IMPERVIOUS PERVIOUS (1)
 Surface Area (ha) = 3.27
 Dep. Storage (mm) = 1.00
 Average Slope (%) = 1.00
 Length (m) = 175.11
 Manning n = 0.013
 Max. Eff. Inten. (mm/hr) = 99.73
 S (mm) = 5.00
 Storage Coeff. (min) = 3.67 (11)
 Unit Hyd. Peak (mm) = 5.00
 Unit Hyd. Peak (cms) = 0.25
 TOTALS
 PEAK FLOW (cms) = 0.34
 TIME TO PEAK (hrs) = 12.08
 R.V. (mm) = 63.90
 RUNOFF VOLUME (mm) = 84.90
 TOTAL RAINFALL (mm) = 84.90
 RUNOFF COEFFICIENT = 0.71

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

(1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 CN = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.

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

| CALIB |
 | WASHED (0052) | Area (ha) = 4.15
 | ID= 1 DT= 5.0 min | Total Imp (ft) = 50.00 Max. Com. (ft) = 3.00
 U.H. Tp (hrs) = 0.42

| ADD HYD (0035) |
 | 1 + 2 = 3 |
 | ID= 1 (0004) | Area (ha) = 1.09
 | ID= 2 (0034) | Area (ha) = 0.88
 | ID= 3 (0035) | Area (ha) = 11.00
 U.H. Tp (hrs) = 12.08
 U.H. Tp (hrs) = 12.08
 U.H. Tp (hrs) = 12.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR (0010) |
 | DT= 5.0 min |
 STORAGE (ha.ft) |
 0.0000 | 0.4000 | 0.3500
 0.1000 | 0.2000 | 0.4500
 0.2500 | 0.2500 | 0.6000
 0.3500 | 0.2700 | 1.2000
 AREA (ha) |
 1.09 | 0.88 | 11.00
 11.0000 | 0.399 | 12.39
 R.V. (mm) = 12.18
 R.V. (mm) = 67.18
 R.V. (mm) = 67.18

INFLOW: ID= 2 (0035) 1.00

OUTFLOW: ID= 1 (0010) 11.000

PEAK FLOW REDUCTION (Out/In) (%) = 20.41

TIME SHIFT OF PEAK FLOW (min) = 30.00

MAXIMUM STORAGE USED (ha.ft) = 0.3493

| CALIB |
 | WASHED (0056) | Area (ha) = 20.14
 | ID= 1 DT= 5.0 min | Total Imp (ft) = 50.00
 U.H. Tp (hrs) = 0.31

Unit Hyd. Peak (cms) = 2.481
 PEAK FLOW (cms) = 1.500 (1)
 TIME TO PEAK (hrs) = 12.280
 RUNOFF VOLUME (mm) = 59.859
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.465

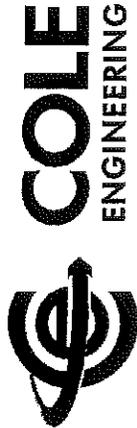
(1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0022) |
 | 1 + 2 = 3 |
 | ID= 1 (0010) | Area (ha) = 11.00
 | ID= 2 (0018) | Area (ha) = 0.50
 | ID= 3 (0022) | Area (ha) = 31.14
 U.H. Tp (hrs) = 12.23
 U.H. Tp (hrs) = 12.23
 U.H. Tp (hrs) = 12.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
 | WASHED (0017) | Area (ha) = 11.57
 | ID= 1 DT= 5.0 min | Total Imp (ft) = 50.00
 U.H. Tp (hrs) = 0.36

Unit Hyd. Peak (cms) = 2.288
 PEAK FLOW (cms) = 1.367 (1)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 59.857
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.465



WASHDC (0053) | Area (ha) = 1.95 Curve Number (CN) = 76.0
 ID=1 DT=5.0 min | IA (mm) = 5.00 # of Linear Res. (N) = 3.00
 V.H. Tp (hrs) = 0.30

Unit Hyd Qpeak (cms) = 0.248
 PEAK FLOW (cms) = 0.148 (1)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 39.857
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.469

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

ADD HYD (0023)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	27.01	1.574	12.25	45.32
ID=1 (0011):	9.84	0.276	12.08	55.33
+ ID=2 (0017):	17.17	1.297	12.25	39.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0023)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	27.01	1.574	12.25	44.74
ID=1 (0023):	27.01	1.574	12.25	44.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0023)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	31.13	1.831	12.25	44.45
ID=1 (0023):	31.13	1.831	12.25	44.45
+ ID=2 (0059):	1.95	0.148	12.25	39.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
SPARHVO (0027)	50.00	1.43	12.25	50.00
ID=1 DT=5.0 min	50.00	1.43	12.25	50.00

IMPERVIOUS	PERVIOUS (1)
Surface Area (ha) = 0.59	0.59
Length (ft) = 1.00	1.00
Average Slope (ft) = 88.59	40.00
Manholes n = 0.013	0.250
Max. Eff. Inten. (mm/hr) = 93.73	56.31
Storage Coeff. (mm) = 5.00	15.00
Unit Hyd. Tpeak (mm) = 2.44 (11)	11.32 (11)
Unit Hyd. Peak (mm) = 5.00	15.00
Unit Hyd. Peak (cms) = 0.30	0.09
PEAK FLOW (cms) = 0.15	0.05
TIME TO PEAK (hrs) = 12.08	12.08 (11)
RUNOFF VOLUME (mm) = 43.90	63.20
TOTAL RAINFALL (mm) = 84.90	84.90

Unit Hyd Qpeak (cms) = 0.377
 PEAK FLOW (cms) = 0.248 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 39.869
 TOTAL RAINFALL (mm) = 84.900
 RUNOFF COEFFICIENT = 0.470

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

ADD HYD (0037)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	9.84	1.050	12.08	66.61
ID=1 (0005):	4.60	0.898	12.08	67.42
+ ID=2 (0056):	1.09	0.152	12.08	63.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0037)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	9.84	1.247	12.08	55.33
ID=1 (0037):	9.84	1.247	12.08	55.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

OUTFLOW (0041)	OUTFLOW (cms)	STORAGE (ha.m.)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 1	0.4000	0.0000	0.2600	0.2100	0.2100
ID=1 (0041):	0.4000	0.0000	0.2600	0.2100	0.2100
+ ID=2 (0057):	0.1100	0.1100	0.3900	0.2700	0.2700
ID=3 (0057):	0.1900	0.1900	0.4000	0.2700	0.2700

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

INFLOW (0041)	INFLOW (cms)	STORAGE (ha.m.)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 1	0.4000	0.0000	0.2600	0.2100	0.2100
ID=1 (0041):	0.4000	0.0000	0.2600	0.2100	0.2100
+ ID=2 (0057):	0.1100	0.1100	0.3900	0.2700	0.2700
ID=3 (0057):	0.1900	0.1900	0.4000	0.2700	0.2700

IMPERVIOUS	PERVIOUS (1)
Surface Area (ha) = 0.59	0.59
Length (ft) = 1.00	1.00
Average Slope (ft) = 88.59	40.00
Manholes n = 0.013	0.250
Max. Eff. Inten. (mm/hr) = 93.73	56.31
Storage Coeff. (mm) = 5.00	15.00
Unit Hyd. Tpeak (mm) = 2.44 (11)	11.32 (11)
Unit Hyd. Peak (mm) = 5.00	15.00
Unit Hyd. Peak (cms) = 0.30	0.09
PEAK FLOW (cms) = 0.15	0.05
TIME TO PEAK (hrs) = 12.08	12.08 (11)
RUNOFF VOLUME (mm) = 43.90	63.20
TOTAL RAINFALL (mm) = 84.90	84.90

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

CRG:0



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RUNOFF COEFFICIENT = 0.99 0.50 0.74

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

- (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
CNS = 76.0 IS NOT THE SAME AS (2)
- (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
TO THE STORAGE COEFFICIENT.
- (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

STANDARD (0001)	Area (ha)	Total Imp (%)	Dia. Corr. (%)	Curve No.
ID= 1 DT= 5.0 min	3.03	34.00	24.00	
IMPERVIOUS PERCENTS (1)				
Surface Area (ha)	1.03	2.00		
Dep. Storage (mm)	1.00	1.50		
Average Slope (%)	1.00	2.00		
Length (m)	142.13	40.00		
Manholes "	0.043	0.250		
Max. Wf. Inten. (mm/hr)	93.73	69.39		
Storage Const. (hr)	5.00	15.00		
Unit Hyd. Peak (mm)	2.24 (11)	11.41 (11)		
Unit Hyd. Peak (cms)	0.27	1.09		
TWOULDS				
PEAK FLOW (cms)	0.19	0.26		
TIME TO PEAK (hrs)	12.08	12.17		
RUNOFF VOLUME (mm)	83.90	45.60		
TOTAL RAINFALL (mm)	84.90	84.90		
RUNOFF COEFFICIENT	0.99	0.54		

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

- (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
CNS = 76.0 IS NOT THE SAME AS (2)
- (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
TO THE STORAGE COEFFICIENT.
- (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

STANDARD (0050)	Area (ha)	Total Imp (%)	Dia. Corr. (%)	Curve No.
ID= 1 DT= 5.0 min	3.03	34.00	24.00	
IMPERVIOUS PERCENTS (1)				
Surface Area (ha)	1.03	2.00		
Dep. Storage (mm)	1.00	1.50		
Average Slope (%)	1.00	2.00		
Length (m)	142.13	40.00		
Manholes "	0.043	0.250		
Max. Wf. Inten. (mm/hr)	93.73	69.39		
Storage Const. (hr)	5.00	15.00		
Unit Hyd. Peak (mm)	2.24 (11)	11.41 (11)		
Unit Hyd. Peak (cms)	0.27	1.09		
TWOULDS				
PEAK FLOW (cms)	0.19	0.26		
TIME TO PEAK (hrs)	12.08	12.17		
RUNOFF VOLUME (mm)	83.90	45.60		
TOTAL RAINFALL (mm)	84.90	84.90		
RUNOFF COEFFICIENT	0.99	0.54		

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

- (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
CNS = 76.0 IS NOT THE SAME AS (2)
- (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
TO THE STORAGE COEFFICIENT.
- (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

STANDARD (0050)	Area (ha)	Total Imp (%)	Dia. Corr. (%)	Curve No.
ID= 1 DT= 5.0 min	3.03	34.00	24.00	
IMPERVIOUS PERCENTS (1)				
Surface Area (ha)	1.03	2.00		
Dep. Storage (mm)	1.00	1.50		
Average Slope (%)	1.00	2.00		
Length (m)	142.13	40.00		
Manholes "	0.043	0.250		
Max. Wf. Inten. (mm/hr)	93.73	69.39		
Storage Const. (hr)	5.00	15.00		
Unit Hyd. Peak (mm)	2.24 (11)	11.41 (11)		
Unit Hyd. Peak (cms)	0.27	1.09		
TWOULDS				
PEAK FLOW (cms)	0.19	0.26		
TIME TO PEAK (hrs)	12.08	12.17		
RUNOFF VOLUME (mm)	83.90	45.60		
TOTAL RAINFALL (mm)	84.90	84.90		
RUNOFF COEFFICIENT	0.99	0.54		

ADD HYD (0028)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 1	4.21	0.625	12.08	57.15
ID= 3 (0028)	0.96	0.108	12.08	39.69
+ ID2= 2 (0050)				
ID = 1 (0028)	5.17	0.731	12.08	53.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0007)	OUTFLOW (cms)	STORAGE (ha-in.)	CUTFLOW (cms)	STORAGE (ha-in.)
ID= 2 --> OUT= 1	0.0000	0.0000	0.0750	0.1350
DT= 5.0 min	0.0150	0.0360	0.0800	0.1750
	0.0450	0.1300	0.0950	0.1950
	0.0325	0.1400	0.1000	0.4000
AREA QPEAK TPEAK R.V.				
	(ha)	(cms)	(hrs)	(mm)
INFLOW: ID= 2 (0028)	5.170	0.731	12.08	53.91
OUTFLOW: ID= 1 (0007)	5.170	0.077	13.08	53.60
PEAK FLOW REDUCTION (out/oin) (%) = 10.46				
TIME SHIFT OF PEAK FLOW (min) = 60.00				
MAXIMUM STORAGE USED (ha-in.) = 0.1611				

CALLB (0025)	Area (ha)	QPEAK (cms)	TPEAK (hrs)	Curve Number
ID= 1 DT= 5.0 min	5.170	0.731	12.08	76.0
				f of linear Res. (R) = 3.00
				V.H. Tp (hrs) = 0.28

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

- (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
CNS = 76.0 IS NOT THE SAME AS (2)
- (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
TO THE STORAGE COEFFICIENT.
- (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLB (0050)	Area (ha)	QPEAK (cms)	TPEAK (hrs)	Curve Number
ID= 1 DT= 5.0 min	5.170	0.731	12.08	76.0
				f of linear Res. (R) = 3.00
				V.H. Tp (hrs) = 0.61

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

- (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
CNS = 76.0 IS NOT THE SAME AS (2)
- (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
TO THE STORAGE COEFFICIENT.
- (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

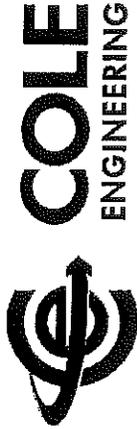
CALLB (0050)	Area (ha)	QPEAK (cms)	TPEAK (hrs)	Curve Number
ID= 1 DT= 5.0 min	5.170	0.731	12.08	76.0
				f of linear Res. (R) = 3.00
				V.H. Tp (hrs) = 0.61

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

- (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
CNS = 76.0 IS NOT THE SAME AS (2)
- (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
TO THE STORAGE COEFFICIENT.
- (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0028)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	5.17	0.977	13.08	53.60
ID= 1 (0007)	0.79	0.082	13.25	39.69
+ ID2= 2 (0025)				
ID = 3 (0026)	5.96	0.113	12.42	51.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



AUG HYD (0026) | AREA | QPEAK | TPEAK | R.V.
 3 + 2 = 1 | (ha) | (cms) | (hrs) | (mm)
 JDA = 3 (0026): 5.96 0.113 12.42 51.77
 + JDE = 2 (0049): 12.59 0.570 12.58 59.87
 LD = 1 (0026): 18.55 0.680 12.58 43.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CRUIERVD (0065) | AREA | INFERVIOUS | PERVIOUS (I)
 LD = 1 ST = 5.0 min | (ha) | (cms) | (hrs) | (mm) | (ha) | (cms) | (hrs) | (mm)
 TOTAL EMP(%) = 27.00 | 27.00 | 27.00 | 27.00 | 27.00 | 27.00 | 27.00 | 27.00

Surface Area (ha) = 0.89
 Dep. Storage (cms) = 1.00
 Average Slope (ft) = 1.00
 Length (mi) = 147.87
 Manning's n = 0.013
 Max Eff. Inbet. (mm/hr) = 93.73
 Max Eff. Stor. (mm) = 13.00
 Storage Coeff. (mm) = 3.32 (I.I.)
 Local Rainfall (mm) = 5.00
 Unit Hyd. Peak (mm) = 0.26
 Unit Hyd. Peak (cms) = 0.23
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 93.96
 LOCAL RAINFALL (mm) = 84.90
 RUNOFF COEFFICIENT = 0.99
 TOTALS
 PEAK FLOW (cms) = 0.443 (I.I.I.)
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 93.96
 LOCAL RAINFALL (mm) = 84.90
 RUNOFF COEFFICIENT = 0.99

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

(I) CN PROCEDURE SELECTED FOR FURTHER LOSSES:
 CN = 76.0 IS = Dep. Storage (Above)
 (II) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (III) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

** SIMULATION NUMBER: 6 **

READ STORY | Filename: C:\Wtemp\ch8
 | b064-7c1-453-9c4-952-1e29525a\ |
 | 2f562e2-4bc3-42f8-9926-1cdd06a2a1 |
 | | Comments: Newford 50 year 24 Hour SCE Type II Stor

TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.08	0.00	5.17	1.85	12.25	13.29
0.17	1.02	6.25	1.85	12.33	13.29
0.25	1.02	6.33	1.85	12.42	13.29
0.33	1.02	6.42	1.85	12.50	13.29
0.42	1.02	6.50	1.85	12.58	13.29
0.50	1.02	6.58	1.85	12.67	13.29
0.58	1.02	6.67	1.85	12.75	13.29
0.67	1.02	6.75	1.85	12.83	13.29
0.75	1.02	6.83	1.85	12.92	13.29
0.83	1.02	6.92	1.85	13.00	13.29
0.92	1.02	7.00	1.85	13.08	13.29
1.00	1.02	7.08	1.85	13.17	13.29
1.08	1.02	7.17	1.85	13.25	13.29
1.17	1.02	7.25	1.85	13.33	13.29
1.25	1.02	7.33	1.85	13.42	13.29

1.32	1.02	7.42	1.85	13.50	1.23	19.58	1.66
1.40	1.02	7.50	1.85	13.58	1.23	19.67	1.66
1.48	1.02	7.58	1.85	13.67	1.23	19.75	1.66
1.56	1.02	7.65	1.85	13.75	1.23	19.83	1.66
1.64	1.02	7.75	1.85	13.82	1.23	19.92	1.66
1.73	1.02	7.83	1.85	13.92	1.23	20.00	1.66
1.81	1.02	7.92	1.85	14.00	1.23	20.08	1.66
1.90	1.02	8.00	1.85	14.08	1.23	20.17	1.66
2.00	1.02	8.08	1.85	14.17	1.23	20.25	1.66
2.08	1.02	8.17	1.85	14.25	1.23	20.33	1.66
2.17	1.02	8.25	1.85	14.33	1.23	20.42	1.66
2.25	1.02	8.33	1.85	14.42	1.23	20.50	1.66
2.33	1.02	8.42	1.85	14.50	1.23	20.58	1.66
2.40	1.02	8.50	1.85	14.58	1.23	20.67	1.66
2.48	1.02	8.59	1.85	14.67	1.23	20.75	1.66
2.56	1.02	8.67	1.85	14.75	1.23	20.83	1.66
2.67	1.02	8.75	1.85	14.83	1.23	20.92	1.66
2.75	1.02	8.83	1.85	14.92	1.23	21.00	1.66
2.83	1.02	8.92	1.85	15.00	1.23	21.08	1.66
2.92	1.02	9.00	1.85	15.08	1.23	21.17	1.66
3.00	1.02	9.08	1.85	15.17	1.23	21.25	1.66
3.07	1.02	9.17	1.85	15.25	1.23	21.33	1.66
3.15	1.02	9.25	1.85	15.33	1.23	21.42	1.66
3.25	1.02	9.33	1.85	15.42	1.23	21.50	1.66
3.33	1.02	9.42	1.85	15.50	1.23	21.58	1.66
3.43	1.02	9.50	1.85	15.58	1.23	21.67	1.66
3.50	1.02	9.59	1.85	15.67	1.23	21.75	1.66
3.58	1.02	9.67	1.85	15.75	1.23	21.83	1.66
3.67	1.02	9.75	1.85	15.83	1.23	21.92	1.66
3.75	1.02	9.83	1.85	15.92	1.23	22.00	1.66
3.83	1.02	9.92	1.85	16.00	1.23	22.08	1.66
3.92	1.02	10.00	1.85	16.08	1.23	22.17	1.66
4.00	1.02	10.09	1.85	16.17	1.23	22.25	1.66
4.08	1.02	10.17	1.85	16.25	1.23	22.33	1.66
4.17	1.02	10.25	1.85	16.33	1.23	22.42	1.66
4.25	1.02	10.33	1.85	16.42	1.23	22.50	1.66
4.33	1.02	10.42	1.85	16.50	1.23	22.58	1.66
4.42	1.02	10.50	1.85	16.58	1.23	22.67	1.66
4.50	1.02	10.58	1.85	16.67	1.23	22.75	1.66
4.58	1.02	10.67	1.85	16.75	1.23	22.83	1.66
4.67	1.02	10.75	1.85	16.83	1.23	22.92	1.66
4.75	1.02	10.83	1.85	16.92	1.23	23.00	1.66
4.83	1.02	10.92	1.85	17.00	1.23	23.08	1.66
4.92	1.02	11.00	1.85	17.08	1.23	23.17	1.66
5.00	1.02	11.08	1.85	17.17	1.23	23.25	1.66
5.08	1.02	11.17	1.85	17.25	1.23	23.33	1.66
5.17	1.02	11.25	1.85	17.33	1.23	23.42	1.66
5.25	1.02	11.33	1.85	17.42	1.23	23.50	1.66
5.33	1.02	11.42	1.85	17.50	1.23	23.58	1.66
5.42	1.02	11.50	1.85	17.58	1.23	23.67	1.66
5.50	1.02	11.59	1.85	17.67	1.23	23.75	1.66
5.58	1.02	11.67	1.85	17.75	1.23	23.83	1.66
5.67	1.02	11.75	1.85	17.83	1.23	23.92	1.66
5.75	1.02	11.83	1.85	17.92	1.23	24.00	1.66
5.83	1.02	11.92	1.85	18.00	1.23	24.08	1.66
5.92	1.02	12.00	1.85	18.08	1.23	24.17	1.66
6.00	1.02	12.08	1.85	18.17	1.23	24.25	1.66
6.08	1.02	12.17	1.85	18.25	1.23	24.33	1.66
6.17	1.02	12.25	1.85	18.33	1.23	24.42	1.66
6.25	1.02	12.33	1.85	18.42	1.23	24.50	1.66

GALEB | Area | (ha) | Curve Number | (CN) = 76.0
 | WASHD | (0014) | Ia | % of Linear Res. (R) = 3.00
 | LD = 1 ST = 5.0 min | U.R. P2(hrs) = 0.50

Unit Hyd. Peak (cms) = 0.438
 PEAK FLOW (cms) = 0.299 (I)
 RUNOFF VOLUME (mm) = 93.96
 LOCAL RAINFALL (mm) = 84.90
 RUNOFF COEFFICIENT = 0.993

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



COLE ENGINEERING

CALL#	Area (ha)	37.83
RESERVED (0002)	Total Imp(%)	82.00
ID= 1 2% 5.0 min		
IMPERVIOUS PERVIOUS (i)		
Surface Area (ha)	23.45	14.38
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	502.24	40.00
Manning's n	0.013	0.250
Max. Eff. Incom. (mm/hr)	101.30	142.85
Storage Coeff. (mm)	5.00	15.00
Unit Hyd. Peak (cms)	8.68 (i)	12.80 (i)
Unit Hyd. Peak (cms)	0.19	0.08
TOTALS		
PEAK FLOW (cms)	3.70	5.526 (i)
TIME TO PEAK (hrs)	12.08	12.17
RUNOFF VOLUME (mm)	91.30	61.36
TOTAL RAINFALL (mm)	92.30	92.30
RUNOFF COEFFICIENT	0.59	0.67

(1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES.
CN = 76.0
(i) THE STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(ii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALL#	Area (ha)	2.89
RESERVED (0002)	Total Imp(%)	50.00
ID= 1 2% 5.0 min		
IMPERVIOUS PERVIOUS (i)		
Surface Area (ha)	1.45	1.45
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	138.60	40.00
Manning's n	0.013	0.250
Max. Eff. Incom. (mm/hr)	101.30	63.78
Storage Coeff. (mm)	5.00	15.00
Unit Hyd. Peak (cms)	5.00 (i)	15.00 (i)
Unit Hyd. Peak (cms)	0.27	0.09
TOTALS		
PEAK FLOW (cms)	0.41	0.558 (i)
TIME TO PEAK (hrs)	12.08	12.17
RUNOFF VOLUME (mm)	51.30	48.21
TOTAL RAINFALL (mm)	52.30	52.30
RUNOFF COEFFICIENT	0.59	0.52

***WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
(1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES.
CN = 76.0
(i) THE STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(ii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALL#	Area (ha)	0.88
RESERVED (0001)	Total Imp(%)	5.00
ID= 1 2% 5.0 min		
IMPERVIOUS PERVIOUS (i)		
Surface Area (ha)	0.88	0.88
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	50.00	40.00
Manning's n	0.013	0.250
Max. Eff. Incom. (mm/hr)	101.30	142.85
Storage Coeff. (mm)	5.00	15.00
Unit Hyd. Peak (cms)	8.68 (i)	12.80 (i)
Unit Hyd. Peak (cms)	0.19	0.08
TOTALS		
PEAK FLOW (cms)	0.050	0.060
TIME TO PEAK (hrs)	12.08	12.17
RUNOFF VOLUME (mm)	91.30	61.36
TOTAL RAINFALL (mm)	92.30	92.30
RUNOFF COEFFICIENT	0.49	0.67

(1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES.
CN = 76.0
(i) THE STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(ii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALL#	Area (ha)	6.08
RESERVED (0011)	Total Imp(%)	5.00
ID= 1 2% 5.0 min		
IMPERVIOUS PERVIOUS (i)		
Surface Area (ha)	23.45	14.38
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	502.24	40.00
Manning's n	0.013	0.250
Max. Eff. Incom. (mm/hr)	101.30	142.85
Storage Coeff. (mm)	5.00	15.00
Unit Hyd. Peak (cms)	8.68 (i)	12.80 (i)
Unit Hyd. Peak (cms)	0.19	0.08
TOTALS		
PEAK FLOW (cms)	3.70	5.526 (i)
TIME TO PEAK (hrs)	12.08	12.17
RUNOFF VOLUME (mm)	91.30	61.36
TOTAL RAINFALL (mm)	92.30	92.30
RUNOFF COEFFICIENT	0.59	0.67

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

CALL#	Area (ha)	40.72
RESERVED (0030)	Total Imp(%)	7.084
ID= 1 2% 5.0 min		
IMPERVIOUS PERVIOUS (i)		
Surface Area (ha)	23.45	14.38
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	502.24	40.00
Manning's n	0.013	0.250
Max. Eff. Incom. (mm/hr)	101.30	142.85
Storage Coeff. (mm)	5.00	15.00
Unit Hyd. Peak (cms)	8.68 (i)	12.80 (i)
Unit Hyd. Peak (cms)	0.19	0.08
TOTALS		
PEAK FLOW (cms)	40.72	7.084
TIME TO PEAK (hrs)	12.08	12.17
RUNOFF VOLUME (mm)	91.30	61.36
TOTAL RAINFALL (mm)	92.30	92.30
RUNOFF COEFFICIENT	0.59	0.67

NOTE: PEAK FLOW DOES NOT INCLUDE BASEFLOWS IF ANY.

CALL#	Area (ha)	41.60
RESERVED (0030)	Total Imp(%)	7.109
ID= 1 2% 5.0 min		
IMPERVIOUS PERVIOUS (i)		
Surface Area (ha)	23.45	14.38
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	502.24	40.00
Manning's n	0.013	0.250
Max. Eff. Incom. (mm/hr)	101.30	142.85
Storage Coeff. (mm)	5.00	15.00
Unit Hyd. Peak (cms)	8.68 (i)	12.80 (i)
Unit Hyd. Peak (cms)	0.19	0.08
TOTALS		
PEAK FLOW (cms)	41.60	7.109
TIME TO PEAK (hrs)	12.08	12.17
RUNOFF VOLUME (mm)	91.30	61.36
TOTAL RAINFALL (mm)	92.30	92.30
RUNOFF COEFFICIENT	0.59	0.67

NOTE: PEAK FLOW DOES NOT INCLUDE BASEFLOWS IF ANY.



COLE ENGINEERING

CALL#	Area (ha)	47.69
RESERVED (0006)	Total Imp(%)	7.375
ID= 1 2% 5.0 min		
IMPERVIOUS PERVIOUS (i)		
Surface Area (ha)	23.45	14.38
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	502.24	40.00
Manning's n	0.013	0.250
Max. Eff. Incom. (mm/hr)	101.30	142.85
Storage Coeff. (mm)	5.00	15.00
Unit Hyd. Peak (cms)	8.68 (i)	12.80 (i)
Unit Hyd. Peak (cms)	0.19	0.08
TOTALS		
PEAK FLOW (cms)	47.69	7.375
TIME TO PEAK (hrs)	12.08	12.17
RUNOFF VOLUME (mm)	91.30	61.36
TOTAL RAINFALL (mm)	92.30	92.30
RUNOFF COEFFICIENT	0.59	0.67

NOTE: PEAK FLOW DOES NOT INCLUDE BASEFLOWS IF ANY.

CALL#	Area (ha)	47.69
RESERVED (0006)	Total Imp(%)	7.375
ID= 1 2% 5.0 min		
IMPERVIOUS PERVIOUS (i)		
Surface Area (ha)	23.45	14.38
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	502.24	40.00
Manning's n	0.013	0.250
Max. Eff. Incom. (mm/hr)	101.30	142.85
Storage Coeff. (mm)	5.00	15.00
Unit Hyd. Peak (cms)	8.68 (i)	12.80 (i)
Unit Hyd. Peak (cms)	0.19	0.08
TOTALS		
PEAK FLOW (cms)	47.69	7.375
TIME TO PEAK (hrs)	12.08	12.17
RUNOFF VOLUME (mm)	91.30	61.36
TOTAL RAINFALL (mm)	92.30	92.30
RUNOFF COEFFICIENT	0.59	0.67

NOTE: PEAK FLOW DOES NOT INCLUDE BASEFLOWS IF ANY.

CALL#	Area (ha)	47.69
RESERVED (0006)	Total Imp(%)	7.375
ID= 1 2% 5.0 min		
IMPERVIOUS PERVIOUS (i)		
Surface Area (ha)	23.45	14.38
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	502.24	40.00
Manning's n	0.013	0.250
Max. Eff. Incom. (mm/hr)	101.30	142.85
Storage Coeff. (mm)	5.00	15.00
Unit Hyd. Peak (cms)	8.68 (i)	12.80 (i)
Unit Hyd. Peak (cms)	0.19	0.08
TOTALS		
PEAK FLOW (cms)	47.69	7.375
TIME TO PEAK (hrs)	12.08	12.17
RUNOFF VOLUME (mm)	91.30	61.36
TOTAL RAINFALL (mm)	92.30	92.30
RUNOFF COEFFICIENT	0.59	0.67

NOTE: PEAK FLOW DOES NOT INCLUDE BASEFLOWS IF ANY.



COLE ENGINEERING

INFLOW : ID= 2 (0030) 47.690 7.375 12.08 67.16
 OUTFLOW : ID= 1 (0008) 47.690 1.458 12.83 67.16

PEAK FLOW REDUCTION (Cont./Cn1) (%) = 19.78
 TIME SKEW OF PEAK FLOW (min) = 45.08
 MAXIMUM STORAGE USED (ha.m.) = 1.4821

AUD HYD. (0020) | AREA | SPEAK | TRSK | R.V. |
 1 + 2 = 3 | (ha) | (cms) | (hrs) | (mm) |
 ID1= 1 (0008) : 47.69 1.458 12.83 67.15
 + ID2= 2 (0014) : 3.44 0.239 12.25 45.48
 ID = 3 (0020) : 51.13 1.598 12.67 65.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

CN1B |
 | BASRD (0015) | Area (ha) = 35.33 | Curve Number (CN) = 76.0
 | ID= 1 DT= 5.0 min | Ia (mm) = 5.09 | # of Linear Res. (N) = 3.00
 | U.H. Tp (hrs) = 0.51

Unit Hyd Qpeak (cms) = 2.691
 PEAK FLOW (cms) = 2.145 (1)
 TIME TO PEAK (hrs) = 12.083
 RUNOFF VOLUME (mm) = 45.485
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

CN1B |
 | WASHD (0045) | Area (ha) = 0.53 | Curve Number (CN) = 76.0
 | ID= 1 DT= 5.0 min | Ia (mm) = 5.09 | # of Linear Res. (N) = 3.00
 | U.H. Tp (hrs) = 0.51

Unit Hyd Qpeak (cms) = 0.119
 PEAK FLOW (cms) = 0.064 (1)
 TIME TO PEAK (hrs) = 12.083
 RUNOFF VOLUME (mm) = 45.384
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

CN1B |
 | RUSHD (0054) | Area (ha) = 5.74 | Curve Number (CN) = 76.0
 | ID= 1 DT= 5.0 min | Ia (mm) = 5.09 | # of Linear Res. (N) = 3.00
 | U.H. Tp (hrs) = 0.50

Unit Hyd Qpeak (cms) = 0.577
 PEAK FLOW (cms) = 0.424 (1)
 TIME TO PEAK (hrs) = 12.333
 RUNOFF VOLUME (mm) = 45.490
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

CALLB |
 | STANBYD (0031) | Area (ha) = 2.73 | D1r. Conn. (%) = 0.10
 | ID= 1 DT= 5.0 min | Total Imp (%) = 22.00

IMPERVIOUS |
 | SURFACED (0044) | Area (ha) = 0.58 | D1r. Conn. (%) = 4.00
 | ID= 1 DT= 5.0 min | Total Imp (%) = 35.00

IMPERVIOUS PAVTIONS (1)
 Surface Area (ha) = 0.60 | PAVTIONS (1) = 2.13
 Dep. Storage (mm) = 1.00 |
 Average Slope (%) = 1.01 |
 Length (m) = 62.18 |
 Manning's n = 0.013 |
 Max. Eff. Inten. (mm/hr) = 101.90 |
 Unit Hyd. Peak (cms) = 0.27 |
 Storage Coeff. (mm) = 5.00 |
 Unit Hyd. Peak (mm) = 5.00 |
 TIME TO PEAK (hrs) = 12.08 |
 RUNOFF VOLUME (mm) = 91.30 |
 TOTAL RAINFALL (mm) = 92.30 |
 RUNOFF COEFFICIENT = 0.99

TOTALS
 2.371 (111)
 74.77
 54.05
 92.30
 0.99

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

- (1) CN PROCEDURE SELECTED FOR PAVTIONS LOSSES.
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

IMPERVIOUS PAVTIONS (1)
 Surface Area (ha) = 0.20 | PAVTIONS (1) = 0.38
 Dep. Storage (mm) = 1.00 |
 Average Slope (%) = 1.01 |
 Length (m) = 62.18 |
 Manning's n = 0.013 |
 Max. Eff. Inten. (mm/hr) = 101.90 |
 Unit Hyd. Peak (cms) = 0.32 |
 Storage Coeff. (mm) = 5.00 |
 Unit Hyd. Peak (mm) = 5.00 |
 TIME TO PEAK (hrs) = 12.08 |
 RUNOFF VOLUME (mm) = 91.30 |
 TOTAL RAINFALL (mm) = 92.30 |
 RUNOFF COEFFICIENT = 0.99

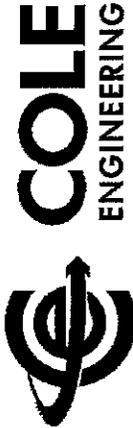
TOTALS
 0.097 (111)
 12.08
 54.59
 92.30
 0.99

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

- (1) CN PROCEDURE SELECTED FOR PAVTIONS LOSSES.
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLB |
 | STANBYD (0040) | Area (ha) = 3.08 | D1r. Conn. (%) = 49.00
 | ID= 1 DT= 5.0 min | Total Imp (%) = 84.00

IMPERVIOUS PAVTIONS (1)
 Surface Area (ha) = 2.65 | PAVTIONS (1) = 1.59
 Dep. Storage (mm) = 1.00 |
 Average Slope (%) = 1.01 |
 Length (m) = 143.25 |



Manmings n = 0.250
 Max. Eff. Inten. (mm/hr) = 101.90 338.18
 over (min) = 5.00 10.00
 Storage Coeff. (min) = 3.15 (11) 7.39 (11)
 Unit Hyd. Tpeak (min) = 3.00 10.00
 Unit Hyd. Peak (cms) = 0.27 0.13
 PEAR FLOW (cms) = 0.42 0.34
 TIME TO PEAK (hrs) = 12.08 12.08
 RUNOFF VOLUME (mm) = 91.30 74.18
 TOTAL RAINFALL (mm) = 92.30 92.30
 RUNOFF COEFFICIENT = 0.99 0.80
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID# 1 (0021): 42.78 2.00 12.08 45.98
 + ID# 2 (0034): 5.74 0.27 12.33 45.49
 ID = 3 (0021): 48.52 2.27 12.25 48.48
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALCULATED
 SPANNED (0034) | Area (ha) = 0.86
 ID# 1 DT = 5.0 min | Total Imp (h) = 50.00 DIF. Coeff. (h) = 50.00
 Surface Area (ha) = 0.44
 Dep. Storage (mm) = 1.00
 Average Slope (h) = 2.00
 Length (m) = 76.59
 Manning's n = 0.013
 Max. Eff. Inten. (mm/hr) = 101.90
 Storage Coeff. (min) = 3.15 (11)
 Unit Hyd. Tpeak (min) = 3.00
 Unit Hyd. Peak (cms) = 0.27
 PEAR FLOW (cms) = 0.42
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 91.30
 TOTAL RAINFALL (mm) = 92.30
 RUNOFF COEFFICIENT = 0.99
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALCULATED
 SPANNED (0034) | Area (ha) = 0.86
 ID# 1 DT = 5.0 min | Total Imp (h) = 50.00 DIF. Coeff. (h) = 50.00
 Surface Area (ha) = 0.44
 Dep. Storage (mm) = 1.00
 Average Slope (h) = 2.00
 Length (m) = 76.59
 Manning's n = 0.013
 Max. Eff. Inten. (mm/hr) = 101.90
 Storage Coeff. (min) = 3.15 (11)
 Unit Hyd. Tpeak (min) = 3.00
 Unit Hyd. Peak (cms) = 0.27
 PEAR FLOW (cms) = 0.42
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 91.30
 TOTAL RAINFALL (mm) = 92.30
 RUNOFF COEFFICIENT = 0.99
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID# 1 (0015): 35.93 2.145 12.50 45.50
 + ID# 2 (0032): 2.73 0.371 12.17 54.05
 ID = 3 (0021): 38.66 2.312 12.42 46.10
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID# 1 (0015): 35.93 2.145 12.50 45.50
 + ID# 2 (0032): 2.73 0.371 12.17 54.05
 ID = 3 (0021): 38.66 2.312 12.42 46.10
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V.
 3 + 2 = 1 | (ha) (cms) (hrs) (mm)
 ID# 3 (0021): 42.32 2.462 12.42 46.10
 + ID# 2 (0040): 3.08 0.767 12.08 62.54
 ID = 1 (0021): 41.74 2.462 12.33 48.79
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V.
 3 + 2 = 1 | (ha) (cms) (hrs) (mm)
 ID# 3 (0021): 42.32 2.462 12.42 46.10
 + ID# 2 (0040): 3.08 0.767 12.08 62.54
 ID = 1 (0021): 41.74 2.462 12.33 48.79
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID# 1 (0021): 42.78 2.00 12.08 45.98
 + ID# 2 (0041): 5.74 0.27 12.33 45.49
 ID = 3 (0021): 48.52 2.27 12.25 48.48
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID# 1 (0021): 42.78 2.00 12.08 45.98
 + ID# 2 (0041): 5.74 0.27 12.33 45.49
 ID = 3 (0021): 48.52 2.27 12.25 48.48
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V.
 3 + 2 = 1 | (ha) (cms) (hrs) (mm)
 ID# 3 (0021): 42.32 2.501 12.33 48.92
 + ID# 2 (0045): 0.53 0.064 12.08 45.35
 ID = 1 (0021): 42.85 2.550 12.25 48.88
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V.
 3 + 2 = 1 | (ha) (cms) (hrs) (mm)
 ID# 3 (0021): 42.32 2.501 12.33 48.92
 + ID# 2 (0045): 0.53 0.064 12.08 45.35
 ID = 1 (0021): 42.85 2.550 12.25 48.88
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID# 1 (0021): 42.78 2.00 12.08 45.98
 + ID# 2 (0041): 5.74 0.27 12.33 45.49
 ID = 3 (0021): 48.52 2.27 12.25 48.48
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID# 1 (0021): 42.78 2.00 12.08 45.98
 + ID# 2 (0041): 5.74 0.27 12.33 45.49
 ID = 3 (0021): 48.52 2.27 12.25 48.48
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



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TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

CALLIB	AREA (ha)	PERVIOUS (%)	IMPERVIOUS (%)	PERVIOUS (l)
WASHVD (0036)	1.09	1.09	50.00	50.00
ID= 1 DT= 5.0 min				
Surface Area (ha)	1.09			
Dep. Storage (mm)	1.00			
Average Slope (%)	1.00			
Length (m)	85.24			
Manning's n	0.013			
Max. Eff. Inten. (mm/hr)	101.90			
Storage Coeff. (min)	5.00			
Unit Hyd. Peak (cms)	2.30 (ii)			
Time to Peak (hrs)	3.30			
Peak Flow (cms)	0.15			
Time to Peak (hrs)	12.08			
Runoff Volume (mm)	91.30			
Total Rainfall (mm)	92.30			
Runoff Coefficient	0.99			
TOTALS				
				0.213 (iii)
				12.08
				48.21
				92.30
				0.52
				0.76

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

(i) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLIB	AREA (ha)	PERVIOUS (%)	IMPERVIOUS (%)	PERVIOUS (l)
WASHVD (0005)	4.60	71.00	29.00	29.00
ID= 1 DT= 5.0 min				
Surface Area (ha)	4.60			
Dep. Storage (mm)	3.27			
Average Slope (%)	1.00			
Length (m)	178.12			
Manning's n	0.013			
Max. Eff. Inten. (mm/hr)	101.90			
Storage Coeff. (min)	5.00			
Unit Hyd. Peak (cms)	3.35 (ii)			
Time to Peak (hrs)	5.00			
Peak Flow (cms)	0.37			
Time to Peak (hrs)	12.08			
Runoff Volume (mm)	91.30			
Total Rainfall (mm)	92.30			
Runoff Coefficient	0.99			
TOTALS				
				0.999 (iii)
				12.08
				57.55
				74.44
				92.30
				0.73

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

(i) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 76.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLIB	AREA (ha)	PERVIOUS (%)	IMPERVIOUS (%)	PERVIOUS (l)
WASHVD (0032)	4.15	5.00	95.00	76.0
ID= 1 DT= 5.0 min				
Surface Area (ha)	4.15			
Dep. Storage (mm)	1.50			
Average Slope (%)	2.00			
Length (m)	40.00			
Manning's n	0.013			
Max. Eff. Inten. (mm/hr)	101.90			
Storage Coeff. (min)	15.00			
Unit Hyd. Peak (cms)	10.75 (ii)			
Time to Peak (hrs)	3.30			
Peak Flow (cms)	0.07			
Time to Peak (hrs)	12.17			
Runoff Volume (mm)	91.30			
Total Rainfall (mm)	92.30			
Runoff Coefficient	0.99			
TOTALS				
				0.213 (iii)
				12.08
				48.21
				92.30
				0.52
				0.76

ADD HYD (0035)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
DT= 1 (0004)	10.12	2.000	12.08	74.50
+ DT= 2 (0034)	0.88	0.172	12.08	69.75
ID= 3 (0035)	11.00	2.172	12.08	74.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

OUTFLOW (0010)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
DT= 1 (0004)	10.12	2.000	12.08	74.50
+ DT= 2 (0034)	0.88	0.172	12.08	69.75
ID= 3 (0035)	11.00	2.172	12.08	74.12

INFLOW: ID= 2 (0035) 11.000 2.172 12.08 74.12
 OUTFLOW: ID= 1 (0010) 11.000 0.435 12.58 74.07
 PEAK FLOW REDUCTION (Cent/Chk) (%) = 20.01
 TIME SHIFT OF PEAK FLOW (hrs) = 30.00
 MAXIMUM STORAGE USED (ha.hrs) = 0.3683

CALLIB	AREA (ha)	PERVIOUS (%)	IMPERVIOUS (%)	PERVIOUS (l)
WASHVD (0010)	20.14	5.00	95.00	76.0
ID= 1 DT= 5.0 min				
Surface Area (ha)	20.14			
Dep. Storage (mm)	5.00			
Average Slope (%)	1.00			
Length (m)	45.48			
Manning's n	0.013			
Max. Eff. Inten. (mm/hr)	101.90			
Storage Coeff. (min)	15.00			
Unit Hyd. Peak (cms)	10.75 (ii)			
Time to Peak (hrs)	3.30			
Peak Flow (cms)	0.07			
Time to Peak (hrs)	12.17			
Runoff Volume (mm)	91.30			
Total Rainfall (mm)	92.30			
Runoff Coefficient	0.99			
TOTALS				
				0.213 (iii)
				12.08
				48.21
				92.30
				0.52
				0.76

Unit Hyd Qpeak (cms) = 2.481

PEAK FLOW (cms) = 1.717 (i)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 45.482
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

ADD HYD (0022)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
DT= 1 (0010)	11.00	0.435	12.58	74.07
+ DT= 2 (0016)	20.14	1.717	12.25	45.48
ID= 3 (0022)	31.14	2.115	12.25	55.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALLIB	AREA (ha)	PERVIOUS (%)	IMPERVIOUS (%)	PERVIOUS (l)
WASHVD (0017)	17.97	5.00	95.00	76.0
ID= 1 DT= 5.0 min				
Surface Area (ha)	17.97			
Dep. Storage (mm)	5.00			
Average Slope (%)	1.00			
Length (m)	45.48			
Manning's n	0.013			
Max. Eff. Inten. (mm/hr)	101.90			
Storage Coeff. (min)	15.00			
Unit Hyd. Peak (cms)	10.75 (ii)			
Time to Peak (hrs)	3.30			
Peak Flow (cms)	0.07			
Time to Peak (hrs)	12.17			
Runoff Volume (mm)	91.30			
Total Rainfall (mm)	92.30			
Runoff Coefficient	0.99			
TOTALS				
				0.213 (iii)
				12.08
				48.21
				92.30
				0.52
				0.76

Unit Hyd Qpeak (cms) = 2.286

PEAK FLOW (cms) = 1.568 (i)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 45.480

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U. S. Tp (hrs) = 0.42

Unit Hyd Qpeak (cms) = 0.377
 PEAK FLOW (cms) = 0.285 (1)
 TIME TO PEAK (hrs) = 12.833
 RUNOFF VOLUME (mm) = 45.493
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

(1) PEAK FLOW DOES NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID# = 1 (0037):	4.60	0.998	12.08	74.44
+ ID# = 2 (0036):	1.09	0.213	12.08	89.75
ID = 3 (0037):	5.69	1.211	12.08	73.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 1				
ID# = 3 (0037):	5.69	1.211	12.08	73.54
+ ID# = 2 (0032):	4.15	0.285	12.33	45.49
ID = 1 (0037):	9.84	1.392	12.08	61.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (BO11)	OUTFLOW (cms)	STORAGE (ha-cm)	OUTFLOW (cms)	STORAGE (ha-cm)	R.V. (mm)
1	0.000	0.000	0.000	0.000	0.000
2	0.110	0.110	0.500	0.410	0.410
3	0.160	0.160	0.350	0.270	0.270
4	0.200	0.180	0.400	0.650	0.650
5	0.840	9.840	1.392	12.08	61.71
6	0.309	9.840	0.309	12.83	61.69

PEAK FLOW REDUCTION (Out/In) (%) = 22.19
 PEAK SHIFT OF PEAK TIME (min) = 45.00
 MAXIMUM STORAGE USED (ha-cm) = 0.2(03)

CAULS	Area (ha)	Curve Number	(CN) = 76.0
RESERVOIR (BO11) <td>3.32</td> <td>3.32</td> <td>76.0</td>	3.32	3.32	76.0
1	5.00	5.00	76.0
2	5.00	5.00	76.0
3	5.00	5.00	76.0
4	5.00	5.00	76.0
5	5.00	5.00	76.0
6	5.00	5.00	76.0

Unit Hyd Qpeak (cms) = 0.437
 PEAK FLOW (cms) = 0.285 (1)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 45.477
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

(1) PEAK FLOW DOES NOT INCLUDE BASEFLOWS IF ANY.

CAULS
 RESERVOIR (BO11)
 ID# = 1 DT = 5.0 min
 Area (ha) = 1.95
 Curve Number (CN) = 76.0
 % of Linear Res. (N) = 3.00
 U. S. Tp (hrs) = 0.30

Unit Hyd Qpeak (cms) = 0.248
 PEAK FLOW (cms) = 0.170 (1)
 TIME TO PEAK (hrs) = 12.250
 RUNOFF VOLUME (mm) = 45.480
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

(1) PEAK FLOW DOES NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID# = 1 (0011):	9.84	0.309	12.83	61.69
+ ID# = 2 (0017):	17.87	1.564	12.25	45.48
ID = 3 (0023):	27.81	1.833	12.25	51.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 1				
ID# = 3 (0023):	27.81	1.833	12.25	51.21
+ ID# = 2 (0039):	27.82	0.295	12.25	45.48
ID = 1 (0023):	31.23	2.108	12.25	50.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID# = 1 (0023):	31.23	2.108	12.25	50.60
+ ID# = 2 (0056):	1.95	0.170	12.25	45.48
ID = 3 (0023):	32.08	2.278	12.25	50.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CAULS
 RESERVOIR (BO11)
 ID# = 1 DT = 5.0 min
 Area (ha) = 1.18
 Total Imp (%) = 50.00
 Fil. Coef. (%) = 50.00

INTERFERING PERVIOUS (i)
 Surface Area (ha) = 0.59
 Dep. Storage (mm) = 1.00
 Average Slope (%) = 1.00
 Length (mi) = 88.09
 Manning's n = 0.250
 Max. Ret. (mm/hr) = 101.90
 over (mi) = 63.78
 Storage Coef. (mi) = 5.00
 15.00
 Unit Hyd. Peak (mi) = 2.36 (11)
 10.81 (11)
 Unit Hyd. Peak (mi) = 5.00
 15.00
 Runoff Coef. (mi) = 0.30
 0.09

PEAK FLOW (cms) = 0.17
 TIME TO PEAK (hrs) = 12.08
 RUNOFF VOLUME (mm) = 45.477
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

APPROX. 0.230 (111)

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RUNOFF VOLUME (mm) = 91.30
 TOTAL RAINFALL (mm) = 92.30
 RUNOFF COEFFICIENT = 0.92

48.21
 92.30
 0.92

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

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES;
 CN = 76.0 Ia = Dep. Storage (Above)
 (1.1) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (1.1.1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

|| CALIB ||
 || STANDARD (0001) || Area (ha) = 3.03
 || ID= 1 DT= 5.0 min || Total Imp (ft) = 34.00 R.L. Comb. (ft) = 24.00

IMPERVIOUS PERCENTS (I)

Surface Area (ha) = 1.03
 Dep. Storage (mm) = 1.00
 Average Slope (ft) = 1.00
 Length (ft) = 182.143
 Manning's n = 0.013

Max. Eff. Inlet (mm/hr) = 101.90
 Storage Coeff. (min) = 5.00
 Unit Hyd. Peak (mm) = 3.13 (1.1)
 Unit Hyd. Peak (mm) = 5.00
 Unit Hyd. Peak (mm) = 0.27

PEAK FLOW (cms) = 0.29
 TIME TO PEAK (hrs) = 0.17
 RUNOFF VOLUME (mm) = 91.30
 TOTAL RAINFALL (mm) = 92.30
 RUNOFF COEFFICIENT = 0.92

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

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES;
 CN = 76.0 Ia = Dep. Storage (Above)
 (1.1) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (1.1.1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

|| CALIB ||
 || WASHED (0050) || Area (ha) = 0.96 Curve Number (CN) = 76.0
 || ID= 1 DT= 5.0 min || Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 || U. H. Tp (hrs) = 0.16

Unit Hyd Peak (cms) = 0.229
 PEAK FLOW (cms) = 0.122 (1)
 TIME TO PEAK (hrs) = 12.093
 RUNOFF VOLUME (mm) = 45.292
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.491

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

|| ADD HYD (0028) ||
 || 1 + 2 = 3 ||
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID= 1 (0001): 3.03 0.470 12.09 61.08
 + ID= 2 (0027): 1.16 0.230 12.09 68.75
 ID = 3 (0028): 4.21 0.700 12.09 63.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

|| ADD HYD (0028) ||
 || 1 + 2 = 3 ||
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID= 1 (0001): 4.21 0.700 12.09 63.51
 + ID= 2 (0028): 0.96 0.122 12.09 45.29
 ID = 3 (0028): 5.17 0.821 12.09 60.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

|| RESERVOIR (0007) ||
 || ID= 2 DT= 5.0 min ||
 || U. H. Tp (hrs) = 0.16

OUTFLOW STORAGE | OUTFLOW STORAGE
 (cms) (ha-ft) | (cms) (ha-ft)
 0.0000 | 0.0000
 0.0150 | 0.0950
 0.0400 | 0.2900
 0.0525 | 0.4400

AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 INFLOW: ID= 2 (0028) 5.170 0.821 12.09 60.13
 OUTFLOW: ID= 1 (0007) 5.170 0.083 13.08 59.82

PEAK FLOW REDUCTION (cms/ft) = 10.14
 TIME SHIFT OF PEAK FLOW (mins) = 60.00
 MAXIMUM STORAGE (ha-ft) = 0.3793

|| CALIB ||
 || WASHED (0025) || Area (ha) = 0.79 Curve Number (CN) = 76.0
 || ID= 1 DT= 5.0 min || Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 || U. H. Tp (hrs) = 0.28

Unit Hyd Peak (cms) = 0.108
 PEAK FLOW (cms) = 0.071 (1)
 TIME TO PEAK (hrs) = 12.280
 RUNOFF VOLUME (mm) = 45.473
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

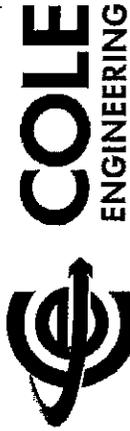
|| CALIB ||
 || WASHED (0049) || Area (ha) = 12.39 Curve Number (CN) = 76.0
 || ID= 1 DT= 5.0 min || Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 || U. H. Tp (hrs) = 0.61

Unit Hyd Peak (cms) = 0.776
 PEAK FLOW (cms) = 0.653 (1)
 TIME TO PEAK (hrs) = 12.583
 RUNOFF VOLUME (mm) = 45.496
 TOTAL RAINFALL (mm) = 92.300
 RUNOFF COEFFICIENT = 0.493

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

|| ADD HYD (0026) ||
 || 1 + 2 = 3 ||
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID= 1 (0007): 5.17 0.821 12.09 63.51
 + ID= 2 (0025): 0.79 0.071 12.28 45.47
 ID = 3 (0026): 5.96 0.141 12.33 57.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

AREA QPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID1= 3 (0.026) 1.56 0.141 12.33 57.92
 + ID2= 2 (0.049) 12.39 0.683 12.38 45.50
 ID = 1 (0.026) 18.35 0.772 12.38 49.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

AREA (ha)= 3.28
 Total Imp(%)= 27.00 DIL. Coeff.(%)= 27.00

IMPERVIOUS PERVIOUS (I)
 (ha) (cms)
 Surface Area 0.89 2.39
 Avg. Storage 1.00 1.50
 Avg. Slope 147.87 40.00
 Manning's n 0.013 0.250

Max. Eff. Inten. (mm/hr)= 43.78
 cover (min)= 5.00 15.00
 Storage Coeff. (min)= 3.21 (all) 11.66 (all)
 Unit Hyd. Peak (min)= 5.00 15.00
 Unit Hyd. Peak (cms)= 0.27 0.69
 PEAK FLOW (cms) = 0.28 0.78
 TIME TO PEAK (hrs) = 14.27 44.27
 RUNOFF VOLUME (mm) = 52.30 154.09
 TOTAL RAINFALL (mm) = 92.30 92.30
 RUNOFF COEFFICIENT = 0.59 0.65

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

- (i) CN PROCEDURE SELECTED FOR PREVIOUS JOBS:
- (ii) CN* = 76.0 is Dep. Storage (Above)
- (iii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL TO THE TIME STEP OF THE PREVIOUS JOBS.
- (iv) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 ** SIMULATION NUMBER: 7 **

FILENAME: C:\V\TEMP\136
 basec4-707-433-504-82-1e282b4
 basec4-707-433-504-82-1e282b4
 Comments: Timesat storm event mm/hr

TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	15.00	3.10	3.00	6.10	43.00
0.20	15.00	3.20	3.00	6.20	43.00
0.40	15.00	3.30	3.00	6.30	43.00
0.60	15.00	3.40	3.00	6.40	43.00
0.80	15.00	3.50	3.00	6.50	43.00
1.00	15.00	3.60	3.00	6.60	43.00
1.20	15.00	3.70	3.00	6.70	43.00
1.40	15.00	3.80	3.00	6.80	43.00
1.60	15.00	3.90	3.00	6.90	43.00
1.80	15.00	4.00	3.00	7.00	43.00
2.00	15.00	4.10	3.00	7.10	43.00
2.20	15.00	4.20	3.00	7.20	43.00
2.40	15.00	4.30	3.00	7.30	43.00

Unit Hyd Qpeak (cms) = 0.438
 PEAK FLOW (cms) = 0.317 (I)
 TIME TO PEAK (hrs) = 7.000
 RUNOFF VOLUME (mm) = 131.726
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683

TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
1.40	20.00	4.40	5.00	7.40	20.00
1.50	20.00	4.50	5.00	7.50	20.00
1.60	20.00	4.60	5.00	7.60	20.00
1.70	20.00	4.70	5.00	7.70	20.00
1.80	20.00	4.80	5.00	7.80	20.00
1.90	20.00	4.90	5.00	7.90	20.00
2.00	20.00	5.00	5.00	8.00	20.00
2.10	18.00	5.10	20.00	8.10	23.00
2.20	16.00	5.20	20.00	8.20	23.00
2.30	14.00	5.30	20.00	8.30	23.00
2.40	12.00	5.40	20.00	8.40	23.00
2.50	10.00	5.50	20.00	8.50	23.00
2.60	8.00	5.60	20.00	8.60	23.00
2.70	6.00	5.70	20.00	8.70	23.00
2.80	4.00	5.80	20.00	8.80	23.00
2.90	2.00	5.90	20.00	8.90	23.00
3.00	0.00	6.00	20.00	9.00	23.00

AREA (ha) = 3.44 Curve Number (CN) = 76.0
 ID = 1 DFM = 5.0 min # of Linear Res. (N) = 3.00
 V.R. Tp (hrs) = 0.30

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

TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	15.00	3.083	3.00	6.083	43.00
0.167	15.00	3.167	3.00	6.167	43.00
0.250	15.00	3.250	3.00	6.250	43.00
0.333	15.00	3.333	3.00	6.333	43.00
0.417	15.00	3.417	3.00	6.417	43.00
0.500	15.00	3.500	3.00	6.500	43.00
0.583	15.00	3.583	3.00	6.583	43.00
0.667	15.00	3.667	3.00	6.667	43.00
0.750	15.00	3.750	3.00	6.750	43.00
0.833	15.00	3.833	3.00	6.833	43.00
0.917	15.00	3.917	3.00	6.917	43.00
1.000	15.00	4.000	3.00	7.000	43.00
1.083	20.00	4.083	5.00	7.083	20.00
1.167	20.00	4.167	5.00	7.167	20.00
1.250	20.00	4.250	5.00	7.250	20.00
1.333	20.00	4.333	5.00	7.333	20.00
1.417	20.00	4.417	5.00	7.417	20.00
1.500	20.00	4.500	5.00	7.500	20.00
1.583	20.00	4.583	5.00	7.583	20.00
1.667	20.00	4.667	5.00	7.667	20.00
1.750	20.00	4.750	5.00	7.750	20.00
1.833	20.00	4.833	5.00	7.833	20.00
1.917	20.00	4.917	5.00	7.917	20.00
2.000	20.00	5.000	5.00	8.000	20.00
2.083	10.00	5.083	20.00	8.083	23.00
2.167	10.00	5.167	20.00	8.167	23.00
2.250	10.00	5.250	20.00	8.250	23.00
2.333	10.00	5.333	20.00	8.333	23.00
2.417	10.00	5.417	20.00	8.417	23.00
2.500	10.00	5.500	20.00	8.500	23.00
2.583	10.00	5.583	20.00	8.583	23.00
2.667	10.00	5.667	20.00	8.667	23.00
2.750	10.00	5.750	20.00	8.750	23.00
2.833	10.00	5.833	20.00	8.833	23.00
2.917	10.00	5.917	20.00	8.917	23.00
3.000	10.00	6.000	20.00	9.000	23.00



COLE ENGINEERING

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

CHLID	Area (ha)	37.83	D.R. Com. (%)	32.00
STANDARD (0002)	Total Imp (%)	62.00		
ID= 1 DP= 5.0 min				
Surface Area (ha)	21.56			
Dep. Storage (mm)	1.00			
Average Slope (W)	1.00			
Length (m)	502.20			
Manning's n	0.013			
Max. Eff. Inten. (mm/hr)	43.00			
Storage Coeff. (min)	10.00			
Unit Hyd. Peak (mm)	9.43 (11)			
Unit Hyd. Peak (mm)	10.00			
Unit Hyd. Peak (mm)	9.12			
PEAK FLOW (cms)	1.44			
TIME TO PEAK (hrs)	7.00			
RUNOFF VOLUME (mm)	192.00			
TOTAL RAINFALL (mm)	193.00			
RUNOFF COEFFICIENT	0.99			
IMPERVIOUS PERVIOUS (1)				
1	0			
2	100			
3	0			
4	100			
5	0			
6	100			
7	0			
8	100			
9	0			
10	100			
11	0			
12	100			
13	0			
14	100			
15	0			
16	100			
17	0			
18	100			
19	0			
20	100			
21	0			
22	100			
23	0			
24	100			
25	0			
26	100			
27	0			
28	100			
29	0			
30	100			
31	0			
32	100			
33	0			
34	100			
35	0			
36	100			
37	0			
38	100			
39	0			
40	100			
41	0			
42	100			
43	0			
44	100			
45	0			
46	100			
47	0			
48	100			
49	0			
50	100			
51	0			
52	100			
53	0			
54	100			
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56	100			
57	0			
58	100			
59	0			
60	100			
61	0			
62	100			
63	0			
64	100			
65	0			
66	100			
67	0			
68	100			
69	0			
70	100			
71	0			
72	100			
73	0			
74	100			
75	0			
76	100			
77	0			
78	100			
79	0			
80	100			
81	0			
82	100			
83	0			
84	100			
85	0			
86	100			
87	0			
88	100			
89	0			
90	100			
91	0			
92	100			
93	0			
94	100			
95	0			
96	100			
97	0			
98	100			
99	0			
100	100			

(1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 CH* = 76.0
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CHLID	Area (ha)	2.89	D.R. Com. (%)	50.00
STANDARD (0022)	Total Imp (%)	50.00		
ID= 1 DP= 5.0 min				
Surface Area (ha)	1.45			
Dep. Storage (mm)	1.00			
Average Slope (W)	1.00			
Length (m)	138.80			
Manning's n	0.013			
Max. Eff. Inten. (mm/hr)	43.00			
Storage Coeff. (min)	3.00			
Unit Hyd. Peak (mm)	4.36 (11)			
Unit Hyd. Peak (mm)	5.00			
Unit Hyd. Peak (mm)	4.23			
PEAK FLOW (cms)	0.17			
TIME TO PEAK (hrs)	6.92			
RUNOFF VOLUME (mm)	192.00			
TOTAL RAINFALL (mm)	193.00			
RUNOFF COEFFICIENT	0.99			
IMPERVIOUS PERVIOUS (1)				
1	0			
2	100			
3	0			
4	100			
5	0			
6	100			
7	0			
8	100			
9	0			
10	100			
11	0			
12	100			
13	0			
14	100			
15	0			
16	100			
17	0			
18	100			
19	0			
20	100			
21	0			
22	100			
23	0			
24	100			
25	0			
26	100			
27	0			
28	100			
29	0			
30	100			
31	0			
32	100			
33	0			
34	100			
35	0			
36	100			
37	0			
38	100			
39	0			
40	100			
41	0			
42	100			
43	0			
44	100			
45	0			
46	100			
47	0			
48	100			
49	0			
50	100			
51	0			
52	100			
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54	100			
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56	100			
57	0			
58	100			
59	0			
60	100			
61	0			
62	100			
63	0			
64	100			
65	0			
66	100			
67	0			
68	100			
69	0			
70	100			
71	0			
72	100			
73	0			
74	100			
75	0			
76	100			
77	0			
78	100			
79	0			
80	100			
81	0			
82	100			
83	0			
84	100			
85	0			
86	100			
87	0			
88	100			
89	0			
90	100			
91	0			
92	100			
93	0			
94	100			
95	0			
96	100			
97	0			
98	100			
99	0			
100	100			

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 CH* = 76.0
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CHLID	Area (ha)	0.86	Curve Number (CN)	75.0
STANDARD (0041)	Imp. (%)	5.00	# of Linear Res. (N)	3.00
ID= 1 DP= 5.0 min				
Unit Hyd Peak (cms)	0.56			
Unit Hyd Peak (cms)	0.56			

PEAK FLOW (cms) = 0.970 (1)
 TIME TO PEAK (hrs) = 7.167
 RUNOFF VOLUME (mm) = 131.074
 TOTAL RAINFALL (mm) = 131.074
 RUNOFF COEFFICIENT = 0.963
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CHLID	Area (ha)	6.09	Curve Number (CN)	76.0
STANDARD (0051)	Imp. (%)	5.00	# of Linear Res. (N)	3.00
ID= 1 DP= 5.0 min				
Unit Hyd Peak (cms)	0.554			
Unit Hyd Peak (cms)	0.554			

PEAK FLOW (cms) = 0.523 (1)
 TIME TO PEAK (hrs) = 7.083
 RUNOFF VOLUME (mm) = 131.763
 TOTAL RAINFALL (mm) = 131.763
 RUNOFF COEFFICIENT = 0.983
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0030)	AREA (ha)	DEPAK (cms)	R.V. (mm)
1 + 2 = 3			
ID= 1 (0002)	97.83	4.122	7.00
+ ID= 2 (0052)	2.89	0.307	7.00
ID = 3 (0030)	40.72	4.430	7.00
			167.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0030)	AREA (ha)	DEPAK (cms)	R.V. (mm)
3 + 2 = 1			
ID= 3 (0030)	40.72	4.430	7.00
+ ID= 2 (0043)	0.86	0.070	7.17
ID = 1 (0030)	41.60	4.498	7.00
			166.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0030)	AREA (ha)	DEPAK (cms)	R.V. (mm)
1 + 2 = 3			
ID= 1 (0030)	41.60	4.495	7.00
+ ID= 2 (0051)	6.09	0.529	7.08
ID = 3 (0030)	47.69	5.017	7.00
			161.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0009)	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
ID= 2	0.0000	0.0000	1.1800	1.2500
ID= 3	0.6500	0.6500	1.4000	1.4000
ID= 4	1.0000	1.0000	1.5500	1.5500
ID= 5	1.0000	1.1000	2.3500	2.6000



AREA DPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 REFLOW: ID= 2 (0030) 47.650 5.017 7.00 161.95
 OVERFLOW: ID= 1 (0010) 47.650 2.320 9.25 161.94

PEAK FLOW REDUCTION (cont/044) (s) = 46.24
 TIME SLEW OF PEAK FLOW (min) = 125.00
 MAXIMUM STORAGE USED (ha-hr) = 2.7544

ADD HYD (0020)
 1 + 2 = 3

AREA OPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID= 1 (0009): 47.69 2.320 9.25 161.94
 + ID= 2 (0014): 3.44 0.317 7.00 151.73
 ID = 3 (0020): 51.13 2.498 9.08 155.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALLS
 1 NASHVD (0005) | Area (ha) = 35.93 Curve Number (CN) = 76.0
 | ID= 1 DT= 5.0 min | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 | U.H. Tp (hrs) = 0.51

Unit Hyd Opeak (cms) = 2.691

PEAK FLOW (cms) = 2.960 (1)
 TIME TO PEAK (hrs) = 7.167
 RUNOFF VOLUME (mm) = 131.771
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683

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

CALLS
 1 NASHVD (0045) | Area (ha) = 0.53 Curve Number (CN) = 76.0
 | ID= 1 DT= 5.0 min | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 | U.H. Tp (hrs) = 0.17

Unit Hyd Opeak (cms) = 0.119

PEAK FLOW (cms) = 0.051 (1)
 TIME TO PEAK (hrs) = 7.000
 RUNOFF VOLUME (mm) = 131.306
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.680

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

CALLS
 1 NASHVD (0054) | Area (ha) = 5.74 Curve Number (CN) = 76.0
 | ID= 1 DT= 5.0 min | Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 | U.H. Tp (hrs) = 0.38

Unit Hyd Opeak (cms) = 0.577

PEAK FLOW (cms) = 0.510 (1)
 TIME TO PEAK (hrs) = 9.310 (1)
 RUNOFF VOLUME (mm) = 131.757
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683

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

CALLS

STANHYD (0031) | Area (ha) = 2.73
 | ID= 1 DT= 5.0 min | Total Imp (s) = 22.00 Dir. Cona. (s) = 0.10

IMPERVIOUS PERVIOUS (1)
 (ha) (mm)
 Surface Area (ha) = 0.60 2.13
 Dep. Storage (mm) = 1.00 1.50
 Average Slope (%) = 13.00 2.00
 Manning's n (m) = 0.013 0.250

Max. Eff. Inten. (mm/hr) = 43.00 47.92
 over (min) = 5.00 15.00
 Storage Coeff. (min) = 4.28 (11) 13.76 (11)
 Unit Hyd. Peak (mm) = 5.00 15.00
 Unit Hyd. Peak (cms) = 0.23 0.08

PEAK FLOW (cms) = 0.00 0.27
 TIME TO PEAK (hrs) = 7.00 7.00
 RUNOFF VOLUME (mm) = 192.00 144.40
 TOTAL RAINFALL (mm) = 193.00 193.00
 RUNOFF COEFFICIENT = 0.99 0.75

TOTALS
 0.275 (11)
 7.00
 144.40
 193.00
 0.75

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

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES!
 (1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES!
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 TO THE STORAGE COEFFICIENT.
 (11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS
 1 STANHYD (0044) | Area (ha) = 0.58
 | ID= 1 DT= 5.0 min | Total Imp (s) = 35.00 Dir. Cona. (s) = 4.00

IMPERVIOUS PERVIOUS (1)
 (ha) (mm)
 Surface Area (ha) = 0.20 0.38
 Dep. Storage (mm) = 1.00 1.50
 Average Slope (%) = 1.00 2.00
 Length (m) = 62.18 40.00
 Manning's n = 0.013 0.250

Max. Eff. Inten. (mm/hr) = 43.00 56.68
 over (min) = 5.00 15.00
 Storage Coeff. (min) = 2.68 (11) 11.50 (11)
 Unit Hyd. Peak (mm) = 5.00 15.00
 Unit Hyd. Peak (cms) = 0.23 0.08

PEAK FLOW (cms) = 0.00 0.06
 TIME TO PEAK (hrs) = 6.58 7.00
 RUNOFF VOLUME (mm) = 192.00 149.65
 TOTAL RAINFALL (mm) = 193.00 193.00
 RUNOFF COEFFICIENT = 0.99 0.78

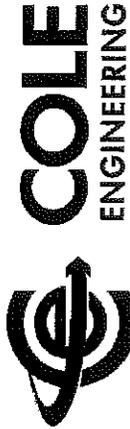
TOTALS
 0.061 (11)
 7.00
 149.65
 193.00
 0.78

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

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES!
 (1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES!
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 TO THE STORAGE COEFFICIENT.
 (11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALLS
 1 STANHYD (0040) | Area (ha) = 3.08
 | ID= 1 DT= 5.0 min | Total Imp (s) = 86.00 Dir. Cona. (s) = 49.00

IMPERVIOUS PERVIOUS (1)
 (ha) (mm)
 Surface Area (ha) = 2.65 0.43
 Dep. Storage (mm) = 1.00 1.50



Average slope (N) = 1.00 2.00
 width (W) = 143.25 40.00
 Manning's n = 0.013 0.250
 Max. Eff. Inten. (mm/hr) = 43.00 152.41
 over (min) = 5.00 15.00
 Storage Coeff. (min) = 4.44 (11) 10.41 (11)
 Unit Hyd. Tpeak (min) = 5.00 15.00
 Unit Hyd. Tpeak (ms) = 0.23 0.09
 PEAK FLOW (cms) = 0.18 0.18
 TIME TO PEAK (hrs) = 6.92 7.00
 RUNOFF VOLUME (mm) = 192.00 172.00
 TOTAL RAINFALL (mm) = 193.00 193.00
 RUNOFF COEFFICIENT = 0.99 0.90

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

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CH* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V. |
 1 + 2 = 3 | (ha) (cms) (hrs) (mm) |
 ID# 1 (0015): 35.93 2.960 7.17 131.77
 + ID# 2 (0031): 2.75 0.275 7.00 144.66
 ID = 3 (0021): 38.66 3.204 7.17 132.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V. |
 1 + 2 = 3 | (ha) (cms) (hrs) (mm) |
 ID# 1 (0015): 35.96 3.204 7.17 132.68
 + ID# 2 (0040): 3.08 0.362 7.00 182.22
 ID = 1 (0021): 41.74 3.487 7.08 136.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V. |
 1 + 2 = 3 | (ha) (cms) (hrs) (mm) |
 ID# 1 (0021): 41.74 3.487 7.08 136.34
 + ID# 2 (0046): 0.58 0.061 7.00 151.33
 ID = 3 (0021): 42.32 3.548 7.00 136.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V. |
 1 + 2 = 3 | (ha) (cms) (hrs) (mm) |
 ID# 1 (0021): 42.32 3.548 7.00 136.54
 + ID# 2 (0045): 0.53 0.051 7.00 131.31
 ID = 1 (0021): 42.85 3.599 7.00 136.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021) | AREA QPEAK TPEAK R.V. |
 1 + 2 = 3 | (ha) (cms) (hrs) (mm) |
 ID# 1 (0021): 42.85 3.599 7.00 136.48
 + ID# 2 (0041): 3.74 0.510 7.00 131.76
 ID = 3 (0021): 48.59 4.104 7.00 135.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

COLLID (0034) | Area (ha) = 0.00 |
 STDYD (0004) | Total Imp(%) = 50.00 |
 ID = 1 DT = 5.0 min | D.C. Com. (%) = 50.00 |
 SURFACE AREA (ha) = 0.44 |
 DEP. STORAGE (mm) = 1.00 |
 AVERAGE SLOPE (%) = 1.00 |
 LENGTH (m) = 76.59 |
 MANNING'S n = 0.013 |
 MAX. EFF. INTEN. (mm/hr) = 43.00 |
 OVER (min) = 5.00 |
 STORAGE COEFF. (min) = 3.05 (11) |
 UNIT HYD. TPEAK (min) = 5.00 |
 UNIT HYD. TPEAK (cms) = 0.27 |
 PEAK FLOW (cms) = 0.05 |
 TIME TO PEAK (hrs) = 6.75 |
 RUNOFF VOLUME (mm) = 192.00 |
 TOTAL RAINFALL (mm) = 193.00 |
 RUNOFF COEFFICIENT = 0.99 |
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CH* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

COLLID (0034) | Area (ha) = 0.00 |
 STDYD (0004) | Total Imp(%) = 70.00 |
 ID = 1 DT = 5.0 min | D.C. Com. (%) = 37.00 |
 SURFACE AREA (ha) = 7.08 |
 DEP. STORAGE (mm) = 1.00 |
 AVERAGE SLOPE (%) = 1.00 |
 LENGTH (m) = 263.00 |
 MANNING'S n = 0.013 |
 MAX. EFF. INTEN. (mm/hr) = 43.00 |
 OVER (min) = 5.00 |
 STORAGE COEFF. (min) = 6.35 (11) |
 UNIT HYD. TPEAK (min) = 5.00 |
 UNIT HYD. TPEAK (cms) = 0.19 |
 PEAK FLOW (cms) = 0.45 |
 TIME TO PEAK (hrs) = 7.00 |
 RUNOFF VOLUME (mm) = 192.00 |
 TOTAL RAINFALL (mm) = 193.00 |
 RUNOFF COEFFICIENT = 0.99 |
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CH* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CH* = 76.0 Is = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.



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

```

| ADD HYD (0035) |
| 1 + 2 = 3 |
|
| ID1= 1 (0004) | AREA OPERK PEAK R.V.
| ID2= 2 (0034) | (ha) (cms) (hrs) (mm)
| ID = 3 (0035) | 11.00 1.237 7.00 171.41
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| RESERVOIR (0010) |
| 1 + 2 = 3 |
| 1 + 2 = 3 |
|
| OUTFLOW | STORAGE | OUTFLOW | STORAGE |
| (cms) | (ha.m.) | (cms) | (ha.m.) |
| 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 0.1000 | 0.2000 | 0.5000 | 0.4500 |
| 0.2500 | 0.2500 | 0.4000 | 0.4800 |
| 0.3500 | 0.2700 | 1.2000 | 0.5000 |
|
| AREA | OPERK | PEAK | R.V. |
| (ha) | (cms) | (hrs) | (mm) |
| 11.000 | 1.237 | 7.00 | 171.41 |
| OUTFLOW: ID= 1 (0010) | 0.819 | 7.25 | 171.37 |
| INFLOW: ID= 2 (0035) | 11.800 | 7.00 | 171.41 |
|
| PEAK FLOW REDUCTION [Out/In] (%) = 66.16 |
| TIME SHIFT OF PEAK FLOW [min] = 15.00 |
| MAXIMUM STORAGE USED [ha.m.] = 0.5227 |
  
```

```

| CALIB |
| WASHFD (0016) | Area (ha) = 20.14 Curve Number (CN) = 76.0
| ID= 1 DF= 5.0 min | Ts (min) = 5.00 # of Linear Res. (N) = 3.00
| U.H. Tp (hrs) = 0.31
|
| Unit Hyd Qpeak (cms) = 2.481
|
| PEAK FLOW (cms) = 1.850 (1)
| TIME TO PEAK (hrs) = 1.850 (1)
| RUNOFF VOLUME (mm) = 131.726
| TOTAL RAINFALL (mm) = 183.000
| RUNOFF COEFFICIENT = 0.683
  
```

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

```

| ADD HYD (0022) |
| 1 + 2 = 3 |
|
| ID1= 1 (0010) | AREA OPERK PEAK R.V.
| ID2= 2 (0016) | (ha) (cms) (hrs) (mm)
| ID = 3 (0022) | 31.14 2.611 7.00 145.73
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| CALIB |
| WASHFD (0017) | Area (ha) = 17.97 Curve Number (CN) = 76.0
| ID= 1 DF= 5.0 min | Ts (min) = 5.00 # of Linear Res. (N) = 3.00
| U.H. Tp (hrs) = 0.30
|
| Unit Hyd Qpeak (cms) = 2.288
|
| PEAK FLOW (cms) = 1.656 (1)
| TIME TO PEAK (hrs) = 7.000
  
```

RUNOFF VOLUME (mm) = 131.726
TOTAL RAINFALL (mm) = 183.000
RUNOFF COEFFICIENT = 0.683

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

```

| CALIB |
| WASHFD (0036) | Area (ha) = 1.09
| ID= 1 DF= 5.0 min | Total Imp (%) = 50.00 DLE. Conn. (%) = 50.00
  
```

INTERFERVIOUS PREVIOUS (1)

```

| SURFACE AREA (ha) = 0.55 |
| DEP. STORAGE (mm) = 1.50 |
| AVERAGE SLOPE (%) = 1.00 |
| LENGTH (ft) = 85.24 |
| MANULAGE n = 0.230 |
|
| MAX. EFF. INTEN. (mm/hr) = 43.00 |
| STORAGE COEFF. (min) = 5.00 |
| UNIT HYD. PEAK (cms) = 3.25 (11) |
| UNIT HYD. PEAK (cms) = 5.00 |
| UNIT HYD. PEAK (cms) = 0.27 |
|
| PEAK FLOW (cms) = 0.07 |
| TIME TO PEAK (hrs) = 6.03 |
| RUNOFF VOLUME (mm) = 143.00 |
| TOTAL RAINFALL (mm) = 183.00 |
| RUNOFF COEFFICIENT = 0.99 |
|
| *POPULS* |
| 0.117 (111) |
| 7.00 |
| 163.00 |
| 183.00 |
| 0.83 |
  
```

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

(1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES:

CN* = 76.0 Is = Dep. Storage (Above)

(11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

TO THE STORAGE COEFFICIENT.

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

```

| CALIB |
| WASHFD (0005) | Area (ha) = 4.60
| ID= 1 DF= 5.0 min | Total Imp (%) = 71.00 DLE. Conn. (%) = 25.00
  
```

INTERFERVIOUS PREVIOUS (1)

```

| SURFACE AREA (ha) = 2.77 |
| DEP. STORAGE (mm) = 1.50 |
| AVERAGE SLOPE (%) = 1.00 |
| LENGTH (ft) = 175.12 |
| MANULAGE n = 0.013 |
|
| MAX. EFF. INTEN. (mm/hr) = 43.00 |
| STORAGE COEFF. (min) = 5.00 |
| UNIT HYD. PEAK (cms) = 5.01 (11) |
| UNIT HYD. PEAK (cms) = 0.21 |
|
| PEAK FLOW (cms) = 0.36 |
| TIME TO PEAK (hrs) = 6.52 |
| RUNOFF VOLUME (mm) = 192.00 |
| TOTAL RAINFALL (mm) = 193.00 |
| RUNOFF COEFFICIENT = 0.99 |
|
| *POPULS* |
| 0.353 (111) |
| 7.00 |
| 172.40 |
| 193.00 |
| 0.89 |
  
```

(1) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES:

CN* = 76.0 Is = Dep. Storage (Above)

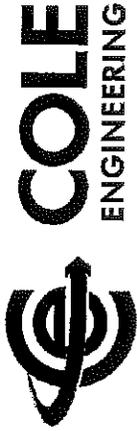
(11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

TO THE STORAGE COEFFICIENT.

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

```

| CALIB |
| WASHFD (0037) | Area (ha) = 4.15 Curve Number (CN) = 76.0
| ID= 1 DF= 5.0 min | Ts (min) = 5.00 # of Linear Res. (N) = 3.00
  
```



COLFE
ENGINEERING

U.R. Tp (hrs) = 0.42

Unit Hyd Qpeak (cms) = 0.377
 PEAK FLOW (cms) = 0.361 (4)
 TIME TO PEAK (hrs) = 7.083
 RUNOFF VOLUME (mm) = 131.763
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683

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

ID	ADD HYD (0037)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	1 + 2 = 3	4.09	0.361	7.00	172.40
	+ ID2 = 2 (0036)	2.09	0.361	7.00	159.48
	ID = 3 (0037)	5.63	0.641	7.00	170.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ID	ADD HYD (0037)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	1 + 2 = 3	4.09	0.641	7.00	170.69
	+ ID2 = 2 (0032)	4.15	0.361	7.08	131.76
	ID = 1 (0037)	9.64	0.956	7.00	154.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0011)	INFLOW ID	OUTFLOW ID	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	R.V. (mm)
1	2 (0037)	1 (0011)	9.840	0.956	154.27	7.00	154.25
	1 (0011)	2 (0037)	9.840	0.367	9.58	7.00	154.25

PEAK FLOW REDUCTION [Qout/Qin] (%) = 38.63
 TIME SHIFT OF PEAK FLOW (min) = 155.00
 MAXIMUM STORAGE USED (ha.m.) = 0.5489

CHANNEL (0053)	AREA (ha)	AREA (ha)	3.32	CURVE NUMBER (CN) = 76.0
1	1 DM = 5.0 min	5.00	5.00	# of Linear Res. (N) = 3.00
	U.R. Tp (hrs) = 0.25			

Unit Hyd Qpeak (cms) = 0.437
 PEAK FLOW (cms) = 0.308 (1)
 TIME TO PEAK (hrs) = 7.000
 RUNOFF VOLUME (mm) = 131.718
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.682

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

Area (ha) = 1.95
 Curve Number (CN) = 76.0
 # of Linear Res. (N) = 3.00
 U.R. Tp (hrs) = 0.30

Unit Hyd Qpeak (cms) = 0.248
 PEAK FLOW (cms) = 0.180 (1)
 TIME TO PEAK (hrs) = 7.000
 RUNOFF VOLUME (mm) = 131.725
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683

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

ID	ADD HYD (0023)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	1 + 2 = 3	27.81	2.020	7.00	139.69
	+ ID2 = 2 (0017)	17.97	1.468	7.00	131.72
	ID = 3 (0023)	27.91	2.020	7.00	139.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ID	ADD HYD (0023)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	1 + 2 = 3	27.81	2.020	7.00	139.69
	+ ID2 = 2 (0053)	3.32	0.308	7.00	131.72
	ID = 1 (0023)	31.13	2.328	7.00	139.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ID	ADD HYD (0023)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	1 + 2 = 3	31.13	2.328	7.00	139.64
	+ ID2 = 2 (0050)	1.95	0.180	7.00	131.73
	ID = 3 (0023)	33.08	2.508	7.00	138.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CHANNEL (0027)	AREA (ha)	AREA (ha)	1.15	DLF. COEFF. (%) = 50.00
1	1 DM = 5.0 min	50.00	50.00	# of Linear Res. (N) = 3.00
	U.R. Tp (hrs) = 0.25			

Unit Hyd Qpeak (cms) = 0.55
 PEAK FLOW (cms) = 0.55
 TIME TO PEAK (hrs) = 1.50
 RUNOFF VOLUME (mm) = 1.00
 TOTAL RAINFALL (mm) = 40.00
 RUNOFF COEFFICIENT = 0.250

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

RESERVOIR (0011)	INFLOW ID	OUTFLOW ID	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	R.V. (mm)
1	2 (0027)	1 (0011)	43.00	0.07	35.28	15.00	15.00
	1 (0011)	2 (0027)	5.00	0.55	2.33 (11)	14.04 (11)	15.00
	1 (0011)	2 (0027)	5.00	0.180	0.180	0.180	0.180
	1 (0011)	2 (0027)	0.180	0.07	0.07	0.06	0.06
	1 (0011)	2 (0027)	6.53	0.70	6.53	0.128 (11)	7.00



RUNOFF VOLUME (mm) = 134.97
 TOTAL RAINFALL (mm) = 193.00
 RUNOFF COEFFICIENT = 0.69

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

- (1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES;
 $CR^* = 76.0$ IS = DEP. STORAGE (ABOVE)
- (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR (0007)
 IN= 2 -> OUT= 1
 ID= 3.0 MIN

CALLIE
 SPANHYD (0001)
 ID= 1 DT= 5.0 min Area (ha) = 3.03
 Total Imp (%) = 34.00 Dil. Coeff. (%) = 24.00

INVERTIONS PERVIOUS (1)

Surface Area (ha)	1.03	2.00
Dep. Storage (mm)	1.00	1.50
Average Slope (%)	1.00	2.00
Length (m)	142.13	49.00
Manning n	0.013	0.250
Max. Eff. Inten. (mm/hr)	43.00	42.16
over (hr)	5.00	15.00
Storage Coeff. (min)	4.42 (11)	14.39 (11)
Unit Hyd. Peak (mm)	5.00	15.00
Unit Hyd. Peak (cms)	0.23	0.08

PEAK FLOW (cms) = 0.09
 TIME TO PEAK (hrs) = 6.52
 RUNOFF VOLUME (mm) = 134.97
 TOTAL RAINFALL (mm) = 193.00
 RUNOFF COEFFICIENT = 0.69

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

(1) ON PROCEDURE SELECTED FOR PREVIOUS LOSSES;
 $CR^* = 76.0$ IS = DEP. STORAGE (ABOVE)

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

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

CALLIE
 SPANHYD (0050)
 ID= 1 DT= 5.0 min Area (ha) = 0.98
 Total Imp (%) = 34.00 Dil. Coeff. (%) = 24.00

Unit Hyd Peak (cms) = 0.223
 PEAK FLOW (cms) = 0.052 (1)
 TIME TO PEAK (hrs) = 7.00
 RUNOFF VOLUME (mm) = 131.00
 TOTAL RAINFALL (mm) = 193.00
 RUNOFF COEFFICIENT = 0.680

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

ADD HYD (0026)
 1 + 2 = 3

ID= 1 (0001): Area (ha) = 3.03
 ID= 2 (0027): Area (ha) = 0.313
 ID= 3 (0028): Area (ha) = 0.126

PEAK FLOW (cms) = 0.439
 TIME TO PEAK (hrs) = 7.00
 RUNOFF VOLUME (mm) = 152.94
 TOTAL RAINFALL (mm) = 193.00
 RUNOFF COEFFICIENT = 0.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0024)
 1 + 2 = 1

ID= 1 (0001): Area (ha) = 3.03
 ID= 2 (0028): Area (ha) = 0.36
 ID= 3 (0029): Area (ha) = 0.431

PEAK FLOW (cms) = 0.531
 TIME TO PEAK (hrs) = 7.00
 RUNOFF VOLUME (mm) = 151.30
 TOTAL RAINFALL (mm) = 193.00
 RUNOFF COEFFICIENT = 0.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0007)
 IN= 2 -> OUT= 1
 ID= 3.0 MIN

CALLIE
 SPANHYD (0025)
 ID= 1 DT= 5.0 min Area (ha) = 0.79
 Total Imp (%) = 34.00 Dil. Coeff. (%) = 24.00

Unit Hyd Peak (cms) = 0.100
 PEAK FLOW (cms) = 0.074 (1)
 TIME TO PEAK (hrs) = 7.00
 RUNOFF VOLUME (mm) = 131.703
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.682

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

CALLIE
 SPANHYD (0049)
 ID= 1 DT= 5.0 min Area (ha) = 12.39
 Total Imp (%) = 34.00 Dil. Coeff. (%) = 24.00

Unit Hyd Peak (cms) = 0.776
 PEAK FLOW (cms) = 0.961 (1)
 TIME TO PEAK (hrs) = 7.250
 RUNOFF VOLUME (mm) = 131.774
 TOTAL RAINFALL (mm) = 193.000
 RUNOFF COEFFICIENT = 0.683

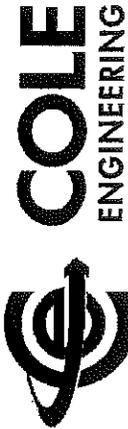
(1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0026)
 1 + 2 = 3

ID= 1 (0001): Area (ha) = 3.03
 ID= 2 (0027): Area (ha) = 0.313
 ID= 3 (0028): Area (ha) = 0.126

PEAK FLOW (cms) = 0.439
 TIME TO PEAK (hrs) = 7.00
 RUNOFF VOLUME (mm) = 152.94
 TOTAL RAINFALL (mm) = 193.00
 RUNOFF COEFFICIENT = 0.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



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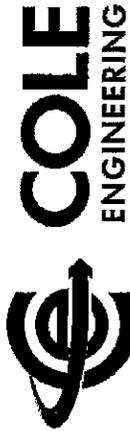
AREA	OPEN	PEAK	R.V.
(ha)	(mm)	(mm/hr)	(%)
1.00	5.96	0.170	7.10
2.00	11.92	0.340	14.20
3.00	17.88	0.510	21.30
4.00	23.84	0.680	28.40
5.00	29.80	0.850	35.50
6.00	35.76	1.020	42.60
7.00	41.72	1.190	49.70
8.00	47.68	1.360	56.80
9.00	53.64	1.530	63.90
10.00	59.60	1.700	71.00
11.00	65.56	1.870	78.10
12.00	71.52	2.040	85.20
13.00	77.48	2.210	92.30
14.00	83.44	2.380	99.40
15.00	89.40	2.550	106.50
16.00	95.36	2.720	113.60
17.00	101.32	2.890	120.70
18.00	107.28	3.060	127.80
19.00	113.24	3.230	134.90
20.00	119.20	3.400	142.00
21.00	125.16	3.570	149.10
22.00	131.12	3.740	156.20
23.00	137.08	3.910	163.30
24.00	143.04	4.080	170.40
25.00	149.00	4.250	177.50
26.00	154.96	4.420	184.60
27.00	160.92	4.590	191.70
28.00	166.88	4.760	200.00
29.00	172.84	4.930	208.30
30.00	178.80	5.100	216.60
31.00	184.76	5.270	224.90
32.00	190.72	5.440	233.20
33.00	196.68	5.610	241.50
34.00	202.64	5.780	249.80
35.00	208.60	5.950	258.10
36.00	214.56	6.120	266.40
37.00	220.52	6.290	274.70
38.00	226.48	6.460	283.00
39.00	232.44	6.630	291.30
40.00	238.40	6.800	300.00
41.00	244.36	6.970	308.30
42.00	250.32	7.140	316.60
43.00	256.28	7.310	324.90
44.00	262.24	7.480	333.20
45.00	268.20	7.650	341.50
46.00	274.16	7.820	350.00
47.00	280.12	7.990	358.30
48.00	286.08	8.160	366.60
49.00	292.04	8.330	374.90
50.00	298.00	8.500	383.20
51.00	303.96	8.670	391.50
52.00	309.92	8.840	400.00
53.00	315.88	9.010	408.30
54.00	321.84	9.180	416.60
55.00	327.80	9.350	424.90
56.00	333.76	9.520	433.20
57.00	339.72	9.690	441.50
58.00	345.68	9.860	450.00
59.00	351.64	10.030	458.30
60.00	357.60	10.200	466.60
61.00	363.56	10.370	474.90
62.00	369.52	10.540	483.20
63.00	375.48	10.710	491.50
64.00	381.44	10.880	500.00
65.00	387.40	11.050	508.30
66.00	393.36	11.220	516.60
67.00	399.32	11.390	524.90
68.00	405.28	11.560	533.20
69.00	411.24	11.730	541.50
70.00	417.20	11.900	550.00
71.00	423.16	12.070	558.30
72.00	429.12	12.240	566.60
73.00	435.08	12.410	574.90
74.00	441.04	12.580	583.20
75.00	447.00	12.750	591.50
76.00	452.96	12.920	600.00
77.00	458.92	13.090	608.30
78.00	464.88	13.260	616.60
79.00	470.84	13.430	624.90
80.00	476.80	13.600	633.20
81.00	482.76	13.770	641.50
82.00	488.72	13.940	650.00
83.00	494.68	14.110	658.30
84.00	500.64	14.280	666.60
85.00	506.60	14.450	674.90
86.00	512.56	14.620	683.20
87.00	518.52	14.790	691.50
88.00	524.48	14.960	700.00
89.00	530.44	15.130	708.30
90.00	536.40	15.300	716.60
91.00	542.36	15.470	724.90
92.00	548.32	15.640	733.20
93.00	554.28	15.810	741.50
94.00	560.24	15.980	750.00
95.00	566.20	16.150	758.30
96.00	572.16	16.320	766.60
97.00	578.12	16.490	774.90
98.00	584.08	16.660	783.20
99.00	590.04	16.830	791.50
100.00	596.00	17.000	800.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

AREA	OPEN	PEAK	R.V.
(ha)	(mm)	(mm/hr)	(%)
1.00	5.96	0.170	7.10
2.00	11.92	0.340	14.20
3.00	17.88	0.510	21.30
4.00	23.84	0.680	28.40
5.00	29.80	0.850	35.50
6.00	35.76	1.020	42.60
7.00	41.72	1.190	49.70
8.00	47.68	1.360	56.80
9.00	53.64	1.530	63.90
10.00	59.60	1.700	71.00
11.00	65.56	1.870	78.10
12.00	71.52	2.040	85.20
13.00	77.48	2.210	92.30
14.00	83.44	2.380	99.40
15.00	89.40	2.550	106.50
16.00	95.36	2.720	113.60
17.00	101.32	2.890	120.70
18.00	107.28	3.060	127.80
19.00	113.24	3.230	134.90
20.00	119.20	3.400	142.00
21.00	125.16	3.570	149.10
22.00	131.12	3.740	156.20
23.00	137.08	3.910	163.30
24.00	143.04	4.080	170.40
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65.00	387.40	11.050	508.30
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67.00	399.32	11.390	524.90
68.00	405.28	11.560	533.20
69.00	411.24	11.730	541.50
70.00	417.20	11.900	550.00
71.00	423.16	12.070	558.30
72.00	429.12	12.240	566.60
73.00	435.08	12.410	574.90
74.00	441.04	12.580	583.20
75.00	447.00	12.750	591.50
76.00	452.96	12.920	600.00
77.00	458.92	13.090	608.30
78.00	464.88	13.260	616.60
79.00	470.84	13.430	624.90
80.00	476.80	13.600	633.20
81.00	482.76	13.770	641.50
82.00	488.72	13.940	650.00
83.00	494.68	14.110	658.30
84.00	500.64	14.280	666.60
85.00	506.60	14.450	674.90
86.00	512.56	14.620	683.20
87.00	518.52	14.790	691.50
88.00	524.48	14.960	700.00
89.00	530.44	15.130	708.30
90.00	536.40	15.300	716.60
91.00	542.36	15.470	724.90
92.00	548.32	15.640	733.20
93.00	554.28	15.810	741.50
94.00	560.24	15.980	750.00
95.00	566.20	16.150	758.30
96.00	572.16	16.320	766.60
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100.00	596.00	17.000	800.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

AREA	OPEN	PEAK	R.V.
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10.00	59.60	1.700	71.00
11.00	65.56	1.870	78.10
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13.00	77.48	2.210	92.30
14.00	83.44	2.380	99.40
15.00	89.40	2.550	106.50
16.00	95.36	2.720	113.60
17.00	101.32	2.890	120.70
18.00	107.28	3.060	127.80
19.00	113.24	3.230	134.90
20.00	119.20	3.400	142.00
21.00	125.16	3.570	149.10
22.00	131.12	3.740	156.20
23.00	137.08	3.910	163.30
24.00	143.04	4	



CH* = 76.0 Ia = Dep. Storages (Above)
 (1) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CANUD
 STANBYD (0032) Area (ha) = 2.89
 ID= 1 DT= 5.0 min Total Imp (ft) = 50.00 DAR, Comb. (%) = 50.00

INFERVIOUS PERVIOUS (1)
 Surface Area (ha) = 1.45
 Dep. Storage (mm) = 1.00
 Average Slope (ft) = 1.00
 Length (m) = 139.80
 Manning's n = 0.013
 Max. Eff. Inlet, (mm/hr) = 85.25
 Area (ha) = 5.00
 Storage Coeff. (min) = 3.89 (11)
 Unit Hyd. Peak (cms) = 22.81 (11)
 Unit Hyd. Peak (cms) = 0.25
 PEAK FLOW (cms) = 0.25
 TIME TO PEAK (hrs) = 1.33
 RUNOFF VOLUME (mm) = 24.05
 PEAK FLOW (cms) = 23.05
 RUNOFF COEFFICIENT = 0.16
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CH* = 76.0 Ia = Dep. Storages (Above)
 (1) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CANUD (0041) Area (ha) = 0.88 Curve Number (CN) = 76.0
 ID= 1 DT= 5.0 min Ia (mm) = 5.00 % of Linear Res. (R) = 3.00
 U.H. Tp (hrs) = 0.56
 Unit Hyd. Peak (cms) = 0.060
 PEAK FLOW (cms) = 0.065 (1)
 TIME TO PEAK (hrs) = 2.000
 RUNOFF VOLUME (mm) = 25.047
 PEAK FLOW (cms) = 25.047
 RUNOFF COEFFICIENT = 0.160
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CANUD (0051) Area (ha) = 5.09 Curve Number (CN) = 76.0
 ID= 1 DT= 5.0 min Ia (mm) = 5.00 % of Linear Res. (R) = 3.00
 U.H. Tp (hrs) = 0.82
 Unit Hyd. Peak (cms) = 0.554
 PEAK FLOW (cms) = 0.846 (1)
 TIME TO PEAK (hrs) = 1.833
 RUNOFF VOLUME (mm) = 4.009
 TOTAL RUNOFF (mm) = 23.047
 RUNOFF COEFFICIENT = 0.160
 (1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0030) 1

1 1 + 2 = 3
 AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
 ID= 1 (0021): 37.83 1.792 1.42 13.47
 + ID= 2 (0022): 2.89 0.252 1.33 14.89
 ID = 3 (0030): 40.72 1.912 1.42 13.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0030) 1
 3 + 2 = 1
 AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
 ID= 1 (0030): 40.72 1.912 1.42 13.55
 + ID= 2 (0041): 0.88 0.005 2.00 4.01
 ID = 1 (0030): 41.60 1.914 1.42 13.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0030) 1
 1 + 2 = 3
 AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
 ID= 1 (0040): 41.60 1.914 1.42 13.35
 + ID= 2 (0041): 0.09 0.046 1.85 4.01
 ID = 3 (0030): 47.69 1.931 1.42 12.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0004)
 ID= 2 -> OUT= 1
 ID= 3 -> OUT= 1
 OUTFLOW STORAGE | OUTFLOW STORAGE | OUTFLOW STORAGE | R.V. (mm)
 (ha) (cms) (hrs) (ha) (cms) (hrs) (ha) (cms) (hrs) (mm)
 0.0000 0.0000 1.1500 1.1500 1.2500
 0.4500 0.8000 1.3500 1.4000
 0.6500 0.9000 1.5500
 1.0000 1.1000 2.3500 2.8000
 AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
 INFLOW: ID= 2 (0030) 47.690 1.931 1.42 12.16
 OUTFLOW: ID= 1 (0004) 47.690 0.285 2.75 12.15
 PEAK FLOW REDUCTION (Cont/Chk) (%) = 13.11
 TIME SHIFT OF PEAK FLOW (min) = 80.00
 MAXIMUM STORAGE (mm) = 0.3825

ADD HYD (0020) 1
 1 + 2 = 3
 AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
 ID= 1 (0008): 47.69 0.233 2.75 12.15
 + ID= 2 (0014): 3.44 0.032 1.67 4.01
 ID = 3 (0020): 51.13 0.263 2.50 11.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CREATE
 MASHED (0015) Area (ha) = 35.93 Curve Number (CN) = 76.0
 ID= 1 DT= 5.0 min Ia (mm) = 5.00 % of Linear Res. (R) = 3.00
 U.H. Tp (hrs) = 0.51
 Unit Hyd. Peak (cms) = 2.691



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

Area (ha) = 0.58
Total Imp(%) = 55.00 DLE, Conn. (%) = 4.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha) = 0.20
Dep. Storage (mm) = 1.50
Average Slope (%) = 1.00
Length (m) = 62.18
Manning's n = 0.013
Max. Eff. Inten. (mm/hr) = 65.26
over (min) = 5.00
Storage Coeff. (min) = 2.78 (11)
Unit Hyd. Peak (mm) = 5.00
Unit Hyd. Peak (cms) = 0.30
PEAK FLOW (cms) = 0.00
TIME TO PEAK (hrs) = 1.33
RUNOFF VOLUME (mm) = 24.05
TOTAL RAINFALL (mm) = 25.05
RUNOFF COEFFICIENT = 0.96

TOTALS
0.013 (11)
1.58
8.02
25.05
0.74

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

(1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
(11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Area (ha) = 3.08
Total Imp(%) = 56.00 DLE, Conn. (%) = 49.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha) = 1.33
Dep. Storage (mm) = 1.00
Average Slope (%) = 1.00
Length (m) = 145.23
Manning's n = 0.013
Max. Eff. Inten. (mm/hr) = 65.26
over (min) = 5.00
Storage Coeff. (min) = 2.78 (11)
Unit Hyd. Peak (mm) = 5.00
Unit Hyd. Peak (cms) = 0.30
PEAK FLOW (cms) = 0.26
TIME TO PEAK (hrs) = 1.33
RUNOFF VOLUME (mm) = 24.05
TOTAL RAINFALL (mm) = 25.05
RUNOFF COEFFICIENT = 0.96

TOTALS
0.302 (11)
1.33
18.42
25.05
0.74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
(1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 76.0 Ia = Dep. Storage (Above)
(11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

AREA OPEAK A.V.
(ha) (cms) (cms)

PEAK FLOW (cms) = 0.238 (1)
TIME TO PEAK (hrs) = 2.430
RUNOFF VOLUME (mm) = 4.008
TOTAL RAINFALL (mm) = 25.047
RUNOFF COEFFICIENT = 0.160

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

Area (ha) = 0.53 Curve Number (CN) = 76.0
Ia (mm) = 5.00 # of Linear Res. (R) = 3.00
U. H. Tp (hrs) = 0.17

Unit Hyd Opeak (cms) = 0.119
PEAK FLOW (cms) = 0.007 (1)
TIME TO PEAK (hrs) = 1.500
RUNOFF VOLUME (mm) = 25.047
TOTAL RAINFALL (mm) = 25.047
RUNOFF COEFFICIENT = 0.159

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

Area (ha) = 5.74 Curve Number (CN) = 76.0
Ia (mm) = 5.00 # of Linear Res. (R) = 3.00
U. H. Tp (hrs) = 0.38

Unit Hyd Opeak (cms) = 0.577
PEAK FLOW (cms) = 0.046 (1)
TIME TO PEAK (hrs) = 1.750
RUNOFF VOLUME (mm) = 4.008
TOTAL RAINFALL (mm) = 25.047
RUNOFF COEFFICIENT = 0.160

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

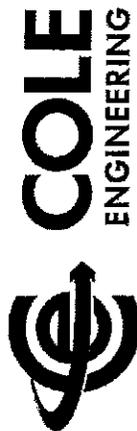
Area (ha) = 2.73 DLE, Conn. (%) = 0.10
Total Imp(%) = 22.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha) = 0.60
Dep. Storage (mm) = 1.00
Average Slope (%) = 1.00
Length (m) = 134.91
Manning's n = 0.013
Max. Eff. Inten. (mm/hr) = 65.26
over (min) = 5.00
Storage Coeff. (min) = 3.63 (11)
Unit Hyd. Peak (mm) = 3.09
Unit Hyd. Peak (cms) = 0.06
PEAK FLOW (cms) = 0.10
TIME TO PEAK (hrs) = 1.33
RUNOFF VOLUME (mm) = 24.05
TOTAL RAINFALL (mm) = 25.05
RUNOFF COEFFICIENT = 0.96

TOTALS
0.047 (11)
1.58
6.60
25.05
0.26

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

(1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 76.0 Ia = Dep. Storage (Above)
(11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.



ID# = 1 (0015): 35.63 0.238 2.00 4.07
 + ID# = 2 (0031): 2.72 0.017 1.58 6.86
 ID# = 3 (0021): 38.66 0.269 1.92 4.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	36.64	0.269	1.92	4.19
2	3.06	0.302	1.33	5.24
3	41.74	0.344	1.33	5.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	41.74	0.344	1.33	5.24
2	0.38	0.013	1.58	5.02
3	42.32	0.352	1.33	5.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	42.32	0.352	1.33	5.28
2	0.83	0.007	1.50	3.99
3	42.63	0.356	1.33	5.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	42.85	0.356	1.33	5.26
2	5.74	0.046	1.75	4.01
3	48.39	0.385	1.67	5.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CRUIS	AREA (ha)	DIL. COEFF. (%)
STANDARD (0034)	30.00	50.00
ID# = 1 (0015)	35.63	2.38
ID# = 2 (0031)	2.72	0.17
ID# = 3 (0021)	38.66	0.269

RESERVOIR (0010)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	1.00	0.44	0.44	1.50
2	1.00	2.00	2.00	4.00
3	76.58	40.00	40.00	0.250
4	65.26	8.28	8.28	21.70
5	2.58	2.58	2.58	25.00

Unit Hyd. Peak (cms) = 0.23
 PEAK FLOW (cms) = 0.08
 RUNOFF VOLUME (mm) = 1.33
 SOCIAL RAINFALL (cms) = 25.34
 RUNOFF COEFFICIENT = 0.92

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

(1) ON PROCEDURE SELECTED FOR FURTHER LOSSES:
 CH# = 76.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CRUIS	AREA (ha)	DIL. COEFF. (%)
STANDARD (0004)	70.00	37.00
ID# = 1 (0015)	7.08	3.04
ID# = 2 (0031)	1.00	1.58
ID# = 3 (0021)	259.74	40.00
ID# = 4 (0013)	0.013	0.258

Surface Area (ha) = 7.08
 Dep. Storage (mm) = 1.00
 Average Slope (%) = 259.74
 Manning's n = 0.013
 Max. Eff. Inven. (mm/hr) = 65.26
 Storage Coeff. (min) = 5.00
 Unit Hyd. Peak (cms) = 5.37 (11)
 Unit Hyd. Peak (cms) = 5.00 (11)
 Unit Hyd. Peak (cms) = 0.21

PEAK FLOW (cms) = 0.59
 TIME TO PEAK (hrs) = 1.33
 RUNOFF VOLUME (mm) = 24.05
 SOCIAL RAINFALL (mm) = 25.05
 RUNOFF COEFFICIENT = 0.96

(1) ON PROCEDURE SELECTED FOR FURTHER LOSSES:
 CH# = 76.0 Ia = Dep. Storage (Above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0035)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	40.12	0.695	1.33	14.86
2	0.86	0.080	1.33	14.68
3	11.90	0.769	1.33	14.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0010)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1	1.00	0.400	0.400	1.50
2	1.00	2.000	2.000	4.000
3	0.2500	0.2500	0.2500	0.4800
4	65.26	8.2760	8.2760	21.700
5	2.58	2.58	2.58	25.00

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PEAK FLOW REDUCTION (Out/In) (1) = 7.60
 TIME SHIFT OF PEAK FLOW (hrs) = 99.00
 MAXIMUM STORAGE USED (mm) = 0.1165

CHLIEB (0016) Area (ha) = 20.14 Curve Number (CN) = 76.0
 WASHED (0017) ID# = 1 DT = 5.0 min Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 STANDARD (0018) U.H. Tp (hrs) = 0.31

Unit Hyd Qpeak (cms) = 2.481

PEAK FLOW (cms) = 0.184 (1)
 TIME TO PEAK (hrs) = 1.667
 RUNOFF VOLUME (mm) = 4.007
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

ADD HYD (0022) AREA OPEAK TPEAK R.V. R.V.
 1 + 2 = 3 (ha) (cms) (hrs) (mm) (mm)
 ID# = 1 (0010): 11.00 0.058 2.67 14.80
 + ID# = 2 (0016): 20.14 0.184 1.67 4.01
 ID# = 3 (0022): 31.14 0.250 1.75 7.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CHLIEB (0017) Area (ha) = 17.97 Curve Number (CN) = 76.0
 WASHED (0018) ID# = 1 DT = 5.0 min Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 STANDARD (0019) U.H. Tp (hrs) = 0.30

Unit Hyd Qpeak (cms) = 2.288

PEAK FLOW (cms) = 0.168 (1)
 TIME TO PEAK (hrs) = 1.667
 RUNOFF VOLUME (mm) = 4.007
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

CHLIEB (0036) Area (ha) = 1.09 DIL. CONN. (3) = 50.00
 STANDARD (0037) ID# = 1 DT = 5.0 min Total Imp (3) = 50.00

IMPERVIOUS PERVIOUS (1)

Surface Area (ha)	0.55	PERVIOUS (1)	0.55
Storage (mm)	1.50		
Average Slope (ha)	1.00		
Length (mm)	85.24		
Mannings n	0.013		
Max. Eff. Inten. (mm/hr)	65.45		
Storage Coeff. (min)	5.00		
Unit Hyd. Qpeak (cms)	2.75 (1)		
Unit Hyd. peak (cms)	5.00		
Unit Hyd. peak (cms)	0.24		
PEAK FLOW (cms)	0.10		
TIME TO PEAK (hrs)	1.67		
RUNOFF VOLUME (mm)	24.05		
TOTAL RAINFALL (mm)	25.05		
RUNOFF COEFFICIENT	0.96		

TOTALS
 0.095 (11)
 14.62
 25.05
 0.21

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

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES!
 (1a) TIME STEP = 6.0 min Ia = Pop. Storage (Above)
 (1b) TIME STEP SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT!
 (1c) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CHLIEB (0005) Area (ha) = 4.60 DIL. CONN. (3) = 29.00
 STANDARD (0006) ID# = 1 DT = 5.0 min Total Imp (3) = 71.00

IMPERVIOUS PERVIOUS (1)

Surface Area (ha)	1.25	PERVIOUS (1)	1.25
Storage (mm)	3.00		
Average Slope (ha)	1.00		
Length (mm)	175.12		
Mannings n	0.013		
Max. Eff. Inten. (mm/hr)	65.25		
Storage Coeff. (min)	5.00		
Unit Hyd. Qpeak (cms)	4.24 (1)		
Unit Hyd. peak (cms)	5.00		
Unit Hyd. peak (cms)	0.24		
PEAK FLOW (cms)	0.22		
TIME TO PEAK (hrs)	1.33		
RUNOFF VOLUME (mm)	24.05		
TOTAL RAINFALL (mm)	25.05		
RUNOFF COEFFICIENT	0.96		

TOTALS
 0.283 (11)
 14.38
 25.05
 0.57

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

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES!
 (1a) TIME STEP = 76.0 min Ia = Res. Storage (Above)
 (1b) TIME STEP SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT!
 (1c) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CHLIEB (0032) Area (ha) = 4.15 Curve Number (CN) = 76.0
 WASHED (0033) ID# = 1 DT = 5.0 min Ia (mm) = 5.00 # of Linear Res. (N) = 3.00
 STANDARD (0034) U.H. Tp (hrs) = 0.42

Unit Hyd Qpeak (cms) = 0.377

PEAK FLOW (cms) = 0.031 (1)
 TIME TO PEAK (hrs) = 1.833
 RUNOFF VOLUME (mm) = 4.000
 TOTAL RAINFALL (mm) = 25.087
 RUNOFF COEFFICIENT = 0.160

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

ADD HYD (0037) AREA OPEAK TPEAK R.V.

1 + 2 = 3 (ha) (cms) (hrs) (mm)	4.15		
ID# = 1 (0005):	1.09		
+ ID# = 2 (0036):	1.09		
ID# = 3 (0037):	5.65		

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0037) |



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ADD HYD (0023)	AREA (ha)	QPEAK (cms)	PEAK (hrs)	R.V. (mm)
1 + 2 = 1				
ID1= 3 (0023):	5.69	0.302	1.33	14.4
+ ID2= 2 (0052):	4.15	0.031	1.83	4.01
ID = 1 (0037):	9.84	0.387	1.33	10.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0011)
ID= 5.0 min

CONVEFLOW (cms)	STORAGE (ha-cm)	CURVEFLOW (cms)	STORAGE (ha-cm)	AREA (ha)	QPEAK (cms)	PEAK (hrs)	R.V. (mm)
0.000	0.000	0.2600	0.2100				
0.1100	0.1100	0.3000	0.2450				
0.1600	0.1600	0.3500	0.2700				
0.2000	0.1800	0.4000	0.0500				
				5.640	0.387	1.33	10.04
				4.150	0.030	1.83	4.01

PEAK FLOW PRODUCTION (Coul./Gal)(ft) = 14.95
TIME SLOPE OF PEAK FLOW (min) = 65.00
MAXIMUM STORAGE USED (ha.m.) = 0.0378

GNL1B (0053)	Area (ha)	Curve Number	Curve Number (CN)	R.V. (mm)
STANDARD (0027)	5.0	5.2	76.0	3.00
ID= 5.0 min		U.S. Tp (hrs) = 0.29		

Unit Hyd Qpeak (cms) = 0.437
PEAK FLOW (cms) = 0.032 (4)
TIME TO PEAK (hrs) = 1.667
RUNOFF VOLUME (mm) = 4.006
TOTAL RAINFALL (mm) = 25.047
RUNOFF COEFFICIENT = 0.160

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

GNL1B (0058)	Area (ha)	Curve Number	Curve Number (CN)	R.V. (mm)
STANDARD (0027)	5.0	1.95	76.0	3.00
ID= 5.0 min		U.S. Tp (hrs) = 0.30		

Unit Hyd Qpeak (cms) = 0.248
PEAK FLOW (cms) = 0.018 (4)
TIME TO PEAK (hrs) = 1.667
RUNOFF VOLUME (mm) = 4.006
TOTAL RAINFALL (mm) = 25.047
RUNOFF COEFFICIENT = 0.160

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

ADD HYD (0023)	AREA (ha)	QPEAK (cms)	PEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0011):	9.84	0.059	2.42	10.02
+ ID2= 2 (0017):	17.97	0.169	1.67	4.01
ID = 3 (0023):	27.81	0.213	1.67	6.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0023)	AREA (ha)	QPEAK (cms)	PEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (0023):	27.81	0.213	1.67	6.13
+ ID2= 2 (0053):	3.32	0.032	1.67	4.01
ID = 1 (0023):	31.13	0.245	1.67	5.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0023)

CONVEFLOW (cms)	STORAGE (ha-cm)	CURVEFLOW (cms)	STORAGE (ha-cm)	AREA (ha)	QPEAK (cms)	PEAK (hrs)	R.V. (mm)
0.000	0.000	0.2600	0.2100				
0.1100	0.1100	0.3000	0.2450				
0.1600	0.1600	0.3500	0.2700				
0.2000	0.1800	0.4000	0.0500				
				31.13	0.245	1.67	5.91
				1.95	0.018	1.67	4.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

GNL1B (0027)

Area (ha)	Curve Number	Curve Number (CN)	R.V. (mm)
50.00	5.2	76.0	3.00
Total Imp (ft) = 50.00			

Surface Area (ha) = 0.59
Dep. Storage (mm) = 1.00
Average Slope (%) = 87.00
Manning's n = 0.013
Max. Eff. Inten. (mm/hr) = 65.26
Storage Coeff. (min) = 5.00
Unit Hyd. Peak (mm) = 5.00
Unit Hyd. Peak (cms) = 0.28
PEAK FLOW (cms) = 0.10
TIME TO PEAK (hrs) = 1.33
HIGHEST VOLUME (mm) = 24.03
TOTAL RAINFALL (mm) = 25.05
RUNOFF COEFFICIENT = 0.95
***WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEE!

(1) ON PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN = 76.0
ID = Dep. Storage (Above)
(1) TIME STEE (FT) SHOULD BE SMALLER OR EQUAL TO TIME STEE (CM).
(11) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

GNL1B (0001)	Area (ha)	Curve Number	Curve Number (CN)	R.V. (mm)
STANDARD (0001)	34.00	3.03	76.0	24.00
ID= 1 DT= 5.0 min				

Surface Area (ha) = 1.03
Dep. Storage (mm) = 1.50
Average Slope (%) = 1.00
Manning's n = 0.013
Max. Eff. Inten. (mm/hr) = 65.26
Storage Coeff. (min) = 5.00
Unit Hyd. Peak (mm) = 3.74
Unit Hyd. Peak (cms) = 3.00

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

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TIME SHIFT OF PEAK FLOW (min)=65.00
 MAXIMUM STORAGE USED (ha.-ft.)= 0.0455

Canals (0025) | Area (ha)= 0.75 Curve Number (CN)= 76.0
 ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res. (N)= 3.00
 U.H. Tp (hrs)= 0.28

Unit Hyd Qpeak (cms) = 0.106

PEAK FLOW (cms) = 0.008 (L)
 TIME TO PEAK (hrs) = 1.667
 RUNOFF VOLUME (mm) = 4.066
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

Canals (0049) | Area (ha)= 12.39 Curve Number (CN)= 76.0
 ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res. (N)= 3.00
 U.H. Tp (hrs)= 0.51

Unit Hyd Qpeak (cms) = 0.776

PEAK FLOW (cms) = 0.073 (L)
 TIME TO PEAK (hrs) = 4.063
 RUNOFF VOLUME (mm) = 25.047
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.160

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

ADD HYD (0026) | AREA OPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID= 1 (0007): 5.17 0.007 4.08 9.85
 + ID= 2 (0025): 0.75 0.006 1.67 4.01
 ID = 3 (0026): 5.96 0.012 2.67 9.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0026) | AREA OPEAK TPEAK R.V.
 3 + 2 = 1 | (ha) (cms) (hrs) (mm)
 ID= 3 (0026): 5.96 0.012 2.67 9.08
 + ID= 2 (0025): 12.39 0.073 2.08 4.01
 ID = 1 (0026): 18.35 0.083 2.08 5.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Canals (0055) | Area (ha)= 3.28 D.L.R. Conn. (%) = 27.00
 ID= 1 DT= 5.0 min | Total Imp.(%) = 27.00
 IMBERTOUS PERCENTS (L)
 Surface Area (ha) = 0.60 2.20
 Dep. Storage (mm) = 1.00 1.50
 Average Slope (ft) = 1.00 2.00
 Length (mi) = 147.87 40.00
 Manning's n = 0.013 0.250

Unit Hyd. peak (cms) = 0.25 *TOTALS*
 PEAK FLOW (cms) = 0.12 0.03
 TIME TO PEAK (hrs) = 1.33 1.67
 RUNOFF VOLUME (mm) = 24.05 6.04
 TOTAL RAINFALL (mm) = 45.96 25.05
 RUNOFF COEFFICIENT = 0.54 0.11

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

(L) CN PROCEDURE SELECTED FOR PREVIOUS LOSSES:
 CN* = 76.0 Ia = Dep. Storage (Above)
 (IL) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (ALL) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Canals (0050) | Area (ha)= 0.96 Curve Number (CN)= 76.0
 ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res. (N)= 3.00
 U.H. Tp (hrs)= 0.16

Unit Hyd Qpeak (cms) = 0.229

PEAK FLOW (cms) = 0.043 (L)
 TIME TO PEAK (hrs) = 1.500
 RUNOFF VOLUME (mm) = 3.980
 TOTAL RAINFALL (mm) = 25.047
 RUNOFF COEFFICIENT = 0.159

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

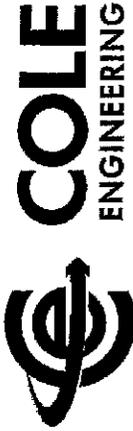
ADD HYD (0028) | AREA OPEAK TPEAK R.V.
 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
 ID= 1 (0001): 3.03 0.133 1.33 10.33
 + ID= 2 (0027): 1.18 0.106 1.33 14.69
 ID = 3 (0028): 4.21 0.239 1.33 11.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0028) | AREA OPEAK TPEAK R.V.
 5 + 2 = 1 | (ha) (cms) (hrs) (mm)
 ID= 5 (0028): 4.21 0.239 1.33 11.57
 + ID= 2 (0050): 0.96 0.013 1.50 3.59
 ID = 1 (0028): 5.17 0.247 1.33 10.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Canals (0007) | AREA OPEAK TPEAK R.V.
 IN= 2 (0029) | 5.170 0.247 1.33 10.16
 OUT= 1 (0007) | 5.170 0.007 4.08 9.85
 PEAK FLOW REDUCTION [outlet/inlet] (%) = 2.91



Max. Eff. Inten. (mm/h.) = 65.26
 Over (h) = 3.00
 Storage Coeff. (ft) = 22.20 (11)
 Unit Hyd. Peak (in/s) = 5.00
 Unit Hyd. Peak (cms) = 0.25
 PEAK FLOW (cms) = 0.15
 TIME TO PEAK (hrs) = 1.33
 RUNOFF VOLUME (mm) = 24.05
 TOTAL RAINFALL (mm) = 25.05
 RUNOFF COEFFICIENT = 0.96
 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN = 76.0 Ia = Dep. Storage (above)
 (11) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

FINISH

APPENDIX F
Quality Controls - CDS Units



Annual TSS Removal Efficiency Using Historical Weather Data

Area (ha) = 5.17
 C = 0.45
 Rational Conv. 2.775 converts from m³/s to l/s
 CDS Model: CDS30_35
 Flowrate = 106 l/s
 Orifice Control = 0 l/s
 Weather Station: 6158350

Engineer: Cole Engineering Group Ltd.
 Contact: Arun Hindupur, M.Sc., P.Eng.
 Report Date: 30-Mar-12

Site: Meaford Development
 Location: Meaford
 Unit: 1

Rainfall Intensity Range (mm/hr)	Total Rainfall* (mm)	Rainfall intensity mm/hr (l)	Runoff Rate Per The Rational Method (l/s) $Q = C \times I \times A \times 2.77$	Rainfall Volume %	CDS Flow Rate (l/s)	Operating Rate	Efficiency** (%)	Relative Efficiency (%)
0.0 - 0.5	620.70	0.5	3.2	7.3%	3.2	0.03	98.0	7.2
0.5 - 1.0	791.80	1.0	6.5	9.4%	6.5	0.06	97.1	9.1
1.0 - 1.5	809.20	1.5	9.7	9.6%	9.7	0.09	96.2	9.2
1.5 - 2.0	765.50	2.0	12.9	9.1%	12.9	0.12	95.4	8.7
2.0 - 2.5	546.70	2.5	16.1	6.5%	16.1	0.15	94.5	6.1
2.5 - 3.0	512.90	3.0	19.4	6.1%	19.4	0.18	93.6	5.7
3.0 - 4.0	840.50	4.0	25.8	10.0%	25.8	0.24	91.9	9.2
4.0 - 5.0	644.80	5.0	32.3	7.6%	32.3	0.30	90.1	6.8
5.0 - 6.0	505.30	6.0	38.7	6.0%	38.7	0.37	88.4	5.3
6.0 - 7.0	430.30	7.0	45.2	5.1%	45.2	0.43	86.6	4.4
7.0 - 8.0	302.10	8.0	51.6	3.6%	51.6	0.49	84.9	3.1
8.0 - 9.0	167.40	9.0	58.1	2.0%	58.1	0.55	83.1	1.7
9.0 - 10.0	275.00	10.0	64.6	3.3%	64.6	0.61	81.4	2.7
10.0 - 11.0	198.10	11.0	71.0	2.3%	71.0	0.67	79.7	1.8
11.0 - 12.0	160.70	12.0	77.5	1.9%	77.5	0.73	77.9	1.5
12.0 - 13.0	136.50	13.0	83.9	1.6%	83.9	0.79	76.2	1.2
13.0 - 15.0	150.10	15.0	96.8	1.8%	96.8	0.91	72.7	1.3
15.0 - 20.0	366.60	20.0	129.1	4.3%	106.0	1.00	57.6	2.5
20.0 - 25.0	70.80	25.0	161.4	0.8%	106.0	1.00	46.1	0.4
25.0 - 30.0	111.90	30.0	193.7	1.3%	106.0	1.00	38.4	0.5
30.0 - 35.0	0.00	35.0	226.0	0.0%	106.0	1.00	32.9	0.0
35.0 - 40.0	38.70	40.0	258.2	0.5%	106.0	1.00	28.8	0.1
8445.60								

TSS Removal: **88.5%**

Efficiency Adjustment: **6.5%**

Net Annual TSS Removal: 82.0%

Net Annual Volume Treated: 96.7%

* Historical Data including years 1982 to 1998 from Ontario Climate Centre

** CDS Efficiency based on Washington Department of Ecology TAPE Water Quality Control Test Protocol

*** Adjustment for use of 60 minute time step data on site with a time of concentration less than 30 minutes



Annual TSS Removal Efficiency Using Historical Weather Data

Area (ha) = 11
 C = 0.69
 Rational Conv. 2.775 converts from m3/s to l/s
 CDS Model: CDS 56_53
 Flowrate = 396 l/s
 Orifice Control = 0 l/s
 Weather Station: 6158350

Engineer: Cole Engineering Group Ltd.
 Contact: Arun Hindupur, M.Sc., P.Eng.
 Report Date: 30-Mar-12

Site: Meaford Development
 Location: Meaford
 Unit: 2

Rainfall Intensity Range (mm/hr)	Total Rainfall* (mm)	Rainfall intensity mm/hr (l)	Runoff Rate Per The Rational Method (l/s) $Q = C \times I \times A \times 2.77$	Rainfall Volume %	CDS Flow Rate (l/s)	Operating Rate	Efficiency** (%)	Relative Efficiency (%)
0.0 - 0.5	620.70	0.5	10.5	7.3%	10.5	0.03	98.1	7.2
0.5 - 1.0	791.80	1.0	21.1	9.4%	21.1	0.05	97.3	9.1
1.0 - 1.5	809.20	1.5	31.6	9.6%	31.6	0.08	96.6	9.3
1.5 - 2.0	765.50	2.0	42.1	9.1%	42.1	0.11	95.8	8.7
2.0 - 2.5	546.70	2.5	52.7	6.5%	52.7	0.13	95.0	6.2
2.5 - 3.0	512.90	3.0	63.2	6.1%	63.2	0.16	94.3	5.8
3.0 - 4.0	840.50	4.0	84.2	10.0%	84.2	0.21	92.8	9.3
4.0 - 5.0	644.80	5.0	105.3	7.6%	105.3	0.27	91.2	6.9
5.0 - 6.0	505.30	6.0	126.4	6.0%	126.4	0.32	89.7	5.4
6.0 - 7.0	430.30	7.0	147.4	5.1%	147.4	0.37	88.2	4.5
7.0 - 8.0	302.10	8.0	168.5	3.6%	168.5	0.43	86.7	3.1
8.0 - 9.0	167.40	9.0	189.6	2.0%	189.6	0.48	85.1	1.7
9.0 - 10.0	275.00	10.0	210.6	3.3%	210.6	0.53	83.6	2.8
10.0 - 11.0	198.10	11.0	231.7	2.3%	231.7	0.59	82.1	1.9
11.0 - 12.0	160.70	12.0	252.7	1.9%	252.7	0.64	80.6	1.5
12.0 - 13.0	136.50	13.0	273.8	1.6%	273.8	0.69	79.0	1.3
13.0 - 15.0	150.10	15.0	315.9	1.8%	315.9	0.80	76.0	1.4
15.0 - 20.0	366.60	20.0	421.2	4.3%	396.0	1.00	66.0	2.8
20.0 - 25.0	70.80	25.0	526.6	0.8%	396.0	1.00	52.8	0.4
25.0 - 30.0	111.90	30.0	631.9	1.3%	396.0	1.00	44.0	0.6
30.0 - 35.0	0.00	35.0	737.2	0.0%	396.0	1.00	37.7	0.0
35.0 - 40.0	38.70	40.0	842.5	0.5%	396.0	1.00	33.0	0.2
8445.60								

TSS Removal: **89.9%**
 Efficiency Adjustment: **6.5%**
Net Annual TSS Removal: 83.4%
Net Annual Volume Treated: 97.2%

* Historical Data including years 1982 to 1998 from Ontario Climate Centre

** CDS Efficiency based on Washington Department of Ecology TAPE Water Quality Control Test Protocol

*** Adjustment for use of 60 minute time step data on site with a time of concentration less than 30 minutes



Annual TSS Removal Efficiency Using Historical Weather Data

Area (ha) = 9.84
 C = 0.504
 Rational Conv. = 2.775 converts from m³/s to l/s
 CDS Model: CDS56_40
 Flowrate = 255 l/s
 Orifice Control = 0 l/s
 Weather Station: 6158350

Engineer: Cole Engineering Group Ltd.
 Contact: Arun Hindupur, M.Sc., P.Eng.
 Report Date: 30-Mar-12

Site: Meaford Development
 Location: Meaford
 Unit: 3

Rainfall Intensity Range (mm/hr)	Total Rainfall* (mm)	Rainfall intensity mm/hr (l)	Runoff Rate Per The Rational Method (l/s) $Q = C \times I \times A \times 2.77$	Rainfall Volume %	CDS Flow Rate (l/s)	Operating Rate	Efficiency** (%)	Relative Efficiency (%)
0.0 - 0.5	620.70	0.5	6.9	7.3%	6.9	0.03	98.1	7.2
0.5 - 1.0	791.80	1.0	13.8	9.4%	13.8	0.05	97.3	9.1
1.0 - 1.5	809.20	1.5	20.6	9.6%	20.6	0.08	96.5	9.3
1.5 - 2.0	765.50	2.0	27.5	9.1%	27.5	0.11	95.8	8.7
2.0 - 2.5	546.70	2.5	34.4	6.5%	34.4	0.13	95.0	6.2
2.5 - 3.0	512.90	3.0	41.3	6.1%	41.3	0.16	94.2	5.7
3.0 - 4.0	840.50	4.0	55.0	10.0%	55.0	0.22	92.7	9.3
4.0 - 5.0	644.80	5.0	68.8	7.6%	68.8	0.27	91.1	6.9
5.0 - 6.0	505.30	6.0	82.6	6.0%	82.6	0.32	89.6	5.4
6.0 - 7.0	430.30	7.0	96.3	5.1%	96.3	0.38	88.0	4.5
7.0 - 8.0	302.10	8.0	110.1	3.6%	110.1	0.43	86.5	3.1
8.0 - 9.0	167.40	9.0	123.9	2.0%	123.9	0.49	84.9	1.7
9.0 - 10.0	275.00	10.0	137.6	3.3%	137.6	0.54	83.4	2.8
10.0 - 11.0	198.10	11.0	151.4	2.3%	151.4	0.59	81.8	1.9
11.0 - 12.0	160.70	12.0	165.1	1.9%	165.1	0.65	80.3	1.5
12.0 - 13.0	136.50	13.0	178.9	1.6%	178.9	0.70	78.7	1.3
13.0 - 15.0	150.10	15.0	206.4	1.8%	206.4	0.81	75.7	1.4
15.0 - 20.0	366.60	20.0	275.2	4.3%	255.0	1.00	65.0	2.8
20.0 - 25.0	70.80	25.0	344.1	0.8%	255.0	1.00	52.0	0.4
25.0 - 30.0	111.90	30.0	412.9	1.3%	255.0	1.00	43.4	0.6
30.0 - 35.0	0.00	35.0	481.7	0.0%	255.0	1.00	37.2	0.0
35.0 - 40.0	38.70	40.0	550.5	0.5%	255.0	1.00	32.5	0.2
8445.60								

TSS Removal: **89.8%**

Efficiency Adjustment: **6.5%**

Net Annual TSS Removal: 83.3%

Net Annual Volume Treated: 97.1%

* Historical Data including years 1982 to 1998 from Ontario Climate Centre

** CDS Efficiency based on Washington Department of Ecology TAPE Water Quality Control Test Protocol

*** Adjustment for use of 60 minute time step data on site with a time of concentration less than 30 minutes



Annual TSS Removal Efficiency Using Historical Weather Data

Area (ha) = 3.08
C = 0.809
Rational Conv. 2.775 converts from m³/s to l/s
CDS Model: CDS30_35
Flowrate = 106 l/s
Orifice Control = 0 l/s
Weather Station: 6158350

Engineer: Cole Engineering Group Ltd.
Contact: Arun Hindupur, M.Sc., P.Eng.
Report Date: 30-Mar-12

Site: Meaford Development
Location: Meaford
Unit: 4

Rainfall Intensity Range (mm/hr)	Total Rainfall* (mm)	Rainfall intensity mm/hr (I)	Runoff Rate Per The Rational Method (l/s) $Q = C \times I \times A \times 2.77$	Rainfall Volume %	CDS Flow Rate (l/s)	Operating Rate	Efficiency** (%)	Relative Efficiency (%)
0.0 - 0.5	620.70	0.5	3.5	7.3%	3.5	0.03	97.9	7.1
0.5 - 1.0	791.80	1.0	6.9	9.4%	6.9	0.07	97.0	9.1
1.0 - 1.5	809.20	1.5	10.4	9.6%	10.4	0.10	96.1	9.2
1.5 - 2.0	765.50	2.0	13.8	9.1%	13.8	0.13	95.1	8.7
2.0 - 2.5	546.70	2.5	17.3	6.5%	17.3	0.16	94.2	6.1
2.5 - 3.0	512.90	3.0	20.7	6.1%	20.7	0.20	93.2	5.7
3.0 - 4.0	840.50	4.0	27.7	10.0%	27.7	0.26	91.4	9.1
4.0 - 5.0	644.80	5.0	34.6	7.6%	34.6	0.33	89.5	6.8
5.0 - 6.0	505.30	6.0	41.5	6.0%	41.5	0.39	87.6	5.3
6.0 - 7.0	430.30	7.0	48.4	5.1%	48.4	0.46	85.8	4.4
7.0 - 8.0	302.10	8.0	55.3	3.6%	55.3	0.52	83.9	3.0
8.0 - 9.0	167.40	9.0	62.2	2.0%	62.2	0.59	82.0	1.6
9.0 - 10.0	275.00	10.0	69.1	3.3%	69.1	0.65	80.2	2.6
10.0 - 11.0	198.10	11.0	76.1	2.3%	76.1	0.72	78.3	1.8
11.0 - 12.0	160.70	12.0	83.0	1.9%	83.0	0.78	76.4	1.5
12.0 - 13.0	136.50	13.0	89.9	1.6%	89.9	0.85	74.5	1.2
13.0 - 15.0	150.10	15.0	103.7	1.8%	103.7	0.98	70.8	1.3
15.0 - 20.0	366.60	20.0	138.3	4.3%	106.0	1.00	53.8	2.3
20.0 - 25.0	70.80	25.0	172.9	0.8%	106.0	1.00	43.0	0.3
25.0 - 30.0	111.90	30.0	207.4	1.3%	106.0	1.00	35.9	0.6
30.0 - 35.0	0.00	35.0	242.0	0.0%	106.0	1.00	30.7	0.0
35.0 - 40.0	38.70	40.0	276.6	0.5%	106.0	1.00	26.9	0.1
8445.60								

TSS Removal:	87.8%
Efficiency Adjustment:	6.5%
Net Annual TSS Removal:	81.3%
Net Annual Volume Treated:	96.4%

* Historical Data including years 1982 to 1998 from Ontario Climate Centre

** CDS Efficiency based on Washington Department of Ecology TAPE Water Quality Control Test Protocol

*** Adjustment for use of 60 minute time step data on site with a time of concentration less than 30 minutes



Annual TSS Removal Efficiency Using Historical Weather Data

Area (ha) = 2.73
 C = 0.393
 Rational Conv. 2.775 converts from m³/s to l/s
 CDS Model: CDS20_25
 Flowrate = 45 l/s
 Orifice Control = 0 l/s
 Weather Station: 6158350

Engineer: Cole Engineering Group Ltd.
 Contact: Arun Hindupur, M.Sc., P.Eng.
 Report Date: 30-Mar-12

Site: Meaford Development
 Location: Meaford
 Unit: 5

Rainfall Intensity Range (mm/hr)	Total Rainfall* (mm)	Rainfall intensity mm/hr (l)	Runoff Rate Per The Rational Method (l/s) $Q = C \times I \times A \times 2.77$	Rainfall Volume %	CDS Flow Rate (l/s)	Operating Rate	Efficiency** (%)	Relative Efficiency (%)
0.0 - 0.5	620.70	0.5	1.5	7.3%	1.5	0.03	97.9	7.1
0.5 - 1.0	791.80	1.0	3.0	9.4%	3.0	0.07	97.0	9.1
1.0 - 1.5	809.20	1.5	4.5	9.6%	4.5	0.10	96.0	9.2
1.5 - 2.0	765.50	2.0	6.0	9.1%	6.0	0.13	95.1	8.7
2.0 - 2.5	546.70	2.5	7.4	6.5%	7.4	0.17	94.1	6.1
2.5 - 3.0	512.90	3.0	8.9	6.1%	8.9	0.20	93.2	5.7
3.0 - 4.0	840.50	4.0	11.9	10.0%	11.9	0.26	91.3	9.1
4.0 - 5.0	644.80	5.0	14.9	7.6%	14.9	0.33	89.4	6.8
5.0 - 6.0	505.30	6.0	17.9	6.0%	17.9	0.40	87.5	5.2
6.0 - 7.0	430.30	7.0	20.8	5.1%	20.8	0.46	85.6	4.4
7.0 - 8.0	302.10	8.0	23.8	3.6%	23.8	0.53	83.7	3.0
8.0 - 9.0	167.40	9.0	26.8	2.0%	26.8	0.60	81.8	1.6
9.0 - 10.0	275.00	10.0	29.8	3.3%	29.8	0.66	79.9	2.6
10.0 - 11.0	198.10	11.0	32.7	2.3%	32.7	0.73	78.0	1.8
11.0 - 12.0	160.70	12.0	35.7	1.9%	35.7	0.79	76.1	1.4
12.0 - 13.0	136.50	13.0	38.7	1.6%	38.7	0.86	74.2	1.2
13.0 - 15.0	150.10	15.0	44.7	1.8%	44.7	0.99	70.4	1.3
15.0 - 20.0	366.60	20.0	59.5	4.3%	45.0	1.00	53.0	2.3
20.0 - 25.0	70.80	25.0	74.4	0.8%	45.0	1.00	42.4	0.3
25.0 - 30.0	111.90	30.0	89.3	1.3%	45.0	1.00	35.4	0.5
30.0 - 35.0	0.00	35.0	104.2	0.0%	45.0	1.00	30.3	0.0
35.0 - 40.0	38.70	40.0	119.1	0.5%	45.0	1.00	26.5	0.1
8445.60								

TSS Removal: **87.7%**
 Efficiency Adjustment: **6.5%**
Net Annual TSS Removal: 81.2%
Net Annual Volume Treated: 96.4%

* Historical Data including years 1982 to 1998 from Ontario Climate Centre

** CDS Efficiency based on Washington Department of Ecology TAPE Water Quality Control Test Protocol

*** Adjustment for use of 60 minute time step data on site with a time of concentration less than 30 minutes

APPENDIX G
Quality Pond Sizing Calculations



Quality Pond Sizing
Pond A2post

Meaford Highland Resort
File No. L10-512
Date: March, 2012

Quality Pond Sizing

	Drainage Area			
Ato-pond =	47.69	ha	Percent Impervious	53.0%
Vpermanent pool =	6913	m ³	Percent Pervious	47.0%
Vextended detention =	1908	m ³		

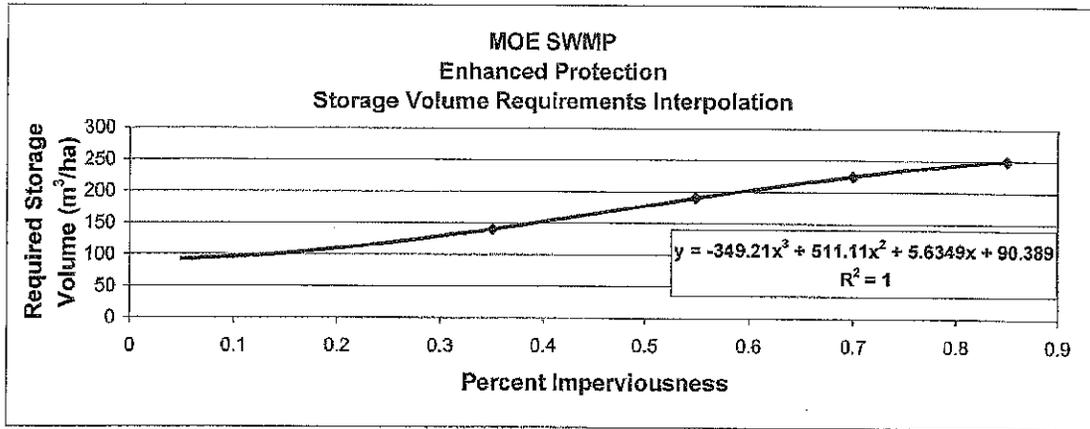
Storage Volume:	V =	185 m ³ / ha
Extended Detention:	V =	40 m ³ / ha
Permanent Pool:	V =	145 m ³ / ha

therefore, provide extended detention storage of 1908 m³
and permanent pool volume of 6913 m³

MOE 2003 SWMP Manual: Water Quality Storage Requirements based on Receiving Waters *

PROTECTION LEVEL	SWMP Type	STORAGE VOLUME (m ³ / ha) FOR IMPERVIOUS LEVEL				
		35%	53.0%	55%	70%	85%
Enhanced	Wet Pond	140	185	190	225	250
Normal	Wet Pond	90		110	130	150
Basic	Wet Pond	60		75	85	95

* Table 3.2 from the MOE SWMP Planning & Design Manual, 2004, pg 3-10



APPENDIX H
Statement of Limiting Conditions and Assumptions

Statement of Limiting Conditions and Assumptions

1. This Report/Study (the "Work") has been prepared at the request of, and for the exclusive use of, the Owner, and its affiliates (the "Intended Users"). No one other than the Intended Users has the right to use and rely on the Work without first obtaining the written authorization of Cole Engineering Group Ltd. (Cole Engineering) and its Owner.
2. Cole Engineering expressly excludes liability to any party except the Intended Users for any use of, and/or reliance upon, the Work.
3. Cole Engineering notes that the following assumptions were made in completing the Work:
 - a) the land use description(s) supplied to us are correct;
 - b) the surveys and data supplied to Cole Engineering by the Owner are accurate;
 - c) market timing, approval delivery and secondary source information is within the control of Parties other than Cole Engineering; and
 - d) there are no encroachments, leases, covenants, binding agreements, restrictions, pledges, charges, liens or special assessments outstanding, or encumbrances which would significantly affect the use or servicing.

Investigations have not been carried out to verify these assumptions. Cole Engineering deems the sources of data and statistical information contained herein to be reliable, but we extend no guarantee of accuracy in these respects.

4. Cole Engineering accepts no responsibility for legal interpretations, questions of survey, opinion of title, hidden or inconspicuous conditions of the property, toxic wastes or contaminated materials, soil or sub-soil conditions, environmental, engineering or other factual and technical matters disclosed by the Owner, the Client, or any public agency, which by their nature, may change the outcome of the Work. Such factors, beyond the scope of this Work, could affect the findings, conclusions and opinions rendered in the Work. We have made disclosure of related potential problems that have come to our attention. Responsibility for diligence with respect to all matters of fact reported herein rests with the Intended Users.
5. Cole Engineering practices engineering in the general areas of infrastructure and transportation. It is not qualified to and is not providing legal or planning advice in this Work.
6. The legal description of the property and the area of the site were based upon surveys and data supplied to us by the Owner. The plans, photographs, and sketches contained in this report are included solely to aide in visualizing the location of the property, the configuration and boundaries of the site, and the relative position of the improvements on the said lands.
7. We have made investigations from secondary sources as documented in the Work, but we have not checked for compliance with by-laws, codes, agency and governmental regulations, etc., unless specifically noted in the Work.
8. Because conditions, including capacity, allocation, economic, social, and political factors change rapidly and, on occasion, without notice or warning, the findings of the Work expressed herein, are as of the date of the Work and cannot necessarily be relied upon as of any other date without subsequent advice from Cole Engineering.
9. The value of proposed improvements should be applied only with regard to the purpose and function of the Work, as outlined in the body of this Work. Any cost estimates set out in the Work are based on construction averages and subject to change.
10. Neither possession of the Work, nor a copy of it, carries the right of publication. All copyright in the Work is reserved to Cole Engineering. The Work shall not be disclosed, produced or reproduced, quoted from, or referred to, in whole or in part, or published in any manner, without the express written consent of Cole Engineering and the Owner.
11. The Work is only valid if it bears the professional engineer's seal and original signature of the author, and if considered in its entirety. Responsibility for unauthorized alteration to the Work is denied.