Loyalist Solar Project – Block C Stormwater Management and Erosion and Sediment Control Report

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1.0 INTRODUCTION

Stantec has been retained by PCL Constructors Canada Inc. (PCL) to assist with final design engineering services related to the proposed development of the 54-megwatt (MW) Loyalist Solar Project (Project) in the Township of Stone Mills, County of Lennox & Addington, Ontario.

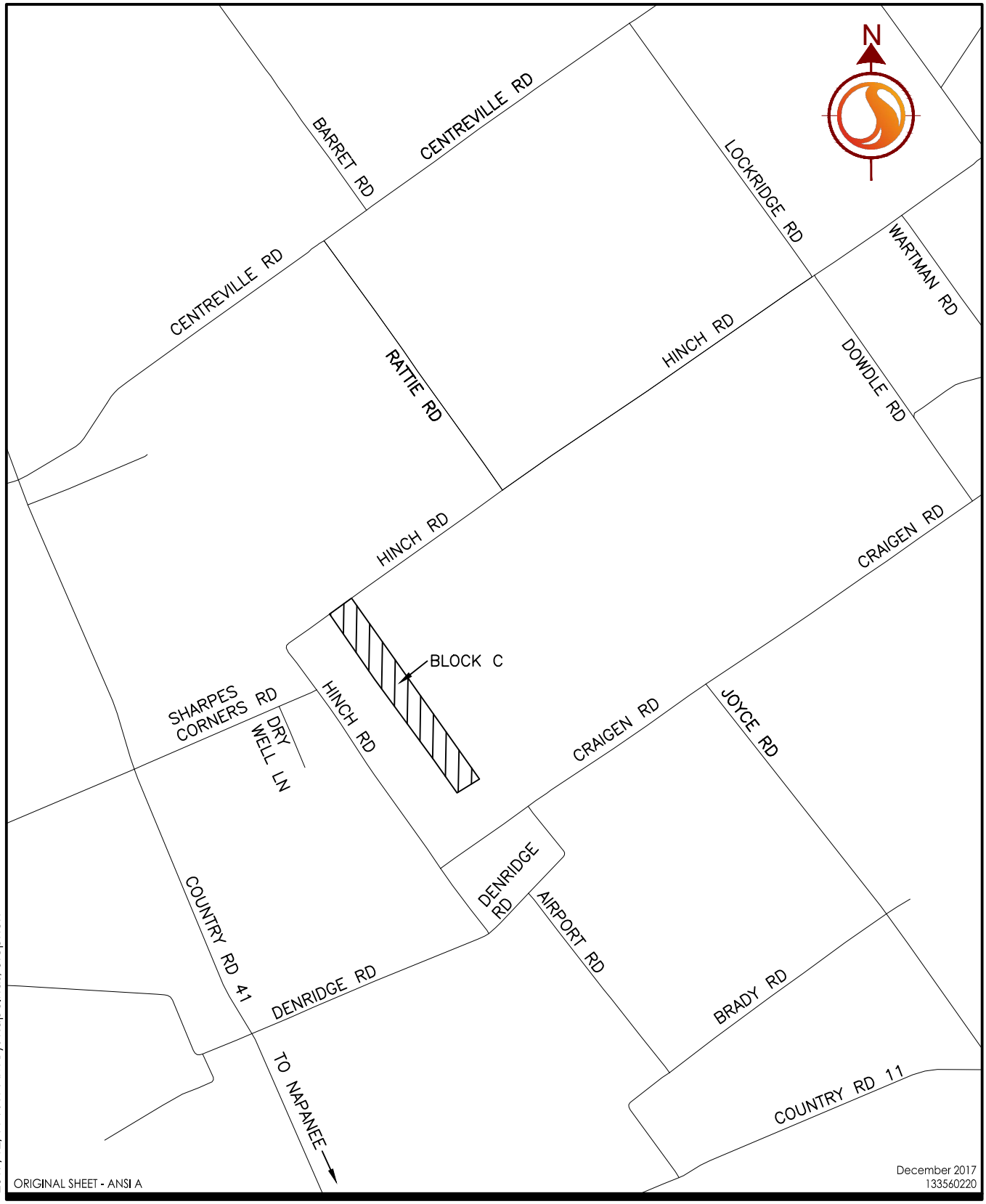
Generation Block C is generally bounded by Hinch Road to the north, a neighboring woodlot to the south, existing agricultural lands to the west, and a neighboring woodlot to the east, as shown on **Figure 1**.

This Stormwater Management (SWM) and Erosion and Sediment Control (ESC) Report summarizes the assessment of potential hydrologic impacts associated with the construction phase (i.e., ESC) and operational phase (i.e., SWM) of the Project. Potential hydrologic impacts assessed include changes to the runoff water quality and/or water quantity discharged to the surface water receiving systems. The objective of the report is to demonstrate that the Project design and proposed mitigation measures associated with the construction and operation phases of the Project, as described in the Renewable Energy Application (REA) Application, detailed engineering design, and herein, are sufficient to address any potential impacts to environmental features within the Project area and, further, to provide details on the mitigation measures and control measures that will be implemented.

1.1 STUDY APPROACH

The study approach involves the following components:

- A quantitative assessment of existing hydrologic conditions of the project area and receiving systems;
- A review of the proposed Project activities as described in the REA Application with an emphasis on assessing the potential for impacts associated with changes in hydrology;
- Completion of final design of SWM measures to control site runoff in a manner consistent with Ministry of Environment and Climate Change (MOECC) and Quinte Conservation (QC) requirements; and
- Development of an ESC strategy outlining the anticipated approach to minimize impacts to receiving surface water systems related to construction.



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Client/Project
BLUEARTH RENEWABLES INC.
LOYALIST SOLAR PROJECT
County of Lennox and Addington, ON

Figure No.
FIG 1.0

Title
LOCATION PLAN
BLOCK 'C'

1.2 BACKGROUND INFORMATION

A variety of sources have been referenced during the preparation of this SWM and ESC report, including project-specific documentation, such as various reports submitted in support of the Renewable Energy Application (REA), and more general industry-standard design guidance documentation and/or literature references, as follows:

General Guidance Documentation / Literature

- *Hydrologic Response of Solar Farms article in the Journal of Hydrologic Engineering,* Cook and McCuen, May 2013
- *Quinte Conservation Stormwater Management Submission Guidelines*, Quinte Conservation, May 2012
- *Low Impact Development Stormwater Management Planning and Design Guide (LID Design Guide)*, Credit Valley Conservation Authority and Toronto Region Conservation, 2010
- *Erosion & Sediment Control Guideline for Urban Construction (ESC Guideline)*, Greater Golden Horseshoe Conservation Authorities (GGHCA), December 2006
- *Stormwater Management Planning and Design Manual (SWMPD Manual)*, Ontario Ministry of the Environment, March 2003
- *Control of Erosion – Fact Sheet,* Ontario Ministry of Food and Agriculture and Rural Affairs (OMAFRA), October 1986

Project-Specific Consultation / Documentation

- *Pre-consultation meeting with Quinte Conservation, Stantec, PCL and BluEarth Renewables*, October 20, 2017
- *Draft Geotechnical Report – Loyalist Solar Project – 230 kV/34.5 kV Collector Station, Township of Stone Mills, ON*, Tulloch Engineering Inc., October 2017
- *Preliminary Stormwater Management and Erosion and Sediment Control Plan*, Tulloch Engineering Inc., March 2017
- *Hydrogeological Assessment – Loyalist Solar Project – Township of Stone Mills,* Harden Environmental Services Ltd., May 2017
- *Loyalist Solar Project – Project Description Report,* Dillon Consulting Ltd., February 2017
- *Loyalist Solar Project – Construction Plan Report,* Dillon Consulting Ltd., February 2017
- *Loyalist Solar Project – Design and Operations Report,* Dillon Consulting Ltd., February 2017

- *Loyalist Solar Project – Water Body Report,* Dillon Consulting Ltd., February 2017
- *Loyalist Solar Project – Water Assessment Report,* Dillon Consulting Ltd., February 2017
- *Loyalist Solar Project Geotechnical Investigation – Township of Stone Mills, ON*, Tulloch Engineering Inc., November 2015

1.3 STORMWATER MANAGEMENT CRITERIA

Based on the background information and pre-consultation noted above, the following SWM design criteria have been established for the Project:

- Water Quantity Control
    - Control post-development runoff rates to pre-development levels for the 2-year to 100-year storm events
    - The designer must also check the 25 mm storm for erosion protection
    - Accommodate future climate change scenarios by designing facilities with an additional 10% design storage capacity
- Water Quality Control
    - Provide MOECC Normal Protection Level (Long-term average removal of 70% of Total Suspended Solids (TSS)) water quality control
- Erosion and Sediment Control
    - Provide appropriate erosion and sediment control during construction/area grading to protect adjacent properties and downstream watercourses, wetlands, and other sensitive receivers from potential siltation

2.0 EXISTING CONDITIONS

2.1 TOPOGRAPHY AND SURFACE DRAINAGE

The location of proposed Generation Block C is currently vacant agricultural lands with moderate to scattered tree cover. Runoff from the northern portion of the site flows north as shallow overland flow to Hinch Road. The runoff from the center of the site flows east as shallow overland flow towards a neighboring woodlot. The runoff from the southern portion of the site flows west towards adjacent agricultural lands. The average site slopes range from approximately 1.6% to 4.2% with elevations ranging from approximately 153 m at the highest location on the site to approximately 141 m at the southern site boundary. Drainage catchments were delineated using a combination of topographic survey, Light Detection and Radar (LiDAR) survey, aerial imagery, and observations made during site visits completed by Stantec on September 26 and 27, 2017. The pre-development drainage catchments are shown on **Figure 2** and are described as follows:

Catchment C-100 –This catchment is primarily woodlot with areas of weed and grasses. Runoff from this catchment flows northwest as shallow overland flow towards Hinch Road.

Catchment C-101 – Vegetation on this pasture is comprised of a mixture of weeds and grasses with scattered tree cover. Runoff from this catchment flows east as shallow overland flow to a neighboring woodlot.

Catchment C-102 – Vegetation on this pasture range is comprised of a mixture of weeds and grasses with scattered tree cover. Runoff from this catchment flows towards a low point in the center of the catchment, and from there to catchment C-101.

Catchment C-103 – This catchment consists of pasture range and is comprised of a mixture of weeds and grasses with scattered tree cover. The runoff from this catchment flows east as shallow overland flow to a neighboring woodlot.

Catchment C-104 – This catchment consists of pasture and some wooded area. The runoff from this catchment flows southeast towards neighboring agricultural lands.

Catchment EXT C-1A – This external drainage area is comprised of pasture range and wooded area. Runoff from this area flows east as shallow overland flow to Catchment C-101.

Catchment EXT C-1B – This external drainage area is comprised of pasture range and wooded area. Runoff from this area flows east as shallow overland flow to Catchment C-102.

Catchment EXT C-2 – This external drainage area is comprised mostly of pasture range, with some scattered tree cover. Runoff from this area flows east as shallow overland flow to Catchment C-103.

2.2 GEOTECHNICAL INFORMATION

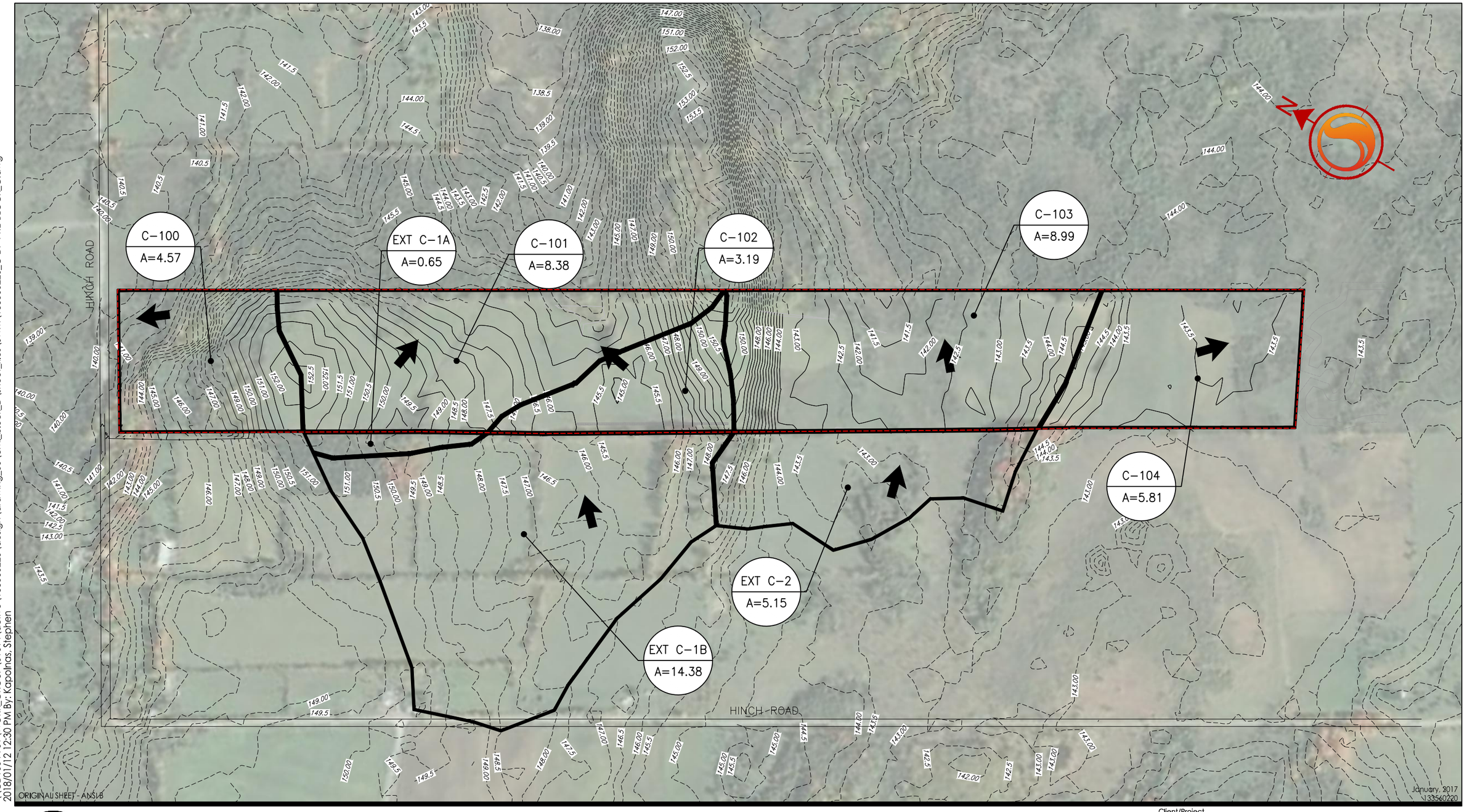
The Soil Map of Lennox and Addington County suggests that the site soils are characterized as Farmington loam and Emily Loam. Detailed geotechnical investigations were completed by Tulloch Engineering Inc. (Tulloch) in 2015 and 2017. The results of these investigations are generally consistent with the soil description presented in the soil survey. Ten (10) boreholes were completed as part of the investigations within the Generation Block C limits. Results show that the site soils are typically comprised of approximately 0 m to 0.4 m of topsoil overlaying sand and silty sand. The soil depth in this area (based on the boreholes) ranges from 0 m to approximately 1.52 m above the bedrock.

2.3 HYDROGEOLOGICAL INFORMATION

A hydrogeological assessment was done by Harden Environmental Services Ltd. (Harden) in 2017, which provided in-depth information on soil types, groundwater levels, groundwater flow, and surface water levels. Observations of surface water and groundwater levels in Hinch Swamp (located east of the site) confirm that there is likely no significant groundwater discharge to Hinch Swamp. The small percentage of land represented by the proposed solar installations compared to the total catchment area of Hinch Swamp indicate that any hydrological changes at the site would only result in minor or insignificant changes to the hydrology of Hinch Swamp. Overall, the Harden hydrogeological assessment states that any increase in runoff or infiltration will be small relative to the hydrogeological input for Hinch swamp.

As part of the hydrogeological assessment completed by Harden Environmental Services Ltd. (Harden) in 2017, monitoring well BH3 was installed within the Generation Block C limits (located approximately 2 km east of the Block C site), and daily groundwater levels were recorded over a period of approximately five months. The measured groundwater levels were less than 0.5 m below the local ground surface for the duration of the monitoring period at monitoring well BH3.

The hydrogeological assessment notes the presence of exposed surface fractures in the bedrock within the proposed work limits. However, the investigation notes that these fractures do not penetrate deeply into the bedrock and the report findings suggest that subsurface flow through the fractures is not significant. This conclusion is supported by surface water monitoring in Hinch Swamp, which showed a steady decrease in the summer 2016 water levels, suggesting that groundwater discharges to the wetland are not significant.



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January, 2017
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Legend

C-100
A=4.57
AREA NUMBER
CONTRIBUTING AREA (ha)

OVERLAND FLOW ROUTE

DRAINAGE BOUNDARY

PROJECT LIMIT BOUNDARY

Scale
1:5000
0 50 150 250m

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT
54MW GROUND-MOUNT SOLAR FARM

Figure No.
FIG 2.0

Title
PRE-DEVELOPMENT CATCHMENTS
BLOCK 'C'

3.0 PROPOSED CONDITIONS

The Loyalist Solar Project employs a low-impact approach to site development. The grading plans presented on **Drawing C-403** show that proposed grades match existing grades wherever possible; existing drainage patterns are preserved wherever possible; roads will typically be constructed at grade to maintain existing drainage patterns; and site excavation will only occur to allow construction of the access road network and inverter stations.

Once panels and racking are in place, all accessible areas will be scarified to alleviate soil compaction prior to seeding. The post-development hydrology will mimic a permanent pasture similar to the existing land use.

Generation Block C includes approximately 1,740 m of 5 m wide access roads, four (4) inverter stations located on granular pads, and ground mounted solar panels. Runoff from the northern portion of the site travels north as shallow overland flow to Hinch Road. Runoff from the center of the site flows southeast as shallow overland flow towards Hinch Swamp. The runoff from the southern portion of the site flows east towards adjacent agricultural lands. Drainage catchments were delineated using a combination of topographical survey, Light Detection and Radar (LiDAR) survey, aerial imagery and observations made during site visits completed by Stantec on September 26 and 27, 2017. Eight catchments were identified to quantify the changes in the runoff flow and volume from pre- to post-development. The proposed drainage catchments are shown on **Figure 3** and are described below:

Catchment C-200 – This catchment includes ground mounted solar panels and access roads. The runoff from this catchment flows northwest as shallow overland flow towards Hinch Road.

Catchment C-201 – This catchment includes ground mounted solar panels, inverter stations, and access roads. Runoff from this catchment flows east as shallow overland flow to a neighbouring woodlot.

Catchment C-202 –This catchment includes ground mounted solar panels, inverter stations, and access roads. The runoff from this catchment flows northeast to catchment C-201 and ultimately to a neighbouring woodlot.

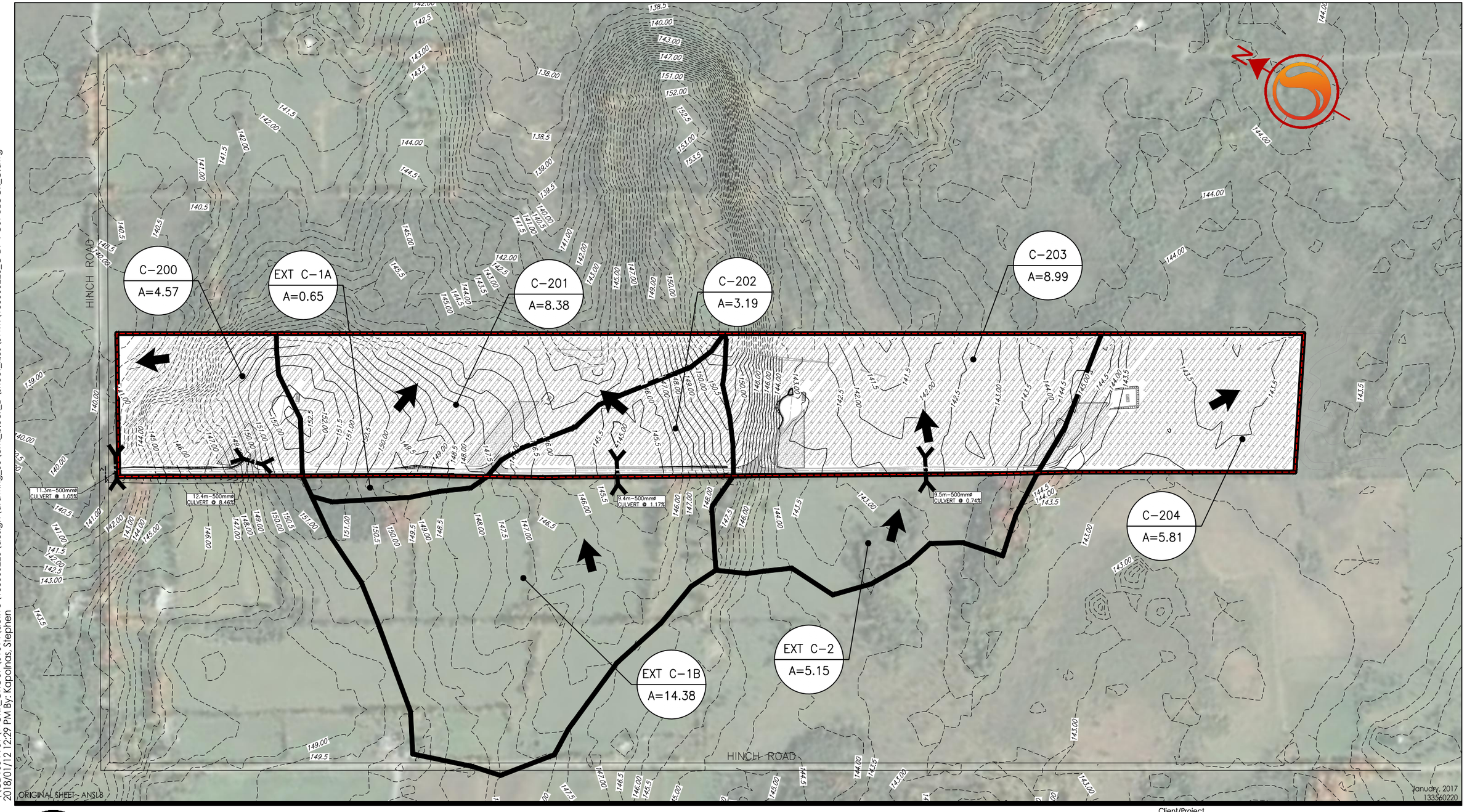
Catchment C-203 –This catchment includes ground mounted solar panels, inverter stations, and access roads. The runoff from this catchment flows east as shallow overland flow to a neighbouring woodlot.

Catchment C-204 –This catchment includes ground mounted solar panels, inverter stations, and access roads. The runoff from this catchment flows east towards a neighbouring agricultural property.

Catchment EXT C-1A – This external drainage area is comprised of pasture and wooded area. Runoff from this area flows east as shallow overland flow to Catchment C-201. This area is not proposed to change following site development.

Catchment EXT C-1B – This external drainage area is comprised of pasture and wooded area. Runoff from this area flows east as shallow overland flow to Catchment C-202. This area is not proposed to change following site development.

Catchment EXT C-2 – This external drainage area is comprised mostly of pasture, with some scattered tree cover. Runoff from this area flows east as shallow overland flow to catchment C-203. This area is not proposed to change following site development.



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Legend

C-200 / A=4.57 — AREA NUMBER / CONTRIBUTING AREA (ha)

OVERLAND FLOW ROUTE

DRAINAGE BOUNDARY

PROPOSED CULVERT

PROJECT LIMIT BOUNDARY

TEMPORARY LAYDOWN AREA

Scale

1:5000

0 50 150 250m

Client/Project

LOYALIST SOLAR LP

LOYALIST SOLAR PROJECT
54MW GROUND-MOUNT SOLAR FARM

Figure No.

FIG 3.0

Title

POST-DEVELOPMENT CATCHMENTS
BLOCK 'C'

4.0 STORMWATER MANAGEMENT DESIGN

In accordance with guidance provided by the MOECC, the Generation Block C stormwater management strategy was developed to treat the runoff from the site under the following conditions:

- During and immediately after construction, prior to establishment of the stabilization vegetation; and
- Following construction, after all stabilization vegetation is established.

The shallow depth to bedrock within much of the Generation Block C project limits presents a significant design constraint for conventional SWM design as it limits excavation of detention areas or channels for stormwater attenuation. Consequently, the proposed SWM strategy relies on at-source controls to reduce runoff and meet the site stormwater management control criteria.

4.1 STORMWATER MANAGEMENT DURING CONSTRUCTION

Recent experience has shown that vegetation clearing and soil compaction caused by construction traffic during solar project site construction typically results in larger peak runoff discharges and volumes than rates and volumes following completion of construction and site stabilization. Furthermore, several growing seasons may be required before stabilization vegetation becomes fully established and the site's hydrologic response meets the conditions anticipated in the proposed SWM strategy. Consequently, an interim SWM strategy was developed to manage the additional site runoff anticipated during construction. The interim SWM strategy includes the following measures to manage the site runoff during construction:

- Soil management practices to reduce runoff and augment infiltration;
- Stormwater detention to capture additional runoff and reduce peak flows and volumes from the site;
- Vegetated buffers to provide additional water quality treatment to the site runoff; and
- Grassed waterways to convey runoff from external drainage areas.

4.1.1 Soil Management

The following soil management measures are proposed for Generation Block C to promote infiltration and reduce the site runoff volumes:

- Minimize topsoil stripping; and
- Ground surface scarification.

Preserving the quantity and quality of the site topsoil is critical to preserving the site infiltration capacity both during and after construction and to promote stabilization vegetation establishment. Topsoil stripping will be limited to the areas necessary for access road and

inverter station construction and for the creation of temporary laydown areas, as required. The proposed stripping limits are identified on **Drawing C-053.** Furthermore, all stripped topsoil must remain on the site and be reused for landscaping or slope interruption berms.

Contour plowing is an agricultural soil conservation practice where tillage is performed perpendicular to the slope. This results in furrows oriented perpendicular to overland flow that provide depression storage and increased surface roughness, improving infiltration rates, reducing runoff peaks and volumes, and promoting sheet flow. Scarification generally perpendicular to the slopes will be performed on Generation Block C to achieve similar results.

Following clearing and grubbing, the Generation Block C work limits will be scarified to a minimum depth of 150 mm, where topsoil depths permit. In accordance with the guidance presented in the ESC Guideline (GGHCA, 2006), scarification will be performed with a chisel plow to retain as much vegetation residue on the soil surface as possible. Plowing will be performed perpendicular to the ground surface slopes to create furrows perpendicular to overland flow. Scarification will be performed again at the end of construction, immediately before restoration seeding, to mitigate soil compaction caused by construction traffic and to promote seed establishment.

4.1.2 Stormwater Detention

As shown on **Drawing C-603**, stormwater detention is provided by a series of slope interruption berms that intercept the Generation Block C surface runoff to reduce the peak discharges and volumes. The collected stormwater is released via infiltration and evaporation until it reaches a depth at which it spills over the berms.

The proposed 300 mm high slope interruption berms are constructed of topsoil and are oriented perpendicular to the ground surface slopes. Each berm has a uniform crest elevation. Spacing between the proposed berms was developed based on the filter berm design guidance presented in the ESC Guideline (GGHCA, 2006) to promote sheet flow. The proposed slope interruption berm stage/storage/discharge relationships are presented in **Appendix A**.

The proposed berms provide sufficient storage to capture all runoff from the 25 mm water quality design rainfall event. Since the captured stormwater is released via infiltration and evaporation, the proposed slope interruption berms provide all necessary water quality treatment to the site runoff.

The slope interruption berms will require periodic regrading during construction to repair ruts and compaction caused by construction traffic.

4.1.3 Vegetated Buffers

Vegetated buffers located along portions of the western site boundary and along a small portion of the northern side of catchment C-200, provide additional water quality control for shallow overland runoff from these catchments. The vegetated buffers are comprised of 5 m

wide swaths of undisturbed native vegetation draining via shallow overland flow. Water quality benefits of the proposed vegetated buffers are achieved by the runoff / vegetation interaction which reduces the velocity of runoff, thereby promoting the sedimentation of particulate matter. The vegetation also provides nutrient uptake benefits to help reduce biological pollutants such as nitrogen and phosphorous.

4.1.4 Grassed Waterways

Runoff from external drainage areas is collected and conveyed through the site by grassed waterways. Wherever possible, the proposed grassed waterway alignments are located along existing drainage paths, as identified based on the available topographic mapping and aerial photography. Where the existing site topography does not adequately contain the flows, and where topsoil depths permit, the proposed grassed waterways will be graded with 20:1 side slopes to a depth of approximately 0.3 m. Collecting and conveying the external drainage through a dedicated channel will reduce the risk of erosion on site, and eliminate the need to provide additional capacity in the proposed slope interruption berms to accommodate the external flows. The grassed waterways will help to maintain surface flows to the downstream properties and the Hinch Swamp, similar to existing conditions. The grassed waterway design calculations are presented in **Appendix A.**

Rock check dams and 450 mm thick riprap structures are proposed within the grassed waterways to dissipate surface water flow. Additionally, rock check dams are proposed at the downstream limits of the proposed grassed waterways to distribute flow along the site perimeter.

4.2 STORMWATER MANAGEMENT POST-CONSTRUCTION

The Loyalist Solar Project increases site impervious coverage to approximately 1.26 ha, or 4.1% of the total site area, mainly in the form of roadways and inverter platforms. The granular roadways will be compacted over the course of construction, and so will act as impervious surfaces. As noted in *Hydrologic Response of Solar Farms* (Cook and McCuen; Journal of Hydrologic Engineering, May 2013), included in **Appendix E** for reference, solar panels suspended on racking above vegetated cover do not functionally contribute to site imperviousness and do not have "a significant effect on the runoff volumes, peaks or times to peak" of solar project development sites. Thus, once the site restoration vegetation is fully established, the Generation Block C peak runoff rates and volumes will be similar to the existing conditions values.

However, recent solar project experience has shown that several growing seasons are necessary for the site restoration vegetation to become fully established. Consequently, the slope interruption berms, vegetated buffers and grassed waterways used to manage runoff during the site construction will remain as permanent features to mitigate the risk of downstream flooding or erosion caused by the site development. Temporary erosion and sediment control measures implemented during construction will remain in place until the site restoration vegetation has become sufficiently established to provide adequate stabilization.

4.2.1 Permanent Slope Interruption Berms

The proposed slope interruption berms used to control the site runoff during construction will be retained as a passive stormwater management measure during the operation phase of the Loyalist Solar Project. Similar to their role during site construction, the proposed berms will provide the following stormwater management functions:

- Intercepting and detaining site runoff;
- Promoting sheet flow; and
- Reducing runoff velocities.

The proposed permanent slope interruption berms will also distribute runoff evenly across the site during the operation phase of the Loyalist Solar Project. In locations where the solar panel rows are oriented parallel to the ground surface slope, runoff may not travel into the sheltered area beneath the panels, reducing the percentage of the site surface available for infiltration. This effect will be mitigated by the permanent slope interruption berms, which will act similar to level spreaders, distributing runoff across the site slopes, including the areas under the solar panels.

At the end of construction, the slope interruption berms will be regraded to repair compaction and damage caused by construction vehicles. The berms will be seeded with restoration seed mix when the rest of the site is stabilized. The slope interruption berms will provide stormwater quantity and quality control while the stabilization vegetation becomes established.

4.2.2 Vegetated Buffers

The 5 m vegetated buffers located along the southwestern side of the road in catchments C-200 and C-202 and C-203, and along a small portion of the northern side of catchment C-200, will continue to provide additional water quality control for shallow overland runoff from Generation Block C following construction.

4.2.3 Grassed Waterways

The proposed grassed waterways will continue to direct the external drainage through the site to reduce the risk of erosion and frequent overtopping of the proposed slope interruption berms and maintain the flow from external areas to the surrounding area.

4.3 HYDROLOGIC ANALYSIS

A hydrologic analysis was performed to characterize the existing conditions peak flows and runoff volumes and to evaluate the interim and proposed condition SWM strategies. The hydrologic calculations were performed using the Stormwater Management Hydrologic Model (SWMHYMO).

4.3.1 Design Storms

In accordance with requirements provided by Quinte Conservation, existing and proposed development conditions were modelled for the 2-, 5- and 100-year rainfall events. The Atmospheric Environment Service (AES) 30% 1-hour and 12-hour synthetic storm distributions were used for each rain event. The AES distribution was selected since it was previously used in the *Preliminary Stormwater Management and Erosion and Sediment Control Plan* (Tulloch, 2017). A 25 mm, 4-hour Chicago design storm was used to assess erosion protection for the site. Rainfall Intensity-Duration-Frequency (IDF) data was obtained from the Environment Canada Belleville station.

4.3.2 Hydrologic Parameters

As per direction provided by Quinte Conservation, the hydrologic calculations were performed for both Antecedent Moisture Condition (AMC) II and III. Soil Conservation Service (SCS) curve numbers (CN) and hydrologic parameters were calculated for each catchment based on land use, slopes, overland flow path lengths, and soil type and are provided in **Appendix A**, while detailed modeling files are included in **Appendices B, C, and D**.

4.3.3 Hydrologic Analysis Results

Hydrologic calculations were performed to estimate the peak stormwater discharges under existing, interim, and proposed conditions. The corresponding results are summarized in the following tables.

Table 1: Peak Flows and Runoff Volumes – AMC II

Discharge Location[1]	Condition[2]	Design Storm						
		25 mm	2-year		5-year		100-year	
		4-hr	1-hr	12-hr	1-hr	12-hr	1-hr	12-hr
Peak Discharge (m^3/s)								
North	Existing	0.03	0.03	0.02	0.05	0.03	0.12	0.08
	Interim	0.00	0.00	0.00	0.00	0.00	0.00	0.13
	Proposed	0.00	0.00	0.00	0.00	0.00	0.00	0.02
North-Centre	Existing	0.05	0.06	0.04	0.09	0.06	0.21	0.34
	Interim	0.01	0.01	0.00	0.01	0.01	0.02	0.61
	Proposed	0.01	0.01	0.00	0.01	0.01	0.02	0.37
South-Centre	Existing	0.11	0.12	0.08	0.19	0.13	0.45	0.31
	Interim	0.03	0.04	0.03	0.06	0.05	0.15	0.38
	Proposed	0.03	0.04	0.03	0.06	0.05	0.15	0.30
South-West	Existing	0.07	0.08	0.04	0.13	0.07	0.28	0.17
	Interim	0.00	0.00	0.00	0.00	0.00	0.00	0.19
	Proposed	0.00	0.00	0.00	0.00	0.00	0.00	0.15
Runoff Volume (mm)								
North	Existing	2.3	1.8	6.5	2.9	11.0	7.0	27.6
	Interim	0.0	0.0	0.0	0.0	0.0	0.0	21.0
	Proposed	0.0	0.0	0.0	0.0	0.0	0.0	1.8
North-Centre	Existing	0.8	0.6	2.2	1.0	3.8	2.4	13.0
	Interim	0.1	0.1	0.2	0.1	0.3	0.2	20.3
	Proposed	0.1	0.1	0.2	0.1	0.4	0.2	12.3
South-Centre	Existing	3.2	2.5	8.8	4.0	14.7	9.6	35.5
	Interim	1.1	0.9	3.1	1.4	5.1	3.3	28.6
	Proposed	1.1	0.9	3.2	1.4	5.3	3.5	19.4
South-West	Existing	4.5	3.6	11.9	5.6	19.4	12.8	44.5
	Interim	0.0	0.0	0.0	0.0	0.0	0.0	26.6
	Proposed	0.0	0.0	0.0	0.0	0.0	0.0	12.5

Notes:

[1] Discharges at the north site boundary represented by Catchment C-100/200.
Discharges at the north-centre site boundary represented by Catchments C-101/201 and C-102 /C-202
Discharges at the south-centre site boundary represented by Catchment C-103/203.
Discharges at the southwest site boundary represented by Catchment C-104/204.

[2] The interim condition calculations were performed using SCS curve numbers consistent with contour farming in poor hydrologic condition to represent the scarified site surfaces. Furthermore, the CALIB NASHYD command was used to define an initial abstraction consistent with plowed surfaces, selected based on the guidance presented in Effects of Tillage on Soil Microrelief, Surface Depression Storage and Soil Water Storage (Guzha, 2003).

The AMC II calculation results show that the interim condition peak flows are less than the existing conditions peak flows for all design storms except for the 100-year 12-hour event. Similarly, the proposed condition peak flows are less than the existing condition peak flows for all design storms except for the 100-year, 12-hour event at the North-Centre catchment. The increase in proposed peak flow rates is largely due to the adjusted grading for the existing low area in the North-Centre catchment. Under proposed conditions the low area will continue to provide attenuation for runoff; however, during the largest storm events, a spill will occur to the proposed grassed waterway. While the peak calculated discharge for this event is slightly greater than the target, no downstream negative impacts are anticipated since:

1. The total runoff volumes are reduced for the proposed condition, compared to existing conditions,
2. There is a single, minor exceedance of flow (8% increase – 0.03 m^3/s) for the proposed conditions,
3. The additional runoff is distributed largely as sheet flow along the site perimeter.

The AMC II proposed condition results suggest that the proposed site SWM strategy captures all of the site runoff for all of the evaluated storms, with the exception of the interim conditions 100-year 12-hr design event.

Table 2: Peak Flows and Runoff Volumes – AMC III

Discharge Location[1]	Condition[2]	Design Storm						
		25 mm	2-year		5-year		100-year	
		4-hr	1-hr	12-hr	1-hr	12-hr	1-hr	12-hr
Peak Discharge (m^3/s)								
North	Existing	0.06	0.06	0.04	0.10	0.06	0.23	0.14
	Interim	0.00	0.00	0.00	0.00	0.02	0.00	0.17
	Proposed	0.00	0.00	0.00	0.00	0.00	0.00	0.13
North-Centre	Existing	0.10	0.11	0.07	0.18	0.11	0.40	0.75
	Interim	0.01	0.01	0.01	0.02	0.31	0.04	0.86
	Proposed	0.01	0.01	0.01	0.02	0.18	0.04	0.74
South-Centre	Existing	0.22	0.25	0.14	0.38	0.23	0.82	0.50
	Interim	0.07	0.08	0.05	0.12	0.08	0.26	0.52
	Proposed	0.07	0.08	0.05	0.12	0.08	0.27	0.45
South-West	Existing	0.14	0.15	0.08	0.23	0.12	0.48	0.25
	Interim	0.00	0.00	0.00	0.00	0.00	0.00	0.22
	Proposed	0.00	0.00	0.00	0.00	0.00	0.00	0.20
Runoff Volume (mm)								
North	Existing	4.7	3.7	12.3	5.8	20.0	13.3	45.7
	Interim	0.0	0.0	0.0	0.0	1.3	0.0	35.6
	Proposed	0.0	0.0	0.0	0.0	0.0	0.0	19.9
North-Centre	Existing	1.6	1.3	4.3	2.0	6.9	4.6	31.6
	Interim	0.2	0.1	0.4	0.2	7.0	0.4	37.8
	Proposed	0.2	0.1	0.4	0.2	4.4	0.4	30.6
South-Centre	Existing	6.4	5.1	16.1	7.9	25.4	17.3	55.0
	Interim	2.2	1.8	5.6	2.7	9.9	6.0	42.9
	Proposed	2.3	1.8	5.8	2.8	9.2	6.2	38.8
South-West	Existing	8.5	6.9	20.2	10.4	31.0	21.6	63.7
	Interim	0.0	0.0	0.0	0.0	0.0	0.0	33.6
	Proposed	0.0	0.0	0.0	0.0	0.0	0.0	32.6

Notes:

1 Discharges at the north site boundary represented by Catchment C-100/200.
Discharges at the north-centre site boundary represented by Catchments C-101/201 and C-102/C-202
Discharges at the south-centre site boundary represented by Catchment C-103/203.
Discharges at the southwest site boundary represented by Catchment C-104/204.

2 The interim condition calculations were performed using SCS curve numbers consistent with contour farming in poor hydrologic condition to represent the scarified site surfaces. Furthermore, the CALIB NASHYD command was used to define an initial abstraction consistent with plowed surfaces, selected based on the guidance presented in Effects of Tillage on Soil Microrelief, Surface Depression Storage and Soil Water Storage (Guzha, 2003).

The AMC III interim condition calculation results are similar to the AMC II calculation results. The interim condition peak flows are less than the existing conditions peak flows for all design storms with the exception of the 5-year, 12-hour (North-Centre outlet only) and the 100-year, 12-hour events. The proposed condition peak flow rates are less than existing conditions for all design storms except for the 5-year, 12-hour event at the North-Centre outlet. While the calculated peak flow rates for both events are slightly higher than the existing condition magnitudes, no downstream negative impacts are anticipated, for the reasons noted above.

4.3.4 Access Road Culverts

The access road culverts are sized to convey the post-development peak discharges from both the 1-hour and 12-hour 2-year storm events. The proposed culvert hydrologic calculations are presented in **Appendix A**. Culverts were modelled in Culvert Master using culverts one size smaller than those proposed to account for 150 mm of embedment.

4.4 GROUNDWATER/SURFACE WATER INTERACTION

The hydrogeological assessment completed by Harden Environmental Services Ltd. (Harden) in 2017 identifies the presence of exposed surface fractures in the bedrock within the proposed work limits. However, the investigation notes that while these fractures likely play a significant role in capturing site runoff, they do not penetrate deeply into the bedrock and the report findings suggest that subsurface flow through the fractures is not significant.

The proposed slope interruption berms alignments will be modified in the field to prevent surface water from ponding on top of exposed fractures to mitigate the risk of increasing local subsurface flows.

In areas where cable is trenched or blasted into bedrock, the resulting trench is proposed to be backfilled with clay or concrete to prevent the trench from acting as a conduit for flows.

4.5 STORMWATER MANAGEMENT MONITORING AND MAINTENANCE

The proposed permanent slope interruption berms and grassed waterways are a passive and simple type of stormwater management practice, with operational and maintenance requirements to match. The site owner's inspection, operational, and maintenance activities can be generally limited to:

- Routine observations as to the presence of trash/debris and accumulated sediment upstream of the berms that could be conveyed downstream and/or affect the capacity of the system, and removal of same as needed.
- A semi-annual walking inspection should be completed during the spring and autumn to identify areas of bare soil and/or erosion. Remediation efforts would typically involve re-grading the affected berm and/or re-vegetating with sod or appropriate seed mix, with fertilizer and water applied as necessary to ensure germination and stabilization.

- Concurrent with the walking inspections, a visual assessment of any areas of persistent sediment build-up should be identified. Excessive sedimentation is an issue requiring attention if it remains in a non-vegetated condition and is, therefore, prone to re-suspension and transport downstream, or if it occurs to an extent that it affects the storage capacity of the berms. If any such condition occurs, the sediment should be removed and the area re-stabilized.
- The walking inspections will also include a review of the ground surface conditions along the entire downstream site perimeter to identify any areas of erosion or concentrated stormwater discharge. Downstream impacts will be identified and the Owner will develop a remediation plan to address them.
- The density and health of vegetation around the berms and the grassed waterways should be evaluated during the walking inspections. Deficiencies in this regard could be indicative of poor species selection or poor growth, and replanting should be undertaken to ensure sufficient vegetation densities.
- The height of the permanent slope interruption berms will likely decline over time due to soil bioturbation, erosion, and compaction by maintenance vehicles. The berm crests shall be restored to their design elevations once the berm heights are reduced to 200 mm or if downstream erosion or surface flow concerns are identified.
- Driving on the slope interruption berms should be avoided during wet periods to reduce the possibility of excessive rutting.

5.0 EROSION AND SEDIMENT CONTROL PLAN

5.1 SITE EROSION POTENTIAL

An assessment of the erosion potential of the construction area was completed following the methodology outlined in the *ESC Guideline (GGHCA, 2006)*. The erosion potential is based on an assessment of three primary factors: namely slope gradient; slope length; and soil texture (erodibility); with the resultant designation of either "low", "medium" or "high" erosion potential. The relative level of erosion potential dictates, to some extent, the comprehensiveness of the resultant ESC system design, monitoring, and maintenance program.

The existing and proposed (post-construction) condition gradients on Generation Block C are classified as moderate (2-10%), with predominantly long slopes (greater than 30 m). Site soils are primarily loam, which has a high erosion potential (*Table A, ESC Guidelines*). Therefore, based on this classification, this site has a "high" erodibility potential (*Table A2, ESC Guidelines*).

Beyond the three-parameter approach described by the *ESC Guidelines*, it is appropriate to account for additional factors that may result in potential sediment transport offsite during construction. In this particular case, construction is anticipated to commence in January 2018, which would prohibit the establishment of vegetative stabilization measures until springtime. Furthermore, removal of the scattered trees during site clearing and grubbing will likely result in some localized soil disturbance.

5.2 DURING CONSTRUCTION DEWATERING

No significant excavation is proposed within Generation Block C. While pile installation for the proposed solar panel racking is anticipated to intercept the groundwater table, significant dewatering is not anticipated due to the low bedrock permeability.

However, these piles will be drilled so dewatering is likely not necessary. If necessary, any required dewatering operations will be completed such that discharge rates will not adversely impact flooding or erosion conditions upstream or downstream of Generation Block C. To mitigate the risk of sediment migration to downstream areas, dewatering discharges may be treated with a variety of measures including, but not limited to, filter socks and sediment traps at the discretion of the contractor in consultation with the owner's engineer. Dewatering measures will be directed through the sediment control measures to a gently sloped, vegetated area (when possible) greater than 30 m from any watercourse or wetland feature. Although an exceedance isn't expected, should anticipated pumping rates exceed 50,000 L/day an Environmental Activity Sector Registration (EASR) application is required. Should anticipated pumping rates exceed 400,000 L/day a Permit to Take Water (PTTW) application is required.

5.3 EROSION AND SEDIMENT CONTROL MEASURES

The various construction activities required to construct Generation Block C include topsoil redistribution, clearing and grubbing, minor grading activities, and general construction traffic. If left unmitigated, these activities will result in impacts ranging from disturbance of at-surface soils, possible exposure of bedrock to potential erosion and sediment transport to offsite locations.

Erosion control will be achieved primarily by:

- Managing disturbed soils using soil conservation practices to reduce runoff and sediment transport during construction;
- Providing temporary runoff detention to reduce peak flows and promote settling; and
- Constructing barriers to filter runoff.

Erosion and sediment control measures will be implemented prior to any grading or servicing works commencing as shown on the accompanying Plans (**Drawings C-603 and C-650**), and include, but are not necessarily limited to, the following measures:

- A perimeter silt fence will be installed at the downstream side of the work limits concurrent with the construction of the site chain link fence. The perimeter silt fence will be fixed to the upstream side of the permanent chain link fence. Where shallow topsoil depths prevent trenching in the filter fabric, 150 mm of clear stone or pea gravel will be used to provide contact between the fabric and the ground surface;

- A 5 m wide vegetated buffer will be provided on the downstream side of all disturbed areas, as shown on **Drawing C-603**, where the project location boundary permits. The vegetated buffer will consist of undisturbed native vegetation and any areas of sparse vegetation will be seeded;

- Grassed waterways to convey external drainage through the site;

- Following all clearing and grubbing operations, contour plowing will be performed in all disturbed areas, were the soil depth permits, to scarify the soil surface. Contour plowing will be performed with a chisel plow to keep existing vegetation near the soil surface;

- Slope interruption berms will be constructed of stripped topsoil from road and inverter station locations to promote sheet flow and provide temporary stormwater detention;

- A construction entrance feature ("mud mat") will be provided at the site entrance to minimize the offsite transport of sediment via construction vehicles;

- Hinch Road will be cleaned daily of any sediment deposited by site construction traffic;

- Stabilize topsoil stockpiles expected to be left in place longer than 30 days with vegetative cover (i.e., hydroseeding) or a rolled erosion control product in the event of unfavourable growing conditions (i.e., during the winter);

- Natural drainage routes will be protected with an erosion control blanket and will have rock check dams to help attenuate flows and encourage deposition of suspended sediment where appropriate;

- No equipment will be permitted to enter any area beyond the proposed work limits during construction;

- Temporarily stockpiled excavated native materials and imported materials with a D_{50} less than 4.75 mm (typical D_{50} of Granular A) will be covered with rolled erosion control products when the material is expected to be left in place longer than 30 days, while imported materials with a D_{50} of 4.75 mm or greater can remain uncovered. Granular A and B (Type II) gradation requirements allow up to 55% percent passing a 4.75 mm sieve (#4 sieve), and may be stockpiled without covering with rolled erosion control products. Uncovered stockpiles will be surrounded with a double layer of light duty silt fence (1 m separation between layers) to provide a secondary layer of protection from sediment migration;

- Re-vegetate all disturbed areas where construction is not expected for 30 days with a minimum 50 mm of topsoil and hydro-seeding or other stabilizing vegetation / erosion protection measures (per OPSS 804). If vegetation establishment is not possible, given seasonal restriction or other revegetation limiting factors, the disturbed area should be stabilized against erosion impacts by non-vegetated means such as erosion control blankets;

- All materials and equipment used for site preparation and project construction should be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from migrating to offsite receivers:

    - Refueling and maintenance of construction equipment should occur in designated areas, a minimum of 30 m from a water body, wetland, or other sensitive receiver;

    - All spills shall be reported to the Environmental Monitor for assessment and documentation, and to establish a remedial plan based on the contractor's project-specific spill response plan. Based on the assessment of the extent of the impact, The Environmental Monitor shall determine if the MOECC Spills Action Centre should be notified. Should the incident require that the Spills Action Centre be notified, this notification will be undertaken as quickly as possible by calling 1-800-268-6060.

- In the event of inclement weather or unfavourable terrain for construction, construction best practices, such as temporary rig-mats may be used to prevent disruption of surface soils and vegetative cover by construction vehicles and equipment.

The ESC measures shall be maintained in good repair during the entire construction period, and removed as contributing drainage areas are restored and stabilized. ESC measures shall not be removed until a qualified erosion and sediment control inspector determines that the measures are no longer required and the risk of surface water and environmental impacts from construction activities are negligible. In addition, the condition of erosion control works, their

overall performance, and any repairs, replacement, or modifications to the installed item shall be noted in logbooks to be kept on-site.

5.4 CONTINGENCY PLAN

The purpose of the contingency plan is to help minimize the risk or consequence of failure of the erosion and sediment control works. Failure could result from insufficient measures, lack of maintenance, or severe weather conditions. The contingency plan includes two areas of consideration: the procedures that will be followed where a failure has occurred; and the contingency measures that will be implemented where there is potential for failure.

The Contractor shall be responsible for following the contingency plan, and will prepare the following items:

- Workers shall be on call for emergency situations for all aspects of the emergency from design to construction of emergency sediment and erosion control measures. Any associated health and safety issues are the responsibility of the Contractor;
- Heavy duty silt fence, double-net straw matting erosion control blankets, straw bales and stakes, sandbags, appropriate sized rip-rap, and clean gravel fill shall be available on-site for emergency installation;
- Heavy equipment shall be on standby for emergency works;
- Fuel spill containment supplies and equipment shall be available on-site for emergency spills of deleterious substances; and
- A contact list for any further required equipment or materials shall be prepared and made available for emergency use.

5.4.1 Contingency Measures in Case of Failure

In the event of a failure, the Contractor will cease all construction related work and focus on erosion and sediment control as required to effectively stabilize the site where a failure has occurred or is imminent.

If significant long-term damage to downstream fish habitat or property is suspected, the Environmental Monitor will immediately assess and document the situation and report the incident to the MOECC Spills Action Centre. Development of the initial restoration plan (by the contractor, in consultation with MOECC) will begin within 24 hours of the discovery of sediment discharge, and will be implemented as soon as possible, following consultation and approval from the MOECC, QC, DFO (if necessary) and the Township of Stone Mills. The plan will address:

- Removal and disposal of sediment from outside the work limits;
- Restoration of the affected area; and

- Restoration of any areas disturbed through deposition or removal.

5.4.2 Contingency Measures where there is a High Risk of Failure

Conditions that may potentially cause failures can be identified through two methods: monitoring of the erosion and sediment control measures, and weather forecasts that anticipate severe weather conditions.

5.4.2.1 High Risk Identified Through Monitoring

Where monitoring has identified a high potential for failure, steps shall be immediately taken to reduce the risk. These measures may include repair to existing measures, modification of existing measures, and the addition of new measures.

5.4.2.2 Severe Weather Anticipated

In cases where the weather forecast indicates that significant rainfall (>10 mm) is expected within a 24-hour period, the Contractor shall immediately complete the following:

- Verify that all erosion and sediment control measures are secure and that there is no exposed soil that could erode and be deposited downstream;
- Verify that all other measures are in good working order; and
- Monitor all measures during the rainfall event, and where a potential for failure is identified, take corrective measures.

If unforeseen events cause the strategies set out in the contingency plan to be insufficient or inappropriate to meet the objective of containing sediment within the work limits, the Contractor will respond in a timely manner with all reasonable measures consistent with safety, to prevent, counteract or remedy any negative effects on the natural environment or adjacent properties.

5.5 EROSION AND SEDIMENT CONTROL MONITORING PROGRAM

To ensure the effectiveness of the various erosion and sediment control measures, a routine program should be implemented which includes the inspection of the erosion and sediment controls daily and after each significant rainfall event (10 mm), and immediate repair of any deficiencies. Non-urgent repairs (i.e., no immediate risk of sediment discharges to the downstream environment) will be completed within 48 hours of identifying the deficiency, or prior to the next anticipated rainfall event, whichever is less. This program will consist of the following activities:

- Visual inspection of the ESC measures to ensure discharged flows are generally free of sediment and turbidity;
- Inspection of vegetation protection, erosion control blankets and silt fencing to ensure that they are maintained in good repair;
- Removal of construction debris that may accumulate; and
- Implementation of remedial measures including erosion stabilization, repair of damaged measures and any other remediation where required.

If the monitoring program outlined above indicates a persistent problem, then the following steps should be undertaken to determine appropriate mitigative measures (if step 1 does not resolve the issue, proceed to step 2):

1. Analysis of the monitoring information and field visits as required, determine the cause of the problem and develop a mitigation plan to address the issue in consultation with a qualified Environmental Monitor.

    a. Implement additional mitigation measures and monitor the results.

2. Convene a meeting with the appropriate review agencies (i.e., MOECC, QC and/or Stone Mills Township, etc.)

    a. Develop a consensus on a proposed plan of action to resolve the problem in consultation with agency staff.

    b. Implement additional mitigation measures and monitor the results.

5.6 LONG TERM EROSION AND SEDIMENT CONTROL

Approximately one (1) year after completion of construction, a site inspection will be completed to ensure that long-term erosion control measures have been effective. Seeded or replanted areas will be inspected to ensure that vegetation measures were successful and reseeding or replanting will occur where necessary.

If erosion control measures are found to be less than fully effective during this survey, reseeding or replanting of problem areas will take place. Should there be residual effects noted during post-construction monitoring, advice on contingency measures will be sought and applied.

6.0 CONCLUSION AND RECOMMENDATIONS

A site stormwater management strategy was developed for proposed Generation Block C to control runoff both during the construction phase and for the project operation phase. The proposed stormwater management strategy focuses on retaining the site runoff at source to mimic the existing conditions hydrology. The on-site detention is provided by a series of slope interruption berms that will remain until the solar project is decommissioned. Hydrologic calculations suggest that the proposed site SWM strategy mitigates the risk of downstream flooding, erosion or water quality impacts caused by the site development.

Based on the findings of the report, the following recommendations are provided:

- The proposed SWM measures provided in this report shall be constructed as designed;
- The ESC measures documented herein shall be implemented during construction; and
- The Stormwater Monitoring and Maintenance Program shall be carried out during and following construction.

APPENDIX A – DESIGN CALCULATIONS

SWMHYMO Parameters
Slope Interruption Berm Storage – Catchment C-200
Slope Interruption Berm Storage – Catchment C-201
Slope Interruption Berm Storage – Catchment C-202
Slope Interruption Berm Storage – Catchment C-203

Subject: SWMHYMO Parameters
Project: Loyalist Solar Project
Site: Block C
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 12, 2018

Existing Conditions

Catchment Number	SWMHYMO Command	Area	CN (AMC II)	CN (AMC III)	Rise	Length	Catchment Slope	Tc	Tp
		(ha)			(m)	(m)	(%)	(hrs)	(hrs)
C-100	DESIGN NASHYD	4.57	54	73	11.0	265	4.2	0.45	0.27
C-101	DESIGN NASHYD	8.38	54	73	8.5	320	2.7	0.58	0.35
C-102	DESIGN NASHYD	3.19	54	73	6.5	200	3.3	0.43	0.26
C-103	DESIGN NASHYD	8.99	64	81	9.5	280	3.4	0.50	0.30
C-104	DESIGN NASHYD	5.81	72	86	2.0	130	1.5	0.44	0.26
EX C-1	DESIGN NASHYD	0.65	62	79	3.5	220	1.6	0.57	0.34
EX C-2	DESIGN NASHYD	14.38	62	79	5.5	477	1.2	0.93	0.56
EX C-3	DESIGN NASHYD	5.15	62	79	4.5	284	1.6	0.65	0.39
		51.12							

Interim Conditions

Catchment Number	SWMHYMO Command	Area	CN (AMC II)	CN (AMC III)	Rise	Length	Catchment Slope	Tc	Tp
		(ha)			(m)	(m)	(%)	(hrs)	(hrs)
C-200	CALIB NASHYD	4.57	78	90	11.0	265	4.2	0.41	0.25
C-201	CALIB NASHYD	8.38	75	88	8.5	320	2.7	0.53	0.32
C-202	CALIB NASHYD	3.19	75	88	6.5	200	3.3	0.39	0.23
C-203	CALIB NASHYD	8.99	81	92	9.5	280	3.4	0.46	0.27
C-204	CALIB NASHYD	5.81	84	93	2.0	130	1.5	0.40	0.24
EX C-1	DESIGN NASHYD	0.65	62	79	3.5	220	1.6	0.57	0.34
EX C-2	DESIGN NASHYD	14.38	62	79	5.5	477	1.2	0.93	0.56
EX C-3	DESIGN NASHYD	5.15	62	79	4.5	284	1.6	0.65	0.39
		51.12							

Note: Initial abstraction value of 5 mm is used for the CALIB NASHYD model

Proposed Conditions

Catchment Number	SWMHYMO Command	Area	CN (AMC II)	CN (AMC III)	Rise	Length	Catchment Slope	Tc	Tp
		(ha)			(m)	(m)	(%)	(hrs)	(hrs)
C-200	DESIGN NASHYD	4.57	57	75	11.0	265	4.2	0.45	0.27
C-201	DESIGN NASHYD	8.38	51	70	8.5	320	2.7	0.58	0.35
C-202	DESIGN NASHYD	3.19	52	71	6.5	200	3.3	0.43	0.26
C-203	DESIGN NASHYD	8.99	66	82	9.5	280	3.4	0.50	0.30
C-204	DESIGN NASHYD	5.81	71	86	2.0	130	1.5	0.44	0.26
EX C-1	DESIGN NASHYD	0.65	63	80	3.5	220	1.6	0.57	0.34
EX C-2	DESIGN NASHYD	14.38	63	80	5.5	477	1.2	0.93	0.56
EX C-3	DESIGN NASHYD	5.15	63	80	4.5	284	1.6	0.65	0.39
		51.12							

Notes:

Time of Concentration calculated using the Airport Method (For areas less than 100 ha)

$Tc = [\ 3.26\ (1.1-C)\ L^{0.5}]\ /\ S^{0.33}$ [min]

Where:
C = Runoff Coefficient = 0.28 for undeveloped areas (flat pasture on silt loam)
C = Runoff Coefficient = 0.35 for interim) plowed conditions
L = Length of Overland Flow (m)
S = Slope (%)

Time to Peak

$Tp = 0.6Tc$

CN is a weighed average for DESIGN NASHYD

V:\01614\active\133560220\design\analysis\SWM\Block C\20180111 - Revisions\[SWMHYMO_parameters_133560220_BlockC_v3.xlsx]CN Number - Prop

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block C
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 12, 2018

Catchment ID:	C-200
Berm Height (mm):	300
Total Berm Length (m):	1200
Surface Slope:	4.2%
Infiltration Rate (mm/hr):	7
Weir Discharge Coefficient:	1.5

Ponding Depth (m)	Ponding Width (m)	Cross Sectional Area (m^2)	Ponding Volume (m^3)	Head (m)	Discharge (m^3/s)	Incremental Drawdown Time (h)	Cumulative Drawdown Time (h)
0.00	0	0	0			0	0
0.01	0.3	0.00	2			1.4	1.4
0.02	0.5	0.01	6			1.4	2.9
0.03	0.8	0.01	14			1.4	4.3
0.04	1.1	0.02	26			1.4	5.7
0.05	1.3	0.03	40			1.4	7.1
0.06	1.6	0.05	58			1.4	8.6
0.07	1.9	0.07	79			1.4	10.0
0.08	2.1	0.09	103			1.4	11.4
0.09	2.4	0.11	130			1.4	12.9
0.10	2.7	0.13	161			1.4	14.3
0.11	2.9	0.16	195			1.4	15.7
0.12	3.2	0.19	232			1.4	17.1
0.13	3.5	0.23	272			1.4	18.6
0.14	3.8	0.26	315			1.4	20.0
0.15	4.0	0.30	362			1.4	21.4
0.16	4.3	0.34	412			1.4	22.9
0.17	4.6	0.39	465			1.4	24.3
0.18	4.8	0.43	521			1.4	25.7
0.19	5.1	0.48	581			1.4	27.1
0.20	5.4	0.54	643			1.4	28.6
0.21	5.6	0.59	709			1.4	30.0
0.22	5.9	0.65	779			1.4	31.4
0.23	6.2	0.71	851			1.4	32.9
0.24	6.4	0.77	927			1.4	34.3
0.25	6.7	0.84	1005			1.4	35.7
0.26	7.0	0.91	1087			1.4	37.1
0.27	7.2	0.98	1173			1.4	38.6
0.28	7.5	1.05	1261			1.4	40.0
0.29	7.8	1.13	1353			1.4	41.4
0.30	8.0	1.21	1448	0	0	1.4	42.9
0.31	8.3	1.29	1546	0.01	2	0.0	42.9
0.32	8.6	1.37	1647	0.02	5	0.0	42.9
0.33	8.8	1.46	1752	0.03	9	0.0	42.9
0.34	9.1	1.55	1860	0.04	14	0.0	42.9
0.35	9.4	1.64	1971	0.05	20	0.0	42.9

Note: Broad crested weir equation used to calculate the discharge: Q = C*L*H^1.5

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block C
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 12, 2018

Catchment ID:	C-201
Berm Height (mm):	300
Total Berm Length (m):	1200
Surface Slope:	2.7%
Infiltration Rate (mm/hr):	7
Weir Discharge Coefficient:	1.5

Ponding Depth (m)	Ponding Width (m)	Cross Sectional Area (m^2)	Ponding Volume (m^3)	Head (m)	Discharge (m^3/s)	Incremental Drawdown Time (h)	Cumulative Drawdown Time (h)
0	0	0	0			0	0
0.01	0.4	0.00	2			1.4	1.4
0.02	0.8	0.01	10			1.4	2.9
0.03	1.2	0.02	22			1.4	4.3
0.04	1.6	0.03	38			1.4	5.7
0.05	2.0	0.05	60			1.4	7.1
0.06	2.4	0.07	86			1.4	8.6
0.07	2.8	0.10	118			1.4	10.0
0.08	3.2	0.13	154			1.4	11.4
0.09	3.6	0.16	195			1.4	12.9
0.1	4.0	0.20	240			1.4	14.3
0.11	4.4	0.24	291			1.4	15.7
0.12	4.8	0.29	346			1.4	17.1
0.13	5.2	0.34	406			1.4	18.6
0.14	5.6	0.39	471			1.4	20.0
0.15	6.0	0.45	541			1.4	21.4
0.16	6.4	0.51	615			1.4	22.9
0.17	6.8	0.58	694			1.4	24.3
0.18	7.2	0.65	778			1.4	25.7
0.19	7.6	0.72	867			1.4	27.1
0.2	8.0	0.80	961			1.4	28.6
0.21	8.4	0.88	1059			1.4	30.0
0.22	8.8	0.97	1163			1.4	31.4
0.23	9.2	1.06	1271			1.4	32.9
0.24	9.6	1.15	1384			1.4	34.3
0.25	10.0	1.25	1501			1.4	35.7
0.26	10.4	1.35	1624			1.4	37.1
0.27	10.8	1.46	1751			1.4	38.6
0.28	11.2	1.57	1883			1.4	40.0
0.29	11.6	1.68	2020			1.4	41.4
0.3	12.0	1.80	2162	0	0	1.4	42.9
0.31	12.4	1.92	2309	0.01	2	0.0	42.9
0.32	12.8	2.05	2460	0.02	5	0.0	42.9
0.33	13.2	2.18	2616	0.03	9	0.0	42.9
0.34	13.6	2.31	2777	0.04	14	0.0	42.9
0.35	14.0	2.45	2943	0.05	20	0.0	42.9

Note: Broad crested weir equation used to calculate the discharge: Q = C*L*H^1.5

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block C
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 12, 2018

Catchment ID:	C-201 (SWM2A)
Berm Height (mm):	300
Total Berm Length (m):	400
Surface Slope:	3.3%
Infiltration Rate (mm/hr):	7
Weir Discharge Coefficient:	1.5

Ponding Depth (m)	Ponding Width (m)	Cross Sectional Area (m^2)	Ponding Volume (m^3)	Head (m)	Discharge (m^3/s)	Incremental Drawdown Time (h)	Cumulative Drawdown Time (h)
0	0	0	0			0	0
0.01	0.3	0.00	1			1.4	1.4
0.02	0.7	0.01	3			1.4	2.9
0.03	1.0	0.01	6			1.4	4.3
0.04	1.3	0.03	11			1.4	5.7
0.05	1.7	0.04	17			1.4	7.1
0.06	2.0	0.06	24			1.4	8.6
0.07	2.3	0.08	33			1.4	10.0
0.08	2.7	0.11	43			1.4	11.4
0.09	3.0	0.13	54			1.4	12.9
0.1	3.3	0.17	67			1.4	14.3
0.11	3.7	0.20	81			1.4	15.7
0.12	4.0	0.24	96			1.4	17.1
0.13	4.3	0.28	113			1.4	18.6
0.14	4.7	0.33	131			1.4	20.0
0.15	5.0	0.37	150			1.4	21.4
0.16	5.3	0.43	171			1.4	22.9
0.17	5.7	0.48	192			1.4	24.3
0.18	6.0	0.54	216			1.4	25.7
0.19	6.3	0.60	240			1.4	27.1
0.2	6.7	0.67	266			1.4	28.6
0.21	7.0	0.73	294			1.4	30.0
0.22	7.3	0.81	322			1.4	31.4
0.23	7.7	0.88	352			1.4	32.9
0.24	8.0	0.96	384			1.4	34.3
0.25	8.3	1.04	416			1.4	35.7
0.26	8.7	1.13	450			1.4	37.1
0.27	9.0	1.21	486			1.4	38.6
0.28	9.3	1.31	522			1.4	40.0
0.29	9.7	1.40	560			1.4	41.4
0.3	10.0	1.50	599	0	0	1.4	42.9
0.31	10.3	1.60	640	0.01	1	0.0	42.9
0.32	10.7	1.71	682	0.02	2	0.0	42.9
0.33	11.0	1.81	725	0.03	3	0.0	42.9
0.34	11.3	1.92	770	0.04	5	0.0	42.9
0.35	11.7	2.04	816	0.05	7	0.0	42.9

Note: Broad crested weir equation used to calculate the discharge: Q = C*L*H^1.5

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block C
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 12, 2018

Catchment ID:	C-202
Berm Height (mm):	300
Total Berm Length (m):	300
Surface Slope:	1.5%
Infiltration Rate (mm/hr):	7
Weir Discharge Coefficient:	1.5

Ponding Depth (m)	Ponding Width (m)	Cross Sectional Area (m^2)	Ponding Volume (m^3)	Head (m)	Discharge (m^3/s)	Incremental Drawdown Time (h)	Cumulative Drawdown Time (h)
0	0	0	0			0	0
0.01	0.7	0.00	1			1.4	1.4
0.02	1.4	0.01	4			1.4	2.9
0.03	2.1	0.03	9			1.4	4.3
0.04	2.8	0.06	17			1.4	5.7
0.05	3.5	0.09	26			1.4	7.1
0.06	4.2	0.13	38			1.4	8.6
0.07	4.9	0.17	51			1.4	10.0
0.08	5.6	0.22	67			1.4	11.4
0.09	6.3	0.28	85			1.4	12.9
0.1	7.0	0.35	105			1.4	14.3
0.11	7.7	0.42	126			1.4	15.7
0.12	8.4	0.50	150			1.4	17.1
0.13	9.1	0.59	177			1.4	18.6
0.14	9.8	0.68	205			1.4	20.0
0.15	10.5	0.78	235			1.4	21.4
0.16	11.1	0.89	268			1.4	22.9
0.17	11.8	1.01	302			1.4	24.3
0.18	12.5	1.13	339			1.4	25.7
0.19	13.2	1.26	377			1.4	27.1
0.2	13.9	1.39	418			1.4	28.6
0.21	14.6	1.54	461			1.4	30.0
0.22	15.3	1.69	506			1.4	31.4
0.23	16.0	1.84	553			1.4	32.9
0.24	16.7	2.01	602			1.4	34.3
0.25	17.4	2.18	653			1.4	35.7
0.26	18.1	2.35	706			1.4	37.1
0.27	18.8	2.54	762			1.4	38.6
0.28	19.5	2.73	819			1.4	40.0
0.29	20.2	2.93	879			1.4	41.4
0.3	20.9	3.14	941	0	0.00	1.4	42.9
0.31	21.6	3.35	1004	0.01	0.45	0.1	42.9
0.32	22.3	3.57	1070	0.02	1.27	0.0	43.0
0.33	23.0	3.79	1138	0.03	2.34	0.0	43.0
0.34	23.7	4.03	1208	0.04	3.60	0.0	43.0
0.35	24.4	4.27	1280	0.05	5.03	0.0	43.0

Note: Broad crested weir equation used to calculate the discharge: Q = C*L*H^1.5

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block C
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 12, 2018

Catchment ID:	C-203
Berm Height (mm):	300
Total Berm Length (m):	2100
Surface Slope:	3.4%
Infiltration Rate (mm/hr):	7
Weir Discharge Coefficient:	1.5

Ponding Depth (m)	Ponding Width (m)	Cross Sectional Area (m^2)	Ponding Volume (m^3)	Head (m)	Discharge (m^3/s)	Incremental Drawdown Time (h)	Cumulative Drawdown Time (h)
0	0	0	0			0	0
0.01	0.3	0.00	3			1.4	1.4
0.02	0.6	0.01	14			1.4	2.9
0.03	1.0	0.01	31			1.4	4.3
0.04	1.3	0.03	54			1.4	5.7
0.05	1.6	0.04	85			1.4	7.1
0.06	1.9	0.06	123			1.4	8.6
0.07	2.3	0.08	167			1.4	10.0
0.08	2.6	0.10	218			1.4	11.4
0.09	2.9	0.13	276			1.4	12.9
0.1	3.2	0.16	340			1.4	14.3
0.11	3.6	0.20	412			1.4	15.7
0.12	3.9	0.23	490			1.4	17.1
0.13	4.2	0.27	575			1.4	18.6
0.14	4.5	0.32	667			1.4	20.0
0.15	4.9	0.36	766			1.4	21.4
0.16	5.2	0.41	871			1.4	22.9
0.17	5.5	0.47	984			1.4	24.3
0.18	5.8	0.53	1103			1.4	25.7
0.19	6.2	0.59	1229			1.4	27.1
0.2	6.5	0.65	1361			1.4	28.6
0.21	6.8	0.71	1501			1.4	30.0
0.22	7.1	0.78	1647			1.4	31.4
0.23	7.5	0.86	1800			1.4	32.9
0.24	7.8	0.93	1960			1.4	34.3
0.25	8.1	1.01	2127			1.4	35.7
0.26	8.4	1.10	2301			1.4	37.1
0.27	8.8	1.18	2481			1.4	38.6
0.28	9.1	1.27	2668			1.4	40.0
0.29	9.4	1.36	2862			1.4	41.4
0.3	9.7	1.46	3063	0	0	1.4	42.9
0.31	10.0	1.56	3271	0.01	3	0.0	42.9
0.32	10.4	1.66	3485	0.02	9	0.0	42.9
0.33	10.7	1.76	3706	0.03	16	0.0	42.9
0.34	11.0	1.87	3934	0.04	25	0.0	42.9
0.35	11.3	1.99	4169	0.05	35	0.0	42.9

Note: Broad crested weir equation used to calculate the discharge: Q = C*L*H^1.5

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block C
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 12, 2018

Catchment ID:	C-204
Berm Height (mm):	300
Total Berm Length (m):	730
Surface Slope:	1.5%
Infiltration Rate (mm/hr):	7
Weir Discharge Coefficient:	1.5

Ponding Depth (m)	Ponding Width (m)	Cross Sectional Area (m^2)	Ponding Volume (m^3)	Head (m)	Discharge (m^3/s)	Incremental Drawdown Time (h)	Cumulative Drawdown Time (h)
0	0	0	0			0	0
0.01	0.7	0.00	3			1.4	1.4
0.02	1.4	0.01	10			1.4	2.9
0.03	2.1	0.03	23			1.4	4.3
0.04	2.8	0.06	41			1.4	5.7
0.05	3.5	0.09	64			1.4	7.1
0.06	4.2	0.13	92			1.4	8.6
0.07	4.9	0.17	125			1.4	10.0
0.08	5.6	0.22	163			1.4	11.4
0.09	6.3	0.28	206			1.4	12.9
0.1	7.0	0.35	254			1.4	14.3
0.11	7.7	0.42	308			1.4	15.7
0.12	8.4	0.50	366			1.4	17.1
0.13	9.1	0.59	430			1.4	18.6
0.14	9.8	0.68	498			1.4	20.0
0.15	10.5	0.78	572			1.4	21.4
0.16	11.1	0.89	651			1.4	22.9
0.17	11.8	1.01	735			1.4	24.3
0.18	12.5	1.13	824			1.4	25.7
0.19	13.2	1.26	918			1.4	27.1
0.2	13.9	1.39	1017			1.4	28.6
0.21	14.6	1.54	1121			1.4	30.0
0.22	15.3	1.69	1231			1.4	31.4
0.23	16.0	1.84	1345			1.4	32.9
0.24	16.7	2.01	1465			1.4	34.3
0.25	17.4	2.18	1589			1.4	35.7
0.26	18.1	2.35	1719			1.4	37.1
0.27	18.8	2.54	1854			1.4	38.6
0.28	19.5	2.73	1994			1.4	40.0
0.29	20.2	2.93	2139			1.4	41.4
0.3	20.9	3.14	2289	0	0	1.4	42.9
0.31	21.6	3.35	2444	0.01	1	0.1	42.9
0.32	22.3	3.57	2604	0.02	3	0.0	43.0
0.33	23.0	3.79	2769	0.03	6	0.0	43.0
0.34	23.7	4.03	2940	0.04	9	0.0	43.0
0.35	24.4	4.27	3115	0.05	12	0.0	43.0

Note: Broad crested weir equation used to calculate the discharge: Q = C*L*H^1.5

Manning's Equation Calculations for Flow in a Channel

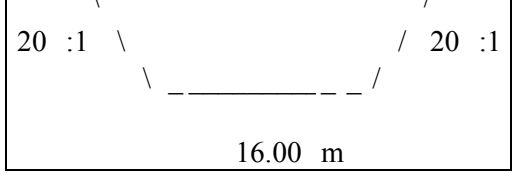
1335-60220 Loyalist Block C: EXT C-1B

Section: Unregulated Tributary

Input Data:		
Flow =	0.567	m^3/s
Manning's 'n' =	0.04	
Channel Slope =	0.6%	
Side Slope =	20	m/m [3 means 3:1]
Side Slope =	20	m/m [3 means 3:1]
Bottom Width =	16	m [0 = triangular, +ve = trapezoidal]

Calculated Values:		
Velocity =	0.36	m/s
Area=	1.572	m^2
Wetted Perimeter =	19.543	m
Top Width =	3.538	m
Hydraulic Radius (R) =	0.080	m

Configuration:



Depth Estimate:

Estimated Flow Depth = **0.088 m** lhs-rhs = -9.8E-05

Note: Calculations are correct when lhs-rhs = 0

Manning's Equation Calculations for Flow in a Channel

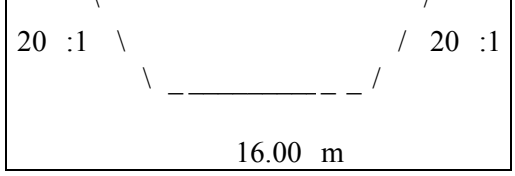
1335-60220 Loyalist Block C: EXT C-2

Section: Unregulated Tributary

Input Data:		
Flow =	0.261	m^3/s
Manning's 'n' =	0.04	
Channel Slope =	0.2%	
Side Slope =	20	m/m [3 means 3:1]
Side Slope =	20	m/m [3 means 3:1]
Bottom Width =	16	m [0 = triangular, +ve = trapezoidal]

Calculated Values:		
Velocity =	0.19	m/s
Area=	1.360	m^2
Wetted Perimeter =	19.103	m
Top Width =	19.099	m
Hydraulic Radius (R) =	0.071	m

Configuration:



Depth Estimate:

Estimated Flow Depth = **0.077 m** lhs-rhs = -6.7E-05

Note: Calculations are correct when lhs-rhs = 0

Culvert Design Report
Culvert 1 (Catchment 200)

Peak Discharge Method: User-Specified			
Design Discharge	0.1200 m³/s	Check Discharge	0.0000 m³/s

Grades Model: Inverts			
Invert Upstream	149.54 m	Invert Downstream	148.49 m
Length	12.40 m	Slope	0.084677 m/m
Drop	1.05 m		

Headwater Model: Unspecified

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	148.49 m

Name	Description	Discharge	HW Elev.	Velocity
x Trial-1	1-525 mm Circular	0.1200 m³/s	149.93 m	2.36 m/s

Culvert Design Report
Culvert 1 (Catchment 200)

Design:Trial-1

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	N/A	m	Storm Event	Design	
Computed Headwater Elevation	149.93	m	Discharge	0.1200	m³/s
Headwater Depth/Height	0.74		Tailwater Elevation	148.49	m
Inlet Control HW Elev.	149.86	m	Control Type	Entrance Control	
Outlet Control HW Elev.	149.93	m			

Grades					
Upstream Invert	149.54	m	Downstream Invert	148.49	m
Length	12.40	m	Constructed Slope	0.084677	m/m

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.15	m
Slope Type	Steep		Normal Depth	0.15	m
Flow Regime	Supercritical		Critical Depth	0.23	m
Velocity Downstream	2.36	m/s	Critical Slope	0.016534	m/m

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	0.53	m
Section Size	525 mm		Rise	0.53	m
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	149.93	m	Upstream Velocity Head	0.09	m
Ke	0.90		Entrance Loss	0.08	m

Inlet Control Properties					
Inlet Control HW Elev.	149.86	m	Flow Control	Unsubmerged	
Inlet Type	Projecting		Area Full	0.2	m²
K	0.03400		HDS 5 Chart	2	
M	1.50000		HDS 5 Scale	3	
C	0.05530		Equation Form	1	
Y	0.54000				

Culvert Design Report
Culvert 2 (Catchment 201)

Peak Discharge Method: User-Specified			
Design Discharge	0.1670 m³/s	Check Discharge	0.0000 m³/s

Grades Model: Inverts			
Invert Upstream	145.02 m	Invert Downstream	144.91 m
Length	9.40 m	Slope	0.011702 m/m
Drop	0.11 m		

Headwater Model: Unspecified

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	144.91 m

Name	Description	Discharge	HW Elev.	Velocity
x Trial-1	1-525 mm Circular	0.1670 m³/s	145.48 m	1.45 m/s

Culvert Design Report
Culvert 2 (Catchment 201)

Design:Trial-1

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	N/A	m	Storm Event	Design	
Computed Headwater Elevation	145.48	m	Discharge	0.1670	m³/s
Headwater Depth/Height	0.86		Tailwater Elevation	144.91	m
Inlet Control HW Elev.	145.44	m	Control Type	Outlet Control	
Outlet Control HW Elev.	145.48	m			

Grades					
Upstream Invert	145.02	m	Downstream Invert	144.91	m
Length	9.40	m	Constructed Slope	0.011702	m/m

Hydraulic Profile					
Profile	M2		Depth, Downstream	0.27	m
Slope Type	Mild		Normal Depth	0.31	m
Flow Regime	Subcritical		Critical Depth	0.27	m
Velocity Downstream	1.45	m/s	Critical Slope	0.017537	m/m

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	0.53	m
Section Size	525 mm		Rise	0.53	m
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	145.48	m	Upstream Velocity Head	0.08	m
Ke	0.90		Entrance Loss	0.07	m

Inlet Control Properties					
Inlet Control HW Elev.	145.44	m	Flow Control	Unsubmerged	
Inlet Type	Projecting		Area Full	0.2	m²
K	0.03400		HDS 5 Chart	2	
M	1.50000		HDS 5 Scale	3	
C	0.05530		Equation Form	1	
Y	0.54000				

Culvert Design Report
Culvert 3 (Catchment 202)

Peak Discharge Method: User-Specified			
Design Discharge	0.0770 m³/s	Check Discharge	0.0000 m³/s

Grades Model: Inverts			
Invert Upstream	142.23 m	Invert Downstream	142.16 m
Length	9.50 m	Slope	0.007368 m/m
Drop	0.07 m		

Headwater Model: Unspecified

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	142.16 m

Name	Description	Discharge	HW Elev.	Velocity
x Trial-1	1-525 mm Circular	0.0770 m³/s	142.53 m	1.14 m/s

Culvert Design Report
Culvert 3 (Catchment 202)

Design:Trial-1

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	N/A	m	Storm Event	Design	
Computed Headwater Elevation	142.53	m	Discharge	0.0770	m³/s
Headwater Depth/Height	0.56		Tailwater Elevation	142.16	m
Inlet Control HW Elev.	142.49	m	Control Type	Outlet Control	
Outlet Control HW Elev.	142.53	m			

Grades					
Upstream Invert	142.23	m	Downstream Invert	142.16	m
Length	9.50	m	Constructed Slope	0.007368	m/m

Hydraulic Profile					
Profile	M2		Depth, Downstream	0.18	m
Slope Type	Mild		Normal Depth	0.22	m
Flow Regime	Subcritical		Critical Depth	0.18	m
Velocity Downstream	1.14	m/s	Critical Slope	0.015953	m/m

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	0.53	m
Section Size	525 mm		Rise	0.53	m
Number Sections	1				

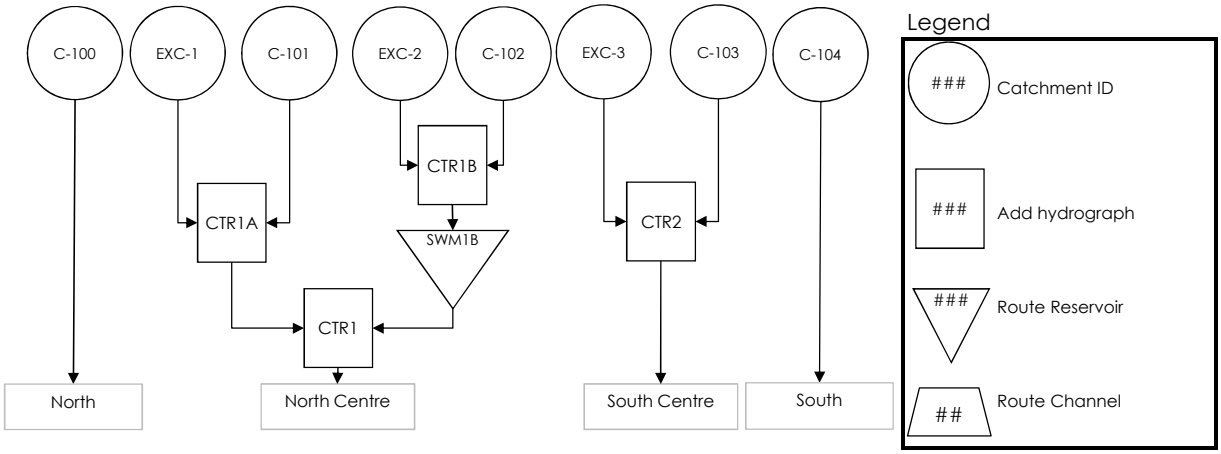
Outlet Control Properties					
Outlet Control HW Elev.	142.53	m	Upstream Velocity Head	0.04	m
Ke	0.90		Entrance Loss	0.03	m

Inlet Control Properties					
Inlet Control HW Elev.	142.49	m	Flow Control	Unsubmerged	
Inlet Type	Projecting		Area Full	0.2	m²
K	0.03400		HDS 5 Chart	2	
M	1.50000		HDS 5 Scale	3	
C	0.05530		Equation Form	1	
Y	0.54000				

APPENDIX B – EXISTING CONDITIONS

NRCS (SCS) Curve Number Determination – Existing Conditions
Existing Conditions SWMHYMO Output – AMC II
Existing Conditions SWMHYMO Output – AMC III

Subject: **Existing Schematic**
Project: **Loyalist Solar Project**
Project No.: **1335-60220**
Client: **Loyalist Solar LP**
Date: **January 12, 2018**



V:\01614\active\133560220\design\analysis\SWM\Block C\[20171212_133560220_BlockC_PondDesignV4.xlsx]Interim Schematic

Subject: **NRCS (SCS) Curve Number Determination - Existing Conditions**
Project: **Loyalist Solar Project**
Site: **Block C**
Project No.: **1335-60220**
Client: **Loyalist Solar LP**
Date: **January 12, 2018**

TABLE OF CURVE NUMBERS (CN's)									
Land Use		Hydrologic Soil Type							Source
		A	AB	B	BC	C	CD	D	
Meadow	"Good"	30	44	58	65	71	75	78	USDA
Woodlot	"Fair"	36	48	60	67	73	76	79	USDA
Lawns	"Good"	39	50	61	68	74	77	80	USDA
Pasture/Range	"Fair"	49	55	60	70	79	82	84	USDA
Crop - SR + CR	"Good"	64	70	75	79	82	84	85	USDA
Gravel		76	81	85	87	89	90	91	USDA
Bare Soil (Fallow)		77	82	86	89	91	93	94	USDA
Wetland/Lake		100	100	100	100	100	100	100	USDA
Impervious		98	98	98	98	98	98	98	USDA

USDA - United States Department of Agriculture (2004), National Engineering Handbook, Part 630 Hydrology, Chapter 9 Hydrologic Soil Cover Compexes

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
	Hydrologic Soil Type							
Catchment	A	AB	B	BC	C	CD	D	TOTAL
C-100		85					15	100
C-101		100						100
C-102		100						100
C-103			85				15	100
C-104			50				50	100
EX C-1			90				10	100
EX C-2			90				10	100
EX C-3			90				10	100

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Bare Soil	Wetland	Impervious	Total
C-100		85		15						100
C-101		10		90						100
C-102		10		90						100
C-103		5		95						100
C-104		20		80						100
EX C-1		15		85						100
EX C-2		15		85						100
EX C-3		15		85						100

CURVE NUMBER (CN) - Existing Conditions											
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Bare Soil	Wetland/ Lakes	Impervious	Weighted CN (AMC II)	Weighted CN (AMC III)
C-100		45		9						54	73
C-101		5		49						54	73
C-102		5		49						54	73
C-103		3		60						64	81
C-104		14		58						72	86
EX C-1		9		53						62	79
EX C-2		9		53						62	79
EX C-3		9		53						62	79

Notes: AMC II assumed - AMC III Conversion Per Soil Conservation Service Curve Number (SCS-CN) Methodology (Mishra, Surendra and Vijay P. Sing (2003))
Hydrological Soil Groups identified based on USDA guidance and MTC Drainage Manual

```
00001> ================================================================================
00002>
00003>    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
00004>    S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
00006>        S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
00007>    SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
00008>                                                          9   9  9   9   # 4730904
00009>          StormWater Management HYdrologic Model           999    999    =========
00010>
00011>  ************************************************************************
00012>  ***************************** SWMHYMO Ver/4.05  ***************************
00013>  *********  A single event and continuous hydrologic simulation model  *********
00014>  *********     based on the principles of HYMO and its successors      *********
00015>  *********                 OTTHYMO-83 and OTTHYMO-89.                  *********
00016>  ************************************************************************
00017>  ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
00018>  *********                  Ottawa,  Ontario: (613) 836-3884           *********
00019>  *********                  Gatineau, Quebec: (819) 243-6858           *********
00020>  *********                  E-Mail: swmhymo@jfsa.com                   *********
00021>  ************************************************************************
00022>
00023>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
00025>  +++++++++                 Kitchener             SERIAL#:4730904      +++++++++
00026>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ************************************************************************
00029>  *********            ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *********
00030>  *********            Maximum value for ID numbers  :     10           *********
00031>  *********            Max. number of rainfall points: 105408           *********
00032>  *********            Max. number of flow points    : 105408           *********
00033>  ************************************************************************
00034>
00035>
00036>  *********************   D E T A I L E D   O U T P U T   *********************
00037>  ************************************************************************
00038>  *         DATE: 2017-12-21     TIME: 12:50:09     RUN COUNTER: 001811       *
00039>  ************************************************************************
00040>  * Input   filename: C:\TREVOR~1\$13356~1\AMCII\CEX-1.dat                  *
00041>  * Output  filename: C:\TREVOR~1\$13356~1\AMCII\CEX-1.out                  *
00042>  * Summary filename: C:\TREVOR~1\$13356~1\AMCII\CEX-1.sum                  *
00043>  * User comments:                                                         *
00044>  * 1:_____________________________________________________________________*
00045>  * 2:_____________________________________________________________________*
00046>  * 3:_____________________________________________________________________*
00047>  ************************************************************************
00048>
00049> ---------------------------------------------------------------------------
00050> 001:0001-----------------------------------------------------------------------
00051> *#************************************************************************
00052> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00053> *#  Date        : 2017/12/04
00054> *#  Modeller    : [C. Fischer]
00055> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00056> *#  License #   : 4730904
00057> *#************************************************************************
00058> *#
00059> *#                      Block C - EXISTING CONDITIONS
00060> *#
00061> *#************************************************************************
00062> --------------------
00063> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
00064> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
00065>     TZERO =   .00 hrs on      0
00066>     METOUT=   2 (output = METRIC)
00067>     NRUN  = 001
00068>     NSTORM=   1
00069>               #  1=LYA2.1hr
00070> ---------------------------------------------------------------------------
00071> 001:0002-----------------------------------------------------------------------
00072> --------------------
00073> | READ STORM       |    Filename: Belleville IDF (1-hr 30% AES - 2 Year)
00074> | Ptotal=  22.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 2 Year)
00075> --------------------
00076>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>                .08  23.868 |    .33  29.172 |    .58  26.520 |    .83   7.956
00079>                .17  37.128 |    .42  34.476 |    .67  13.260 |    .92   2.652
00080>                .25  55.692 |    .50  23.868 |    .75  10.608 |   1.00    .000
00081>
00082> ---------------------------------------------------------------------------
00083> 001:0003-----------------------------------------------------------------------
00084> *#************************************************************************
00085> *#
00086> *#                              AMC II Conditions
00087> *#
00088> *#************************************************************************
00089> ----------------------
00090> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=54.00
00091> | 01:C-100  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00092> ----------------------   U.H. Tp(hrs)=    .270
00093>
00094>     Unit Hyd Qpeak  (cms)=     .646
00095>
00096>     PEAK FLOW       (cms)=     .031 (i)
00097>     TIME TO PEAK    (hrs)=     .783
00098>     RUNOFF VOLUME    (mm)=    1.791
00099>     TOTAL RAINFALL   (mm)=   22.100
00100>     RUNOFF COEFFICIENT   =     .081
00101>
00102>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00103>
00104> ---------------------------------------------------------------------------
00105> 001:0004-----------------------------------------------------------------------
00106> ----------------------
00107> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=62.00
00108> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00109> ----------------------   U.H. Tp(hrs)=    .340
00110>
00111>     Unit Hyd Qpeak  (cms)=     .073
00112>
00113>     PEAK FLOW       (cms)=     .005 (i)
00114>     TIME TO PEAK    (hrs)=     .867
00115>     RUNOFF VOLUME    (mm)=    2.407
00116>     TOTAL RAINFALL   (mm)=   22.100
00117>     RUNOFF COEFFICIENT   =     .109
00118>
00119>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00120>
00121> ---------------------------------------------------------------------------
00122> 001:0005-----------------------------------------------------------------------
00123> ----------------------
00124> | DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number   (CN)=54.00
00125> | 02:C-101  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00126> ----------------------   U.H. Tp(hrs)=    .350
00127>
00128>     Unit Hyd Qpeak  (cms)=     .914
00129>
00130>     PEAK FLOW       (cms)=     .050 (i)
00131>     TIME TO PEAK    (hrs)=     .867
00132>     RUNOFF VOLUME    (mm)=    1.791
00133>     TOTAL RAINFALL   (mm)=   22.100
00134>     RUNOFF COEFFICIENT   =     .081
00135>
00136>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00137>
00138> ---------------------------------------------------------------------------
00139> 001:0006-----------------------------------------------------------------------
00140> ----------------------
00141> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00142> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00143>                        ID1 01:EXC-1        .65     .005     .87   2.41    .000
00144>                       +ID2 02:C-101       8.38     .050     .87   1.79    .000
00145>                        ========================================================
00146>                        SUM 10:CTR1A        9.03     .055     .87   1.84    .000
00147>
00148>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00149>
00150> ---------------------------------------------------------------------------
00151> 001:0007-----------------------------------------------------------------------
00152> ----------------------
00153> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=62.00
00154> | 01:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00155> ----------------------   U.H. Tp(hrs)=    .560
00156>
00157>     Unit Hyd Qpeak  (cms)=     .981
00158>
00159>     PEAK FLOW       (cms)=     .083 (i)
00160>     TIME TO PEAK    (hrs)=    1.067
00161>     RUNOFF VOLUME    (mm)=    2.407
00162>     TOTAL RAINFALL   (mm)=   22.100
00163>     RUNOFF COEFFICIENT   =     .109
00164>
00165>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00166>
00167> ---------------------------------------------------------------------------
00168> 001:0008-----------------------------------------------------------------------
00169> ----------------------
00170> | DESIGN NASHYD      |   Area     (ha)=    3.19   Curve Number   (CN)=54.00
00171> | 02:C-102  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00172> ----------------------   U.H. Tp(hrs)=    .260
00173>
00174>     Unit Hyd Qpeak  (cms)=     .469
00175>
00176>     PEAK FLOW       (cms)=     .022 (i)
00177>     TIME TO PEAK    (hrs)=     .767
00178>     RUNOFF VOLUME    (mm)=    1.791
00179>     TOTAL RAINFALL   (mm)=   22.100
00180>     RUNOFF COEFFICIENT   =     .081
00181>
00182>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00183>
00184> ---------------------------------------------------------------------------
00185> 001:0009-----------------------------------------------------------------------
00186> ----------------------
00187> | ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00188> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00189>                        ID1 01:EXC-2       14.38     .083    1.07   2.41    .000
00190>                       +ID2 02:C-102        3.19     .022     .77   1.79    .000
00191>                        ========================================================
00192>                        SUM 09:CTR1B       17.57     .099     .98   2.30    .000
00193>
00194>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00195>
00196> ---------------------------------------------------------------------------
00197> 001:0010-----------------------------------------------------------------------
00198> --------------------
00199> | ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
00200> |  IN>09:(CTR1B )  |
00201> | OUT<08:(SWM1B )  |    =========  OUTLFOW STORAGE TABLE  =========
00202> --------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00203>                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
00204>                           .000  .0000E+00    |     .000  .1618E+00
00205>                           .000  .1259E-01    |     .000  .2671E+00
00206>                           .000  .4269E-01    |     .000  .4058E+00
00207>                           .000  .8978E-01    |     .000  .4888E+00
00208>
00209>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00210>     ---------------            (ha)     (cms)     (hrs)       (mm)
00211>     INFLOW >09: (CTR1B )      17.57      .099      .983      2.295
00212>     OUTFLOW<08: (SWM1B )      17.57      .000      .000       .000
00213>    OVERFLOW<07: (OVSWMB)        .00      .000      .000       .000
00214>
00215>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00216>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00217>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00218>
00219>
00220>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00221>                    TIME SHIFT OF PEAK FLOW          (min)=   -59.00
00222>                    MAXIMUM  STORAGE   USED       (ha.m.)=.4033E-01
00223>
00224>      *** WARNING: Outflow volume is less than inflow volume.
00225> ---------------------------------------------------------------------------
00226> 001:0011-----------------------------------------------------------------------
00227> ----------------------
00228> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00229> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00230>                        ID1 10:CTR1A        9.03     .055     .87   1.84    .000
00231>                       +ID2 08:SWM1B       17.57     .000     .00    .00    .000
00232>                       +ID3 07:OVSWMB        .00     .000     .00    .00    .000
00233>                        ========================================================
00234>                        SUM 06:CTR1        26.60     .055     .87    .62    .000
00235>
00236>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00237>
00238> ---------------------------------------------------------------------------
00239> 001:0012-----------------------------------------------------------------------
00240> ----------------------
00241> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=62.00
00242> | 04:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00243> ----------------------   U.H. Tp(hrs)=    .390
00244>
00245>     Unit Hyd Qpeak  (cms)=     .504
00246>
00247>     PEAK FLOW       (cms)=     .038 (i)
00248>     TIME TO PEAK    (hrs)=     .917
00249>     RUNOFF VOLUME    (mm)=    2.407
00250>     TOTAL RAINFALL   (mm)=   22.100
00251>     RUNOFF COEFFICIENT   =     .109
00252>
00253>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00254>
```

```
00255> ------------------------------------------------------------------------------
00256> 001:0013------------------------------------------------------------------------
00257> ---------------------
00258> | DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=64.00
00259> | 05:C-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00260> ---------------------   U.H. Tp(hrs)=    .300
00261>
00262>      Unit Hyd Qpeak  (cms)=    1.145
00263>
00264>      PEAK FLOW       (cms)=     .084 (i)
00265>      TIME TO PEAK    (hrs)=     .817
00266>      RUNOFF VOLUME    (mm)=    2.596
00267>      TOTAL RAINFALL   (mm)=   22.100
00268>      RUNOFF COEFFICIENT   =     .117
00269>
00270>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00271>
00272> ------------------------------------------------------------------------------
00273> 001:0014------------------------------------------------------------------------
00274> ------------------------
00275> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00276> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
00277>                        ID1 04:EXC-3        5.15     .038     .92   2.41    .000
00278>                       +ID2 05:C-103        8.99     .084     .82   2.60    .000
00279>                        ========================================================
00280>                        SUM 10:CTR2         14.14     .121     .85   2.53    .000
00281>
00282>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00283>
00284> ------------------------------------------------------------------------------
00285> 001:0015------------------------------------------------------------------------
00286> ---------------------
00287> | DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=72.00
00288> | 06:C-104  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00289> ---------------------   U.H. Tp(hrs)=    .260
00290>
00291>      Unit Hyd Qpeak  (cms)=     .854
00292>
00293>      PEAK FLOW       (cms)=     .079 (i)
00294>      TIME TO PEAK    (hrs)=     .767
00295>      RUNOFF VOLUME    (mm)=    3.555
00296>      TOTAL RAINFALL   (mm)=   22.100
00297>      RUNOFF COEFFICIENT   =     .161
00298>
00299>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00300>
00301> ------------------------------------------------------------------------------
00302> 001:0016------------------------------------------------------------------------
00303> *#*************************************************************************
00304>   ** END OF RUN :   1
00305>
00306> *************************************************************************
00307>
00308>
00309>
00310>
00311>
00312> --------------------
00313> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
00314> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
00315>     TZERO =   .00 hrs on        0
00316>     METOUT=   2 (output = METRIC)
00317>     NRUN   = 002
00318>     NSTORM=   1
00319>              #  1=LYA2.12h
00320> ------------------------------------------------------------------------------
00321> 002:0002------------------------------------------------------------------------
00322> *#*************************************************************************
00323> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00324> *#  Date        : 2017/12/04
00325> *#  Modeller    : [C. Fischer]
00326> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00327> *#  License #   : 4730904
00328> *#*************************************************************************
00329> *#
00330> *#                     Block C - EXISTING CONDITIONS
00331> *#
00332> *#*************************************************************************
00333> ------------------------------------------------------------------------------
00334> 002:0002------------------------------------------------------------------------
00335> --------------------
00336> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 2 Year)
00337> | Ptotal=  42.24 mm|    Comments: Belleville IDF (12-hr 30% AES - 2 Year)
00338> --------------------
00339>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00340>                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00341>               1.00   3.960 |   4.00   6.600 |   7.00   1.320 |  10.00    .000
00342>               2.00  11.440 |   5.00   6.160 |   8.00    .440 |  11.00    .000
00343>               3.00   8.800 |   6.00   3.520 |   9.00    .000 |  12.00    .000
00344>
00345> ------------------------------------------------------------------------------
00346> 002:0003------------------------------------------------------------------------
00347> *#*************************************************************************
00348> *#
00349> *#                              AMC II Conditions
00350> *#
00351> *#*************************************************************************
00352> ---------------------
00353> | DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=54.00
00354> | 01:C-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00355> ---------------------   U.H. Tp(hrs)=    .270
00356>
00357>      Unit Hyd Qpeak  (cms)=     .646
00358>
00359>      PEAK FLOW       (cms)=     .019 (i)
00360>      TIME TO PEAK    (hrs)=    5.033
00361>      RUNOFF VOLUME    (mm)=    6.455
00362>      TOTAL RAINFALL   (mm)=   42.240
00363>      RUNOFF COEFFICIENT   =     .153
00364>
00365>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00366>
00367> ------------------------------------------------------------------------------
00368> 002:0004------------------------------------------------------------------------
00369> ---------------------
00370> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=62.00
00371> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00372> ---------------------   U.H. Tp(hrs)=    .340
00373>
00374>      Unit Hyd Qpeak  (cms)=     .073
00375>
00376>      PEAK FLOW       (cms)=     .004 (i)
00377>      TIME TO PEAK    (hrs)=    5.050
00378>      RUNOFF VOLUME    (mm)=    8.450
00379>      TOTAL RAINFALL   (mm)=   42.240
00380>      RUNOFF COEFFICIENT   =     .200
00381>
00382>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00383>
00384> ------------------------------------------------------------------------------
00385> 002:0005------------------------------------------------------------------------
00386> ---------------------
00387> | DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=54.00
00388> | 02:C-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00389> ---------------------   U.H. Tp(hrs)=    .350
00390>
00391>      Unit Hyd Qpeak  (cms)=     .914
00392>
00393>      PEAK FLOW       (cms)=     .035 (i)
00394>      TIME TO PEAK    (hrs)=    5.067
00395>      RUNOFF VOLUME    (mm)=    6.455
00396>      TOTAL RAINFALL   (mm)=   42.240
00397>      RUNOFF COEFFICIENT   =     .153
00398>
00399>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00400>
00401> ------------------------------------------------------------------------------
00402> 002:0006------------------------------------------------------------------------
00403> ------------------------
00404> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00405> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
00406>                        ID1 01:EXC-1         .65     .004    5.05   8.45    .000
00407>                       +ID2 02:C-101        8.38     .035    5.07   6.46    .000
00408>                        ========================================================
00409>                        SUM 10:CTR1A         9.03     .039    5.07   6.60    .000
00410>
00411>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00412>
00413> ------------------------------------------------------------------------------
00414> 002:0007------------------------------------------------------------------------
00415> ---------------------
00416> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=62.00
00417> | 01:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00418> ---------------------   U.H. Tp(hrs)=    .560
00419>
00420>      Unit Hyd Qpeak  (cms)=     .981
00421>
00422>      PEAK FLOW       (cms)=     .076 (i)
00423>      TIME TO PEAK    (hrs)=    5.117
00424>      RUNOFF VOLUME    (mm)=    8.450
00425>      TOTAL RAINFALL   (mm)=   42.240
00426>      RUNOFF COEFFICIENT   =     .200
00427>
00428>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00429>
00430> ------------------------------------------------------------------------------
00431> 002:0008------------------------------------------------------------------------
00432> ---------------------
00433> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=54.00
00434> | 02:C-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00435> ---------------------   U.H. Tp(hrs)=    .260
00436>
00437>      Unit Hyd Qpeak  (cms)=     .469
00438>
00439>      PEAK FLOW       (cms)=     .014 (i)
00440>      TIME TO PEAK    (hrs)=    5.033
00441>      RUNOFF VOLUME    (mm)=    6.455
00442>      TOTAL RAINFALL   (mm)=   42.240
00443>      RUNOFF COEFFICIENT   =     .153
00444>
00445>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00446>
00447> ------------------------------------------------------------------------------
00448> 002:0009------------------------------------------------------------------------
00449> ------------------------
00450> | ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00451> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
00452>                        ID1 01:EXC-2        14.38     .076    5.12   8.45    .000
00453>                       +ID2 02:C-102        3.19     .014    5.03   6.46    .000
00454>                        ========================================================
00455>                        SUM 09:CTR1B        17.57     .089    5.08   8.09    .000
00456>
00457>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00458>
00459> ------------------------------------------------------------------------------
00460> 002:0010------------------------------------------------------------------------
00461> ---------------------
00462> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00463> |  IN>09:(CTR1B )    |
00464> | OUT<08:(SWM1B )    |    =========  OUTLFOW STORAGE TABLE  =========
00465> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00466>                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
00467>                             .000  .0000E+00    |     .000  .1618E+00
00468>                             .000  .1259E-01    |     .000  .2671E+00
00469>                             .000  .4269E-01    |     .000  .4058E+00
00470>                             .000  .8978E-01    |     .000  .4888E+00
00471>
00472>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00473>      ---------------           (ha)     (cms)     (hrs)       (mm)
00474>      INFLOW >09: (CTR1B )     17.57      .089     5.083      8.088
00475>      OUTFLOW<08: (SWM1B )     17.57      .000      .000       .000
00476>     OVERFLOW<07: (OVSWMB)       .00      .000      .000       .000
00477>
00478>                        TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00479>                        CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00480>                        PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00481>
00482>
00483>                        PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00484>                        TIME SHIFT OF PEAK FLOW         (min)=  -305.00
00485>                        MAXIMUM  STORAGE   USED       (ha.m.)=.1421E+00
00486>
00487>       *** WARNING: Outflow volume is less than inflow volume.
00488> ------------------------------------------------------------------------------
00489> 002:0011------------------------------------------------------------------------
00490> ------------------------
00491> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00492> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
00493>                        ID1 10:CTR1A         9.03     .039    5.07   6.60    .000
00494>                       +ID2 08:SWM1B        17.57     .000     .00    .00    .000
00495>                       +ID3 07:OVSWMB         .00     .000     .00    .00    .000
00496>                        ========================================================
00497>                        SUM 06:CTR1         26.60     .039    5.07   2.24    .000
00498>
00499>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00500>
00501> ------------------------------------------------------------------------------
00502> 002:0012------------------------------------------------------------------------
00503> ---------------------
00504> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=62.00
00505> | 04:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00506> ---------------------   U.H. Tp(hrs)=    .390
00507>
00508>      Unit Hyd Qpeak  (cms)=     .504
```

```
00509>
00510>      PEAK FLOW       (cms)=     .028 (i)
00511>      TIME TO PEAK    (hrs)=    5.067
00512>      RUNOFF VOLUME    (mm)=    8.450
00513>      TOTAL RAINFALL   (mm)=   42.240
00514>      RUNOFF COEFFICIENT   =     .200
00515>
00516>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00517>
00518> ------------------------------------------------------------------------------
00519> 002:0013--------------------------------------------------------------------
00520> ----------------------
00521> | DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=64.00
00522> | 05:C-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00523> ----------------------   U.H. Tp(hrs)=    .300
00524>
00525>      Unit Hyd Qpeak  (cms)=    1.145
00526>
00527>      PEAK FLOW       (cms)=     .052 (i)
00528>      TIME TO PEAK    (hrs)=    5.050
00529>      RUNOFF VOLUME    (mm)=    9.039
00530>      TOTAL RAINFALL   (mm)=   42.240
00531>      RUNOFF COEFFICIENT   =     .214
00532>
00533>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00534>
00535> ------------------------------------------------------------------------------
00536> 002:0014--------------------------------------------------------------------
00537> ----------------------
00538> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00539> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00540>                       ID1 04:EXC-3         5.15     .028    5.07   8.45    .000
00541>                      +ID2 05:C-103         8.99     .052    5.05   9.04    .000
00542>                       ========================================================
00543>                       SUM 10:CTR2          14.14     .080    5.05   8.82    .000
00544>
00545>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00546>
00547> ------------------------------------------------------------------------------
00548> 002:0015--------------------------------------------------------------------
00549> ----------------------
00550> | DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=72.00
00551> | 06:C-104  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00552> ----------------------   U.H. Tp(hrs)=    .260
00553>
00554>      Unit Hyd Qpeak  (cms)=     .854
00555>
00556>      PEAK FLOW       (cms)=     .044 (i)
00557>      TIME TO PEAK    (hrs)=    5.033
00558>      RUNOFF VOLUME    (mm)=   11.896
00559>      TOTAL RAINFALL   (mm)=   42.240
00560>      RUNOFF COEFFICIENT   =     .282
00561>
00562>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00563>
00564> ------------------------------------------------------------------------------
00565> 002:0016--------------------------------------------------------------------
00566> *#**************************************************************************
00567> ------------------------------------------------------------------------------
00568> 002:0002--------------------------------------------------------------------
00569>   ** END OF RUN :   2
00570>
00571> ****************************************************************************
00572>
00573>
00574>
00575>
00576>
00577> --------------------
00578> | START            |  Project  dir.: C:\TREVOR-1\$13356-1\AMCII\
00579> --------------------  Rainfall dir.: C:\TREVOR-1\$13356-1\AMCII\
00580>     TZERO =   .00 hrs on        0
00581>     METOUT=   2 (output = METRIC)
00582>     NRUN  = 003
00583>     NSTORM=   1
00584>            #  1=LYA5.1hr
00585> ------------------------------------------------------------------------------
00586> 003:0002--------------------------------------------------------------------
00587> *#**************************************************************************
00588> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00589> *#  Date        : 2017/12/04
00590> *#  Modeller    : [C. Fischer]
00591> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00592> *#  License #   : 4730904
00593> *#**************************************************************************
00594> *#
00595> *#                     Block C - EXISTING CONDITIONS
00596> *#
00597> *#**************************************************************************
00598> ------------------------------------------------------------------------------
00599> 003:0002--------------------------------------------------------------------
00600> --------------------
00601> | READ STORM        |    Filename: Belleville IDF (1-hr 30% AES - 5 Year)
00602> | Ptotal=  28.00 mm|    Comments: Belleville IDF (1-hr 30% AES - 5 Year)
00603> --------------------
00604>                TIME     RAIN |   TIME     RAIN |   TIME     RAIN |   TIME     RAIN
00605>                 hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr
00606>                 .08   30.240 |    .33   36.960 |    .58   33.600 |    .83   10.080
00607>                 .17   47.040 |    .42   43.680 |    .67   16.800 |    .92    3.360
00608>                 .25   70.560 |    .50   30.240 |    .75   13.440 |   1.00     .000
00609>
00610> ------------------------------------------------------------------------------
00611> 003:0003--------------------------------------------------------------------
00612> *#**************************************************************************
00613> *#
00614> *#                              AMC II Conditions
00615> *#
00616> *#**************************************************************************
00617> ----------------------
00618> | DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=54.00
00619> | 01:C-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00620> ----------------------   U.H. Tp(hrs)=    .270
00621>
00622>      Unit Hyd Qpeak  (cms)=     .646
00623>
00624>      PEAK FLOW       (cms)=     .050 (i)
00625>      TIME TO PEAK    (hrs)=     .767
00626>      RUNOFF VOLUME    (mm)=    2.891
00627>      TOTAL RAINFALL   (mm)=   28.000
00628>      RUNOFF COEFFICIENT   =     .103
00629>
00630>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00631>
00632> ------------------------------------------------------------------------------
00633> 003:0004--------------------------------------------------------------------
00634> ----------------------
00635> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=62.00
00636> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00637> ----------------------   U.H. Tp(hrs)=    .340
00638>
00639>      Unit Hyd Qpeak  (cms)=     .073
00640>
00641>      PEAK FLOW       (cms)=     .008 (i)
00642>      TIME TO PEAK    (hrs)=     .850
00643>      RUNOFF VOLUME    (mm)=    3.854
00644>      TOTAL RAINFALL   (mm)=   28.000
00645>      RUNOFF COEFFICIENT   =     .138
00646>
00647>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00648>
00649> ------------------------------------------------------------------------------
00650> 003:0005--------------------------------------------------------------------
00651> ----------------------
00652> | DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=54.00
00653> | 02:C-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00654> ----------------------   U.H. Tp(hrs)=    .350
00655>
00656>      Unit Hyd Qpeak  (cms)=     .914
00657>
00658>      PEAK FLOW       (cms)=     .080 (i)
00659>      TIME TO PEAK    (hrs)=     .867
00660>      RUNOFF VOLUME    (mm)=    2.891
00661>      TOTAL RAINFALL   (mm)=   28.000
00662>      RUNOFF COEFFICIENT   =     .103
00663>
00664>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00665>
00666> ------------------------------------------------------------------------------
00667> 003:0006--------------------------------------------------------------------
00668> ----------------------
00669> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00670> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00671>                       ID1 01:EXC-1          .65     .008     .85   3.85    .000
00672>                      +ID2 02:C-101         8.38     .080     .87   2.89    .000
00673>                       ========================================================
00674>                       SUM 10:CTR1A          9.03     .088     .87   2.96    .000
00675>
00676>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00677>
00678> ------------------------------------------------------------------------------
00679> 003:0007--------------------------------------------------------------------
00680> ----------------------
00681> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=62.00
00682> | 01:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00683> ----------------------   U.H. Tp(hrs)=    .560
00684>
00685>      Unit Hyd Qpeak  (cms)=     .981
00686>
00687>      PEAK FLOW       (cms)=     .133 (i)
00688>      TIME TO PEAK    (hrs)=    1.067
00689>      RUNOFF VOLUME    (mm)=    3.855
00690>      TOTAL RAINFALL   (mm)=   28.000
00691>      RUNOFF COEFFICIENT   =     .138
00692>
00693>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00694>
00695> ------------------------------------------------------------------------------
00696> 003:0008--------------------------------------------------------------------
00697> ----------------------
00698> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=54.00
00699> | 02:C-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00700> ----------------------   U.H. Tp(hrs)=    .260
00701>
00702>      Unit Hyd Qpeak  (cms)=     .469
00703>
00704>      PEAK FLOW       (cms)=     .035 (i)
00705>      TIME TO PEAK    (hrs)=     .767
00706>      RUNOFF VOLUME    (mm)=    2.891
00707>      TOTAL RAINFALL   (mm)=   28.000
00708>      RUNOFF COEFFICIENT   =     .103
00709>
00710>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00711>
00712> ------------------------------------------------------------------------------
00713> 003:0009--------------------------------------------------------------------
00714> ----------------------
00715> | ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00716> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00717>                       ID1 01:EXC-2         14.38     .133    1.07   3.85    .000
00718>                      +ID2 02:C-102          3.19     .035     .77   2.89    .000
00719>                       ========================================================
00720>                       SUM 09:CTR1B         17.57     .159     .98   3.68    .000
00721>
00722>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00723>
00724> ------------------------------------------------------------------------------
00725> 003:0010--------------------------------------------------------------------
00726> --------------------
00727> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00728> |  IN>09:(CTR1B )   |
00729> | OUT<08:(SWM1B )   |    =========  OUTLFOW STORAGE TABLE  =========
00730> --------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00731>                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
00732>                            .000  .0000E+00    |     .000  .1618E+00
00733>                            .000  .1259E-01    |     .000  .2671E+00
00734>                            .000  .4269E-01    |     .000  .4058E+00
00735>                            .000  .8978E-01    |     .000  .4888E+00
00736>
00737>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00738>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00739>      INFLOW >09: (CTR1B )      17.57      .159      .983      3.680
00740>      OUTFLOW<08: (SWM1B )      17.57      .000      .000       .000
00741>     OVERFLOW<07: (OVSWMB)        .00      .000      .000       .000
00742>
00743>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00744>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00745>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00746>
00747>
00748>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00749>                    TIME SHIFT OF PEAK FLOW          (min)=   -59.00
00750>                    MAXIMUM  STORAGE   USED        (ha.m.)=.6466E-01
00751>
00752>       *** WARNING: Outflow volume is less than inflow volume.
00753> ------------------------------------------------------------------------------
00754> 003:0011--------------------------------------------------------------------
00755> ----------------------
00756> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00757> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00758>                       ID1 10:CTR1A          9.03     .088     .87   2.96    .000
00759>                      +ID2 08:SWM1B         17.57     .000     .00    .00    .000
00760>                      +ID3 07:OVSWMB          .00     .000     .00    .00    .000
00761>                       ========================================================
00762>                       SUM 06:CTR1          26.60     .088     .87   1.01    .000
```

```
00763>
00764>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00765>
00766> ------------------------------------------------------------------------------
00767> 003:0012------------------------------------------------------------------------
00768> ----------------------
00769> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number    (CN)=62.00
00770> | 04:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00771> ----------------------   U.H. Tp(hrs)=    .390
00772>
00773>      Unit Hyd Qpeak  (cms)=     .504
00774>
00775>      PEAK FLOW       (cms)=     .061 (i)
00776>      TIME TO PEAK    (hrs)=     .900
00777>      RUNOFF VOLUME    (mm)=    3.855
00778>      TOTAL RAINFALL   (mm)=   28.000
00779>      RUNOFF COEFFICIENT   =     .138
00780>
00781>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00782>
00783> ------------------------------------------------------------------------------
00784> 003:0013------------------------------------------------------------------------
00785> ----------------------
00786> | DESIGN NASHYD      |   Area     (ha)=    8.99   Curve Number    (CN)=64.00
00787> | 05:C-103  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00788> ----------------------   U.H. Tp(hrs)=    .300
00789>
00790>      Unit Hyd Qpeak  (cms)=    1.145
00791>
00792>      PEAK FLOW       (cms)=     .133 (i)
00793>      TIME TO PEAK    (hrs)=     .800
00794>      RUNOFF VOLUME    (mm)=    4.146
00795>      TOTAL RAINFALL   (mm)=   28.000
00796>      RUNOFF COEFFICIENT   =     .148
00797>
00798>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00799>
00800> ------------------------------------------------------------------------------
00801> 003:0014------------------------------------------------------------------------
00802> ----------------------
00803> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00804> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00805>                        ID1 04:EXC-3        5.15     .061     .90   3.85    .000
00806>                       +ID2 05:C-103        8.99     .133     .80   4.15    .000
00807>                        ============================================================
00808>                        SUM 10:CTR2         14.14     .193     .83   4.04    .000
00809>
00810>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00811>
00812> ------------------------------------------------------------------------------
00813> 003:0015------------------------------------------------------------------------
00814> ----------------------
00815> | DESIGN NASHYD      |   Area     (ha)=    5.81   Curve Number    (CN)=72.00
00816> | 06:C-104  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00817> ----------------------   U.H. Tp(hrs)=    .260
00818>
00819>      Unit Hyd Qpeak  (cms)=     .854
00820>
00821>      PEAK FLOW       (cms)=     .125 (i)
00822>      TIME TO PEAK    (hrs)=     .750
00823>      RUNOFF VOLUME    (mm)=    5.606
00824>      TOTAL RAINFALL   (mm)=   28.000
00825>      RUNOFF COEFFICIENT   =     .200
00826>
00827>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00828>
00829> ------------------------------------------------------------------------------
00830> 003:0016------------------------------------------------------------------------
00831> *#############################################################################
00832> ------------------------------------------------------------------------------
00833> 003:0002------------------------------------------------------------------------
00834> ------------------------------------------------------------------------------
00835> 003:0002------------------------------------------------------------------------
00836>   ** END OF RUN :   3
00837>
00838> *****************************************************************************
00839>
00840>
00841>
00842>
00843>
00844> --------------------
00845> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
00846> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
00847>     TZERO =   .00 hrs on        0
00848>     METOUT=   2 (output = METRIC)
00849>     NRUN  = 004
00850>     NSTORM=   1
00851>            #  1=LYA5.12h
00852> ------------------------------------------------------------------------------
00853> 004:0002------------------------------------------------------------------------
00854> *#############################################################################
00855> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00856> *#  Date        : 2017/12/04
00857> *#  Modeller    : [C. Fischer]
00858> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00859> *#  License #   : 4730904
00860> *#############################################################################
00861> *#
00862> *#                          Block C - EXISTING CONDITIONS
00863> *#
00864> *#############################################################################
00865> ------------------------------------------------------------------------------
00866> 004:0002------------------------------------------------------------------------
00867> --------------------
00868> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 5 Year)
00869> | Ptotal=  55.97 mm|    Comments: Belleville IDF (12-hr 30% AES - 5 Year)
00870> --------------------
00871>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00872>                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00873>               1.00   5.247 |   4.00   8.745 |   7.00   1.749 |  10.00    .000
00874>               2.00  15.158 |   5.00   8.162 |   8.00    .583 |  11.00    .000
00875>               3.00  11.660 |   6.00   4.664 |   9.00    .000 |  12.00    .000
00876>
00877> ------------------------------------------------------------------------------
00878> 004:0003------------------------------------------------------------------------
00879> *#############################################################################
00880> *#
00881> *#                                AMC II Conditions
00882> *#
00883> *#############################################################################
00884> ----------------------
00885> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number    (CN)=54.00
00886> | 01:C-100  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00887> ----------------------   U.H. Tp(hrs)=    .270
00888>
00889>      Unit Hyd Qpeak  (cms)=     .646
00890>
00891>      PEAK FLOW       (cms)=     .032 (i)
00892>      TIME TO PEAK    (hrs)=    5.033
00893>      RUNOFF VOLUME    (mm)=   10.954
00894>      TOTAL RAINFALL   (mm)=   55.968
00895>      RUNOFF COEFFICIENT   =     .196
00896>
00897>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00898>
00899> ------------------------------------------------------------------------------
00900> 004:0004------------------------------------------------------------------------
00901> ----------------------
00902> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number    (CN)=62.00
00903> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00904> ----------------------   U.H. Tp(hrs)=    .340
00905>
00906>      Unit Hyd Qpeak  (cms)=     .073
00907>
00908>      PEAK FLOW       (cms)=     .006 (i)
00909>      TIME TO PEAK    (hrs)=    5.050
00910>      RUNOFF VOLUME    (mm)=   14.118
00911>      TOTAL RAINFALL   (mm)=   55.968
00912>      RUNOFF COEFFICIENT   =     .252
00913>
00914>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00915>
00916> ------------------------------------------------------------------------------
00917> 004:0005------------------------------------------------------------------------
00918> ----------------------
00919> | DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number    (CN)=54.00
00920> | 02:C-101  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00921> ----------------------   U.H. Tp(hrs)=    .350
00922>
00923>      Unit Hyd Qpeak  (cms)=     .914
00924>
00925>      PEAK FLOW       (cms)=     .059 (i)
00926>      TIME TO PEAK    (hrs)=    5.050
00927>      RUNOFF VOLUME    (mm)=   10.954
00928>      TOTAL RAINFALL   (mm)=   55.968
00929>      RUNOFF COEFFICIENT   =     .196
00930>
00931>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00932>
00933> ------------------------------------------------------------------------------
00934> 004:0006------------------------------------------------------------------------
00935> ----------------------
00936> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00937> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00938>                        ID1 01:EXC-1         .65     .006    5.05  14.12    .000
00939>                       +ID2 02:C-101        8.38     .059    5.05  10.95    .000
00940>                        ============================================================
00941>                        SUM 10:CTR1A         9.03     .064    5.05  11.18    .000
00942>
00943>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00944>
00945> ------------------------------------------------------------------------------
00946> 004:0007------------------------------------------------------------------------
00947> ----------------------
00948> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number    (CN)=62.00
00949> | 01:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00950> ----------------------   U.H. Tp(hrs)=    .560
00951>
00952>      Unit Hyd Qpeak  (cms)=     .981
00953>
00954>      PEAK FLOW       (cms)=     .125 (i)
00955>      TIME TO PEAK    (hrs)=    5.100
00956>      RUNOFF VOLUME    (mm)=   14.118
00957>      TOTAL RAINFALL   (mm)=   55.968
00958>      RUNOFF COEFFICIENT   =     .252
00959>
00960>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00961>
00962> ------------------------------------------------------------------------------
00963> 004:0008------------------------------------------------------------------------
00964> ----------------------
00965> | DESIGN NASHYD      |   Area     (ha)=    3.19   Curve Number    (CN)=54.00
00966> | 02:C-102  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00967> ----------------------   U.H. Tp(hrs)=    .260
00968>
00969>      Unit Hyd Qpeak  (cms)=     .469
00970>
00971>      PEAK FLOW       (cms)=     .023 (i)
00972>      TIME TO PEAK    (hrs)=    5.033
00973>      RUNOFF VOLUME    (mm)=   10.954
00974>      TOTAL RAINFALL   (mm)=   55.968
00975>      RUNOFF COEFFICIENT   =     .196
00976>
00977>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00978>
00979> ------------------------------------------------------------------------------
00980> 004:0009------------------------------------------------------------------------
00981> ----------------------
00982> | ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00983> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00984>                        ID1 01:EXC-2        14.38     .125    5.10  14.12    .000
00985>                       +ID2 02:C-102         3.19     .023    5.03  10.95    .000
00986>                        ============================================================
00987>                        SUM 09:CTR1B        17.57     .147    5.07  13.54    .000
00988>
00989>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00990>
00991> ------------------------------------------------------------------------------
00992> 004:0010------------------------------------------------------------------------
00993> ----------------------
00994> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00995> |  IN>09:(CTR1B )    |
00996> | OUT<08:(SWM1B )    |    =========  OUTLFOW STORAGE TABLE  =========
00997> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00998>                             (cms)     (ha.m.)  |    (cms)    (ha.m.)
00999>                             .000   .0000E+00   |     .000  .1618E+00
01000>                             .000   .1259E-01   |     .000  .2671E+00
01001>                             .000   .4269E-01   |     .000  .4058E+00
01002>                             .000   .8978E-01   |     .000  .4888E+00
01003>
01004>     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
01005>     ---------------------       (ha)     (cms)     (hrs)       (mm)
01006>     INFLOW >09: (CTR1B )       17.57      .147    5.067     13.543
01007>     OUTFLOW<08: (SWM1B )       17.57      .000      .000       .000
01008>    OVERFLOW<07: (OVSWMB)         .00      .000      .000       .000
01009>
01010>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01011>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01012>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01013>
01014>
01015>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01016>                    TIME SHIFT OF PEAK FLOW          (min)=  -304.00
```

```
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2380E+00

       *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0011--------------------------------------------------------------------------
----------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 10:CTR1A          9.03     .064    5.05  11.18    .000
                      +ID2 08:SWM1B         17.57     .000     .00    .00    .000
                      +ID3 07:OVSWMB          .00     .000     .00    .00    .000
                       ============================================================
                       SUM 06:CTR1           26.60     .064    5.05   3.80    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0012--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=62.00
| 04:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .045 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   14.118
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .252

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

--------------------------------------------------------------------------------
004:0013--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=64.00
| 05:C-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .300

     Unit Hyd Qpeak  (cms)=    1.145

     PEAK FLOW       (cms)=     .085 (i)
     TIME TO PEAK    (hrs)=    5.033
     RUNOFF VOLUME    (mm)=   15.034
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .269

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

--------------------------------------------------------------------------------
004:0014--------------------------------------------------------------------------
----------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 04:EXC-3          5.15     .045    5.07  14.12    .000
                      +ID2 05:C-103          8.99     .085    5.03  15.03    .000
                       ============================================================
                       SUM 10:CTR2           14.14     .130    5.05  14.70    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0015--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=72.00
| 06:C-104  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .854

     PEAK FLOW       (cms)=     .072 (i)
     TIME TO PEAK    (hrs)=    3.083
     RUNOFF VOLUME    (mm)=   19.360
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .346

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

--------------------------------------------------------------------------------
004:0016--------------------------------------------------------------------------
*#*************************************************************************
--------------------------------------------------------------------------------
004:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002--------------------------------------------------------------------------
  ** END OF RUN :   4

 ************************************************************************
----------------------
| START              |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
----------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
    TZERO =   .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 005
    NSTORM=   1
          #  1=LYA100.1hr
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/12/04
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
*#  License #   : 4730904
*#*************************************************************************
*#
*#                     Block C - EXISTING CONDITIONS
*#
*#*************************************************************************
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
----------------------
| READ STORM         |    Filename: Belleville IDF (1-hr 30% AES - 100 Year)
| Ptotal=  44.10 mm  |    Comments: Belleville IDF (1-hr 30% AES - 100 Year)
----------------------
              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .08  47.628 |    .33  58.212 |    .58  52.920 |    .83  15.876
               .17  74.088 |    .42  68.796 |    .67  26.460 |    .92   5.292
               .25 111.132 |    .50  47.628 |    .75  21.168 |   1.00    .000

--------------------------------------------------------------------------------
005:0003--------------------------------------------------------------------------
*#*************************************************************************
*#
*#                          AMC II Conditions
*#
*#*************************************************************************
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=54.00
| 01:C-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=     .646

     PEAK FLOW       (cms)=     .120 (i)
     TIME TO PEAK    (hrs)=     .767
     RUNOFF VOLUME    (mm)=    7.008
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .159

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

--------------------------------------------------------------------------------
005:0004--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=62.00
| 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .020 (i)
     TIME TO PEAK    (hrs)=     .850
     RUNOFF VOLUME    (mm)=    9.152
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .208

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

--------------------------------------------------------------------------------
005:0005--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=54.00
| 02:C-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .350

     Unit Hyd Qpeak  (cms)=     .914

     PEAK FLOW       (cms)=     .193 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=    7.008
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .159

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

--------------------------------------------------------------------------------
005:0006--------------------------------------------------------------------------
----------------------
| ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXC-1           .65     .020     .85   9.15    .000
                      +ID2 02:C-101          8.38     .193     .87   7.01    .000
                       ============================================================
                       SUM 10:CTR1A          9.03     .213     .85   7.16    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0007--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=62.00
| 01:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .560

     Unit Hyd Qpeak  (cms)=     .981

     PEAK FLOW       (cms)=     .315 (i)
     TIME TO PEAK    (hrs)=    1.050
     RUNOFF VOLUME    (mm)=    9.153
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .208

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

--------------------------------------------------------------------------------
005:0008--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=54.00
| 02:C-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .469

     PEAK FLOW       (cms)=     .085 (i)
     TIME TO PEAK    (hrs)=     .750
     RUNOFF VOLUME    (mm)=    7.008
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .159

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

--------------------------------------------------------------------------------
005:0009--------------------------------------------------------------------------
----------------------
| ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXC-2         14.38     .315    1.05   9.15    .000
                      +ID2 02:C-102          3.19     .085     .75   7.01    .000
                       ============================================================
                       SUM 09:CTR1B         17.57     .377     .97   8.76    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0010--------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>09:(CTR1B )    |
| OUT<08:(SWM1B )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |     .000  .1618E+00
                           .000  .1259E-01    |     .000  .2671E+00
                           .000  .4269E-01    |     .000  .4058E+00
```

```
                          .000  .8978E-01   |     .000  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------             (ha)     (cms)     (hrs)       (mm)
     INFLOW >09: (CTR1B )      17.57      .377      .967      8.763
     OUTFLOW<08: (SWM1B )      17.57      .000      .000       .000
    OVERFLOW<07: (OVSWMB)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -58.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1540E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0011----------------------------------------------------------------------
----------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 10:CTR1A         9.03     .213     .85   7.16    .000
                      +ID2 08:SWM1B        17.57     .000     .00    .00    .000
                      +ID3 07:OVSWMB         .00     .000     .00    .00    .000
                       ==========================================================
                       SUM 06:CTR1          26.60     .213     .85   2.43    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0012----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=62.00
| 04:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .145 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    9.153
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .208

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

--------------------------------------------------------------------------------
005:0013----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=64.00
| 05:C-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .300

     Unit Hyd Qpeak  (cms)=    1.145

     PEAK FLOW       (cms)=     .313 (i)
     TIME TO PEAK    (hrs)=     .800
     RUNOFF VOLUME    (mm)=    9.784
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .222

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

--------------------------------------------------------------------------------
005:0014----------------------------------------------------------------------
----------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 04:EXC-3         5.15     .145     .90   9.15    .000
                      +ID2 05:C-103         8.99     .313     .80   9.78    .000
                       ==========================================================
                       SUM 10:CTR2          14.14     .454     .82   9.55    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0015----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=72.00
| 06:C-104  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .854

     PEAK FLOW       (cms)=     .284 (i)
     TIME TO PEAK    (hrs)=     .733
     RUNOFF VOLUME    (mm)=   12.836
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .291

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

--------------------------------------------------------------------------------
005:0016----------------------------------------------------------------------
*#*****************************************************************************
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
   ** END OF RUN :   5

*******************************************************************************




--------------------
| START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
--------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
           #  1=LYA100.12h
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/12/04
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
*#  License #   : 4730904
*#*****************************************************************************
*#
*#                     Block C - EXISTING CONDITIONS
*#
*#*****************************************************************************
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 100 Year
| Ptotal=  93.70 mm|    Comments: Belleville IDF (12-hr 30% AES - 100 Year
--------------------
               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               1.00   8.784 |   4.00  14.640 |   7.00   2.928 |  10.00    .000
               2.00  25.376 |   5.00  13.664 |   8.00    .976 |  11.00    .000
               3.00  19.520 |   6.00   7.808 |   9.00    .000 |  12.00    .000

--------------------------------------------------------------------------------
006:0003----------------------------------------------------------------------
*#*****************************************************************************
*#
*#                              AMC II Conditions
*#
*#*****************************************************************************
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=54.00
| 01:C-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=     .646

     PEAK FLOW       (cms)=     .079 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   27.547
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .294

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

--------------------------------------------------------------------------------
006:0004----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=62.00
| 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .014 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   34.292
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .366

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

--------------------------------------------------------------------------------
006:0005----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=54.00
| 02:C-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .350

     Unit Hyd Qpeak  (cms)=     .914

     PEAK FLOW       (cms)=     .142 (i)
     TIME TO PEAK    (hrs)=    5.050
     RUNOFF VOLUME    (mm)=   27.547
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .294

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

--------------------------------------------------------------------------------
006:0006----------------------------------------------------------------------
----------------------
| ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXC-1          .65     .014    3.13  34.29    .000
                      +ID2 02:C-101         8.38     .142    5.05  27.55    .000
                       ==========================================================
                       SUM 10:CTR1A          9.03     .155    5.05  28.03    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0007----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=62.00
| 01:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .560

     Unit Hyd Qpeak  (cms)=     .981

     PEAK FLOW       (cms)=     .291 (i)
     TIME TO PEAK    (hrs)=    5.083
     RUNOFF VOLUME    (mm)=   34.292
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .366

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

--------------------------------------------------------------------------------
006:0008----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=54.00
| 02:C-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .469

     PEAK FLOW       (cms)=     .055 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   27.547
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .294

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

--------------------------------------------------------------------------------
006:0009----------------------------------------------------------------------
----------------------
| ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXC-2         14.38     .291    5.08  34.29    .000
```

```
                    +ID2 02:C-102          3.19     .055    3.10  27.55    .000
                     ============================================================
                     SUM 09:CTR1B         17.57     .346    5.05  33.07    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>09:(CTR1B )   |
| OUT<08:(SWM1B )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00    |     .000  .1618E+00
                           .000  .1259E-01    |     .000  .2671E+00
                           .000  .4269E-01    |     .000  .4058E+00
                           .000  .8978E-01    |     .000  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >09: (CTR1B )      17.57      .346     5.050     33.068
     OUTFLOW<08: (SWM1B )      14.78      .000      .000       .000
    OVERFLOW<07: (OVSWMB)       2.79      .238     6.133     33.068

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        4
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=     4.73
                    PERCENTAGE OF TIME OVERFLOWING     (%)=    39.34


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
                    TIME SHIFT OF PEAK FLOW          (min)=  -303.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4888E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
--------------------
| ADD HYD (CTR1     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 10:CTR1A         9.03     .155    5.05  28.03    .000
                     +ID2 08:SWM1B        14.78     .000     .00    .00    .000
                     +ID3 07:OVSWMB        2.79     .238    6.13  33.07    .000
                      ============================================================
                      SUM 06:CTR1         26.60     .335    6.13  12.98    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DESIGN NASHYD     |   Area     (ha)=    5.15   Curve Number   (CN)=62.00
| 04:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .109 (i)
     TIME TO PEAK    (hrs)=    3.183
     RUNOFF VOLUME    (mm)=   34.292
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .366

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

--------------------------------------------------------------------------------
--------------------
| DESIGN NASHYD     |   Area     (ha)=    8.99   Curve Number   (CN)=64.00
| 05:C-103  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .300

     Unit Hyd Qpeak  (cms)=    1.145

     PEAK FLOW       (cms)=     .205 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   36.160
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .386

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

--------------------------------------------------------------------------------
--------------------
| ADD HYD (CTR2     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 04:EXC-3         5.15     .109    3.18  34.29    .000
                     +ID2 05:C-103         8.99     .205    3.12  36.16    .000
                      ============================================================
                      SUM 10:CTR2         14.14     .313    3.13  35.48    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DESIGN NASHYD     |   Area     (ha)=    5.81   Curve Number   (CN)=72.00
| 06:C-104  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .854

     PEAK FLOW       (cms)=     .168 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   44.509
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .475

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

--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
   ** END OF RUN :   6

 ******************************************************************************
```

```


--------------------
| START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
---------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
    TZERO =   .00 hrs on       0
    METOUT=   2 (output = METRIC)
    NRUN  = 007
    NSTORM=   1
           #  1=25mm.4hr
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/12/04
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
*#  License #   : 4730904
*#*****************************************************************************
*#
*#                      Block C - EXISTING CONDITIONS
*#
*#*****************************************************************************
--------------------------------------------------------------------------------
--------------------
| READ STORM        |    Filename: 25 mm, 4hr Chicago Storm
| Ptotal=  25.00 mm|    Comments: 25 mm, 4hr Chicago Storm
--------------------
            TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
             hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
             .08   1.465 |  1.08   4.024 |  2.08   5.764 |  3.08   2.074
             .17   1.540 |  1.17   4.814 |  2.17   4.969 |  3.17   1.977
             .25   1.625 |  1.25   6.025 |  2.25   4.374 |  3.25   1.889
             .33   1.720 |  1.33   8.114 |  2.33   3.913 |  3.33   1.810
             .42   1.829 |  1.42  12.526 |  2.42   3.545 |  3.42   1.737
             .50   1.955 |  1.50  27.198 |  2.50   3.245 |  3.50   1.671
             .58   2.101 |  1.58  74.855 |  2.58   2.994 |  3.58   1.610
             .67   2.274 |  1.67  31.410 |  2.67   2.782 |  3.67   1.553
             .75   2.482 |  1.75  16.819 |  2.75   2.601 |  3.75   1.501
             .83   2.736 |  1.83  11.357 |  2.83   2.443 |  3.83   1.453
             .92   3.055 |  1.92   8.563 |  2.92   2.305 |  3.92   1.408
            1.00   3.468 |  2.00   6.882 |  3.00   2.183 |  4.00   1.366

--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
*#*****************************************************************************
*#
*#                            AMC II Conditions
*#
*#*****************************************************************************
--------------------
| DESIGN NASHYD     |   Area     (ha)=    4.57   Curve Number   (CN)=54.00
| 01:C-100  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=     .646

     PEAK FLOW       (cms)=     .028 (i)
     TIME TO PEAK    (hrs)=    1.933
     RUNOFF VOLUME    (mm)=    2.302
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .092

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

--------------------------------------------------------------------------------
--------------------
| DESIGN NASHYD     |   Area     (ha)=     .65   Curve Number   (CN)=62.00
| 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .005 (i)
     TIME TO PEAK    (hrs)=    2.017
     RUNOFF VOLUME    (mm)=    3.081
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .123

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

--------------------------------------------------------------------------------
--------------------
| DESIGN NASHYD     |   Area     (ha)=    8.38   Curve Number   (CN)=54.00
| 02:C-101  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .350

     Unit Hyd Qpeak  (cms)=     .914

     PEAK FLOW       (cms)=     .043 (i)
     TIME TO PEAK    (hrs)=    2.033
     RUNOFF VOLUME    (mm)=    2.302
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .092

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

--------------------------------------------------------------------------------
--------------------
| ADD HYD (CTR1A    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXC-1          .65     .005    2.02   3.08    .000
                     +ID2 02:C-101         8.38     .043    2.03   2.30    .000
                      ============================================================
                      SUM 10:CTR1A         9.03     .048    2.03   2.36    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DESIGN NASHYD     |   Area     (ha)=   14.38   Curve Number   (CN)=62.00
| 01:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .560

     Unit Hyd Qpeak  (cms)=     .981

     PEAK FLOW       (cms)=     .073 (i)
     TIME TO PEAK    (hrs)=    2.317
     RUNOFF VOLUME    (mm)=    3.082
```

```
      TOTAL RAINFALL   (mm)=   25.000
      RUNOFF COEFFICIENT   =     .123

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

------------------------------------------------------------------------------
007:0008------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=54.00
| 02:C-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .260

      Unit Hyd Qpeak  (cms)=     .469

      PEAK FLOW       (cms)=     .020 (i)
      TIME TO PEAK    (hrs)=    1.917
      RUNOFF VOLUME    (mm)=    2.302
      TOTAL RAINFALL   (mm)=   25.000
      RUNOFF COEFFICIENT   =     .092

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

------------------------------------------------------------------------------
007:0009------------------------------------------------------------------------
------------------------
| ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXC-2         14.38     .073    2.32   3.08    .000
                      +ID2 02:C-102          3.19     .020    1.92   2.30    .000
                       ========================================================
                       SUM 09:CTR1B         17.57     .086    2.22   2.94    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0010------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>09:(CTR1B )    |
| OUT<08:(SWM1B )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
                            .000  .0000E+00     |     .000  .1618E+00
                            .000  .1259E-01     |     .000  .2671E+00
                            .000  .4269E-01     |     .000  .4058E+00
                            .000  .8978E-01     |     .000  .4888E+00

      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
      ---------------            (ha)     (cms)     (hrs)       (mm)
      INFLOW >09: (CTR1B )      17.57      .086     2.217      2.941
      OUTFLOW<08: (SWM1B )      17.57      .000      .000       .000
     OVERFLOW<07: (OVSWMB)        .00      .000      .000       .000

                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                     TIME SHIFT OF PEAK FLOW          (min)=  -133.00
                     MAXIMUM  STORAGE   USED       (ha.m.)=.5167E-01

       *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
007:0011------------------------------------------------------------------------
------------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 10:CTR1A          9.03     .048    2.03   2.36    .000
                      +ID2 08:SWM1B         17.57     .000     .00    .00    .000
                      +ID3 07:OVSWMB          .00     .000     .00    .00    .000
                       ========================================================
                       SUM 06:CTR1          26.60     .048    2.03    .80    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0012------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=62.00
| 04:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .390

      Unit Hyd Qpeak  (cms)=     .504

      PEAK FLOW       (cms)=     .033 (i)
      TIME TO PEAK    (hrs)=    2.083
      RUNOFF VOLUME    (mm)=    3.082
      TOTAL RAINFALL   (mm)=   25.000
      RUNOFF COEFFICIENT   =     .123

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

------------------------------------------------------------------------------
007:0013------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=64.00
| 05:C-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .300

      Unit Hyd Qpeak  (cms)=    1.145

      PEAK FLOW       (cms)=     .074 (i)
      TIME TO PEAK    (hrs)=    1.967
      RUNOFF VOLUME    (mm)=    3.319
      TOTAL RAINFALL   (mm)=   25.000
      RUNOFF COEFFICIENT   =     .133

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

------------------------------------------------------------------------------
007:0014------------------------------------------------------------------------
------------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 04:EXC-3          5.15     .033    2.08   3.08    .000
                      +ID2 05:C-103          8.99     .074    1.97   3.32    .000
                       ========================================================
                       SUM 10:CTR2          14.14     .106    2.00   3.23    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0015------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=72.00
| 06:C-104  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .260

      Unit Hyd Qpeak  (cms)=     .854

      PEAK FLOW       (cms)=     .072 (i)
      TIME TO PEAK    (hrs)=    1.900
      RUNOFF VOLUME    (mm)=    4.516
      TOTAL RAINFALL   (mm)=   25.000
      RUNOFF COEFFICIENT   =     .181

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

------------------------------------------------------------------------------
007:0016------------------------------------------------------------------------
*#*************************************************************************
------------------------------------------------------------------------------
007:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
007:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
007:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
007:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
007:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
007:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
007:0002------------------------------------------------------------------------
      FINISH
------------------------------------------------------------------------------
*************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0010 ROUTE RESERVOIR
       *** WARNING: Outflow volume is less than inflow volume.
       *** WARNING: Outflow volume is less than inflow volume.
       *** WARNING: Outflow volume is less than inflow volume.
       *** WARNING: Outflow volume is less than inflow volume.
       *** WARNING: Outflow volume is less than inflow volume.
       *** WARNING: Outflow volume is less than inflow volume.
       *** WARNING: Outflow volume is less than inflow volume.
   Simulation ended on 2017-12-21     at 12:50:11
==============================================================================
```

```
00001> ================================================================================
00002>
00003>    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
00004>    S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
00006>        S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
00007>    SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
00008>                                                          9   9  9   9   # 4730904
00009>          StormWater Management HYdrologic Model           999    999    =========
00010>
00011>  ****************************************************************************
00012>  ***************************** SWMHYMO Ver/4.05  ******************************
00013>  *********  A single event and continuous hydrologic simulation model  *********
00014>  *********     based on the principles of HYMO and its successors      *********
00015>  *********                 OTTHYMO-83 and OTTHYMO-89.                  *********
00016>  ****************************************************************************
00017>  ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
00018>  *********                  Ottawa,  Ontario: (613) 836-3884           *********
00019>  *********                  Gatineau, Quebec: (819) 243-6858           *********
00020>  *********                  E-Mail: swmhymo@jfsa.com                   *********
00021>  ****************************************************************************
00022>
00023>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
00025>  +++++++++                  Kitchener             SERIAL#:4730904     +++++++++
00026>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ****************************************************************************
00029>  *********            ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
00030>  *********            Maximum value for ID numbers  :     10             *********
00031>  *********            Max. number of rainfall points: 105408             *********
00032>  *********            Max. number of flow points    : 105408             *********
00033>  ****************************************************************************
00034>
00035>
00036>  **********************   D E T A I L E D   O U T P U T   **********************
00037>  ****************************************************************************
00038>  *         DATE: 2017-12-21     TIME: 12:50:50     RUN COUNTER: 001812         *
00039>  ****************************************************************************
00040>  * Input   filename: C:\TREVOR~1\$13356~1\AMCIII\CEX-1.dat                    *
00041>  * Output  filename: C:\TREVOR~1\$13356~1\AMCIII\CEX-1.out                    *
00042>  * Summary filename: C:\TREVOR~1\$13356~1\AMCIII\CEX-1.sum                    *
00043>  * User comments:                                                            *
00044>  * 1:_______________________________________________________________________*
00045>  * 2:_______________________________________________________________________*
00046>  * 3:_______________________________________________________________________*
00047>  ****************************************************************************
00048>
00049> ----------------------------------------------------------------------------
00050> 001:0001----------------------------------------------------------------------
00051> *#****************************************************************************
00052> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00053> *#  Date        : 2017/12/04
00054> *#  Modeller    : [C. Fischer]
00055> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00056> *#  License #   : 4730904
00057> *#****************************************************************************
00058> *#
00059> *#                       Block C - EXISTING CONDITIONS
00060> *#
00061> *#****************************************************************************
00062> --------------------
00063> | START           |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
00064> -------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
00065>     TZERO =   .00 hrs on      0
00066>     METOUT=   2 (output = METRIC)
00067>     NRUN  = 001
00068>     NSTORM=   1
00069>                #  1=LYA2.1hr
00070> ----------------------------------------------------------------------------
00071> 001:0002----------------------------------------------------------------------
00072> --------------------
00073> | READ STORM       |    Filename: Belleville IDF (1-hr 30% AES - 2 Year)
00074> | Ptotal=  22.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 2 Year)
00075> --------------------
00076>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>                .08  23.868 |    .33  29.172 |    .58  26.520 |    .83   7.956
00079>                .17  37.128 |    .42  34.476 |    .67  13.260 |    .92   2.652
00080>                .25  55.692 |    .50  23.868 |    .75  10.608 |   1.00    .000
00081>
00082> ----------------------------------------------------------------------------
00083> 001:0003----------------------------------------------------------------------
00084> *#****************************************************************************
00085> *#
00086> *#                              AMC III Conditions
00087> *#
00088> *#****************************************************************************
00089> ----------------------
00090> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=73.00
00091> | 01:C-100  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00092> ----------------------   U.H. Tp(hrs)=    .270
00093>
00094>     Unit Hyd Qpeak  (cms)=     .646
00095>
00096>     PEAK FLOW       (cms)=     .064 (i)
00097>     TIME TO PEAK    (hrs)=     .767
00098>     RUNOFF VOLUME    (mm)=    3.705
00099>     TOTAL RAINFALL   (mm)=   22.100
00100>     RUNOFF COEFFICIENT   =     .168
00101>
00102>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00103>
00104> ----------------------------------------------------------------------------
00105> 001:0004----------------------------------------------------------------------
00106> ----------------------
00107> | DESIGN NASHYD      |   Area     (ha)=     .64   Curve Number   (CN)=79.00
00108> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00109> ----------------------   U.H. Tp(hrs)=    .340
00110>
00111>     Unit Hyd Qpeak  (cms)=     .072
00112>
00113>     PEAK FLOW       (cms)=     .010 (i)
00114>     TIME TO PEAK    (hrs)=     .850
00115>     RUNOFF VOLUME    (mm)=    4.815
00116>     TOTAL RAINFALL   (mm)=   22.100
00117>     RUNOFF COEFFICIENT   =     .218
00118>
00119>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00120>
00121> ----------------------------------------------------------------------------
00122> 001:0005----------------------------------------------------------------------
00123> ----------------------
00124> | DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number   (CN)=73.00
00125> | 02:C-101  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00126> ----------------------   U.H. Tp(hrs)=    .350
00127>
00128>     Unit Hyd Qpeak  (cms)=     .914
00129>
00130>     PEAK FLOW       (cms)=     .103 (i)
00131>     TIME TO PEAK    (hrs)=     .867
00132>     RUNOFF VOLUME    (mm)=    3.705
00133>     TOTAL RAINFALL   (mm)=   22.100
00134>     RUNOFF COEFFICIENT   =     .168
00135>
00136>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00137>
00138> ----------------------------------------------------------------------------
00139> 001:0006----------------------------------------------------------------------
00140> ----------------------
00141> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00142> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00143>                        ID1 01:EXC-1        .64     .010     .85   4.82    .000
00144>                       +ID2 02:C-101       8.38     .103     .87   3.70    .000
00145>                        ========================================================
00146>                        SUM 10:CTR1A        9.02     .113     .87   3.78    .000
00147>
00148>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00149>
00150> ----------------------------------------------------------------------------
00151> 001:0007----------------------------------------------------------------------
00152> ----------------------
00153> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=79.00
00154> | 01:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00155> ----------------------   U.H. Tp(hrs)=    .560
00156>
00157>     Unit Hyd Qpeak  (cms)=     .981
00158>
00159>     PEAK FLOW       (cms)=     .167 (i)
00160>     TIME TO PEAK    (hrs)=    1.067
00161>     RUNOFF VOLUME    (mm)=    4.816
00162>     TOTAL RAINFALL   (mm)=   22.100
00163>     RUNOFF COEFFICIENT   =     .218
00164>
00165>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00166>
00167> ----------------------------------------------------------------------------
00168> 001:0008----------------------------------------------------------------------
00169> ----------------------
00170> | DESIGN NASHYD      |   Area     (ha)=    3.19   Curve Number   (CN)=73.00
00171> | 02:C-102  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00172> ----------------------   U.H. Tp(hrs)=    .260
00173>
00174>     Unit Hyd Qpeak  (cms)=     .469
00175>
00176>     PEAK FLOW       (cms)=     .045 (i)
00177>     TIME TO PEAK    (hrs)=     .750
00178>     RUNOFF VOLUME    (mm)=    3.705
00179>     TOTAL RAINFALL   (mm)=   22.100
00180>     RUNOFF COEFFICIENT   =     .168
00181>
00182>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00183>
00184> ----------------------------------------------------------------------------
00185> 001:0009----------------------------------------------------------------------
00186> ----------------------
00187> | ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00188> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00189>                        ID1 01:EXC-2       14.38     .167    1.07   4.82    .000
00190>                       +ID2 02:C-102        3.19     .045     .75   3.70    .000
00191>                        ========================================================
00192>                        SUM 09:CTR1B       17.57     .199     .98   4.61    .000
00193>
00194>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00195>
00196> ----------------------------------------------------------------------------
00197> 001:0010----------------------------------------------------------------------
00198> --------------------
00199> | ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
00200> |  IN>09:(CTR1B )  |
00201> | OUT<08:(SWM1B )  |    =========  OUTLFOW STORAGE TABLE  =========
00202> --------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00203>                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
00204>                           .000  .0000E+00    |     .000  .1618E+00
00205>                           .000  .1259E-01    |     .000  .2671E+00
00206>                           .000  .4269E-01    |     .000  .4058E+00
00207>                           .000  .8978E-01    |     .000  .4888E+00
00208>
00209>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00210>     ---------------            (ha)     (cms)     (hrs)       (mm)
00211>     INFLOW >09: (CTR1B )      17.57      .199      .983      4.614
00212>     OUTFLOW<08: (SWM1B )      17.57      .000      .000       .000
00213>    OVERFLOW<07: (OVSWMB)        .00      .000      .000       .000
00214>
00215>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00216>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00217>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00218>
00219>
00220>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00221>                    TIME SHIFT OF PEAK FLOW          (min)=   -59.00
00222>                    MAXIMUM  STORAGE   USED       (ha.m.)=.8107E-01
00223>
00224>      *** WARNING: Outflow volume is less than inflow volume.
00225> ----------------------------------------------------------------------------
00226> 001:0011----------------------------------------------------------------------
00227> ----------------------
00228> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00229> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00230>                        ID1 10:CTR1A        9.02     .113     .87   3.78    .000
00231>                       +ID2 08:SWM1B       17.57     .000     .00    .00    .000
00232>                       +ID3 07:OVSWMB        .00     .000     .00    .00    .000
00233>                        ========================================================
00234>                        SUM 06:CTR1        26.59     .113     .87   1.28    .000
00235>
00236>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00237>
00238> ----------------------------------------------------------------------------
00239> 001:0012----------------------------------------------------------------------
00240> ----------------------
00241> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=79.00
00242> | 04:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00243> ----------------------   U.H. Tp(hrs)=    .390
00244>
00245>     Unit Hyd Qpeak  (cms)=     .504
00246>
00247>     PEAK FLOW       (cms)=     .077 (i)
00248>     TIME TO PEAK    (hrs)=     .900
00249>     RUNOFF VOLUME    (mm)=    4.816
00250>     TOTAL RAINFALL   (mm)=   22.100
00251>     RUNOFF COEFFICIENT   =     .218
00252>
00253>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00254>
```

```
00255> ---------------------------------------------------------------------------
00256> 001:0013---------------------------------------------------------------------
00257> ---------------------
00258> | DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=81.00
00259> | 05:C-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00260> ---------------------   U.H. Tp(hrs)=    .300
00261>
00262>      Unit Hyd Qpeak  (cms)=    1.145
00263>
00264>      PEAK FLOW       (cms)=     .171 (i)
00265>      TIME TO PEAK    (hrs)=     .800
00266>      RUNOFF VOLUME    (mm)=    5.293
00267>      TOTAL RAINFALL   (mm)=   22.100
00268>      RUNOFF COEFFICIENT   =     .239
00269>
00270>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00271>
00272> ---------------------------------------------------------------------------
00273> 001:0014---------------------------------------------------------------------
00274> ------------------------
00275> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00276> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
00277>                        ID1 04:EXC-3        5.15     .077     .90   4.82    .000
00278>                       +ID2 05:C-103        8.99     .171     .80   5.29    .000
00279>                        ========================================================
00280>                        SUM 10:CTR2         14.14     .245     .83   5.12    .000
00281>
00282>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00283>
00284> ---------------------------------------------------------------------------
00285> 001:0015---------------------------------------------------------------------
00286> ---------------------
00287> | DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=86.00
00288> | 06:C-104  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00289> ---------------------   U.H. Tp(hrs)=    .260
00290>
00291>      Unit Hyd Qpeak  (cms)=     .854
00292>
00293>      PEAK FLOW       (cms)=     .153 (i)
00294>      TIME TO PEAK    (hrs)=     .733
00295>      RUNOFF VOLUME    (mm)=    6.850
00296>      TOTAL RAINFALL   (mm)=   22.100
00297>      RUNOFF COEFFICIENT   =     .310
00298>
00299>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00300>
00301> ---------------------------------------------------------------------------
00302> 001:0016---------------------------------------------------------------------
00303>   ** END OF RUN :   1
00304>
00305> ***************************************************************************
00306>
00307>
00308>
00309>
00310>
00311> --------------------
00312> | START            |  Project  dir.: C:\TREVOR-1\$13356-1\AMCIII\
00313> --------------------  Rainfall dir.: C:\TREVOR-1\$13356-1\AMCIII\
00314>     TZERO =   .00 hrs on        0
00315>     METOUT=   2 (output = METRIC)
00316>     NRUN  = 002
00317>     NSTORM=   1
00318>              #  1=LYA2.12h
00319> ---------------------------------------------------------------------------
00320> 002:0002---------------------------------------------------------------------
00321> *#************************************************************************
00322> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00323> *#  Date       : 2017/12/04
00324> *#  Modeller   : [C. Fischer]
00325> *#  Company    : Stantec Consulting Ltd. (Waterloo)
00326> *#  License #  : 4730904
00327> *#************************************************************************
00328> *#
00329> *#                     Block C - EXISTING CONDITIONS
00330> *#
00331> *#************************************************************************
00332> ---------------------------------------------------------------------------
00333> 002:0002---------------------------------------------------------------------
00334> --------------------
00335> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 2 Year)
00336> | Ptotal=  42.24 mm|    Comments: Belleville IDF (12-hr 30% AES - 2 Year)
00337> --------------------
00338>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00339>                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00340>               1.00   3.960 |   4.00   6.600 |   7.00   1.320 |  10.00    .000
00341>               2.00  11.440 |   5.00   6.160 |   8.00    .440 |  11.00    .000
00342>               3.00   8.800 |   6.00   3.520 |   9.00    .000 |  12.00    .000
00343>
00344> ---------------------------------------------------------------------------
00345> 002:0003---------------------------------------------------------------------
00346> *#************************************************************************
00347> *#
00348> *#                              AMC III Conditions
00349> *#
00350> *#************************************************************************
00351> ---------------------
00352> | DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=73.00
00353> | 01:C-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00354> ---------------------   U.H. Tp(hrs)=    .270
00355>
00356>      Unit Hyd Qpeak  (cms)=     .646
00357>
00358>      PEAK FLOW       (cms)=     .035 (i)
00359>      TIME TO PEAK    (hrs)=    5.033
00360>      RUNOFF VOLUME    (mm)=   12.323
00361>      TOTAL RAINFALL   (mm)=   42.240
00362>      RUNOFF COEFFICIENT   =     .292
00363>
00364>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00365>
00366> ---------------------------------------------------------------------------
00367> 002:0004---------------------------------------------------------------------
00368> ---------------------
00369> | DESIGN NASHYD      |   Area    (ha)=     .64   Curve Number   (CN)=79.00
00370> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00371> ---------------------   U.H. Tp(hrs)=    .340
00372>
00373>      Unit Hyd Qpeak  (cms)=     .072
00374>
00375>      PEAK FLOW       (cms)=     .006 (i)
00376>      TIME TO PEAK    (hrs)=    3.150
00377>      RUNOFF VOLUME    (mm)=   15.331
00378>      TOTAL RAINFALL   (mm)=   42.240
00379>      RUNOFF COEFFICIENT   =     .363
00380>
00381>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00382>
00383> ---------------------------------------------------------------------------
00384> 002:0005---------------------------------------------------------------------
00385> ---------------------
00386> | DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=73.00
00387> | 02:C-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00388> ---------------------   U.H. Tp(hrs)=    .350
00389>
00390>      Unit Hyd Qpeak  (cms)=     .914
00391>
00392>      PEAK FLOW       (cms)=     .064 (i)
00393>      TIME TO PEAK    (hrs)=    5.050
00394>      RUNOFF VOLUME    (mm)=   12.323
00395>      TOTAL RAINFALL   (mm)=   42.240
00396>      RUNOFF COEFFICIENT   =     .292
00397>
00398>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00399>
00400> ---------------------------------------------------------------------------
00401> 002:0006---------------------------------------------------------------------
00402> ------------------------
00403> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00404> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
00405>                        ID1 01:EXC-1         .64     .006    3.15  15.33    .000
00406>                       +ID2 02:C-101        8.38     .064    5.05  12.32    .000
00407>                        ========================================================
00408>                        SUM 10:CTR1A         9.02     .070    5.05  12.54    .000
00409>
00410>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00411>
00412> ---------------------------------------------------------------------------
00413> 002:0007---------------------------------------------------------------------
00414> ---------------------
00415> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=79.00
00416> | 01:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00417> ---------------------   U.H. Tp(hrs)=    .560
00418>
00419>      Unit Hyd Qpeak  (cms)=     .981
00420>
00421>      PEAK FLOW       (cms)=     .132 (i)
00422>      TIME TO PEAK    (hrs)=    5.083
00423>      RUNOFF VOLUME    (mm)=   15.331
00424>      TOTAL RAINFALL   (mm)=   42.240
00425>      RUNOFF COEFFICIENT   =     .363
00426>
00427>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00428>
00429> ---------------------------------------------------------------------------
00430> 002:0008---------------------------------------------------------------------
00431> ---------------------
00432> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=73.00
00433> | 02:C-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00434> ---------------------   U.H. Tp(hrs)=    .260
00435>
00436>      Unit Hyd Qpeak  (cms)=     .469
00437>
00438>      PEAK FLOW       (cms)=     .025 (i)
00439>      TIME TO PEAK    (hrs)=    3.100
00440>      RUNOFF VOLUME    (mm)=   12.323
00441>      TOTAL RAINFALL   (mm)=   42.240
00442>      RUNOFF COEFFICIENT   =     .292
00443>
00444>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00445>
00446> ---------------------------------------------------------------------------
00447> 002:0009---------------------------------------------------------------------
00448> ------------------------
00449> | ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00450> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
00451>                        ID1 01:EXC-2        14.38     .132    5.08  15.33    .000
00452>                       +ID2 02:C-102         3.19     .025    3.10  12.32    .000
00453>                        ========================================================
00454>                        SUM 09:CTR1B        17.57     .157    5.05  14.79    .000
00455>
00456>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00457>
00458> ---------------------------------------------------------------------------
00459> 002:0010---------------------------------------------------------------------
00460> --------------------
00461> | ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
00462> |  IN>09:(CTR1B )  |
00463> | OUT<08:(SWM1B )  |    =========  OUTFLOW STORAGE TABLE  =========
00464> --------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00465>                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
00466>                            .000  .0000E+00    |     .000  .1618E+00
00467>                            .000  .1259E-01    |     .000  .2671E+00
00468>                            .000  .4269E-01    |     .000  .4058E+00
00469>                            .000  .8978E-01    |     .000  .4888E+00
00470>
00471>     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
00472>     --------------------        (ha)     (cms)     (hrs)       (mm)
00473>     INFLOW >09: (CTR1B )       17.57      .157     5.050     14.785
00474>     OUTFLOW<08: (SWM1B )       17.57      .000      .000       .000
00475>    OVERFLOW<07: (OVSWMB)         .00      .000      .000       .000
00476>
00477>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00478>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00479>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00480>
00481>
00482>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00483>                    TIME SHIFT OF PEAK FLOW          (min)=  -303.00
00484>                    MAXIMUM  STORAGE   USED        (ha.m.)=.2598E+00
00485>
00486>       *** WARNING: Outflow volume is less than inflow volume.
00487> ---------------------------------------------------------------------------
00488> 002:0011---------------------------------------------------------------------
00489> ------------------------
00490> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00491> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
00492>                        ID1 10:CTR1A         9.02     .070    5.05  12.54    .000
00493>                       +ID2 08:SWM1B        17.57     .000     .00    .00    .000
00494>                       +ID3 07:OVSWMB         .00     .000     .00    .00    .000
00495>                        ========================================================
00496>                        SUM 06:CTR1         26.59     .070    5.05   4.25    .000
00497>
00498>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00499>
00500> ---------------------------------------------------------------------------
00501> 002:0012---------------------------------------------------------------------
00502> ---------------------
00503> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=79.00
00504> | 04:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00505> ---------------------   U.H. Tp(hrs)=    .390
00506>
00507>      Unit Hyd Qpeak  (cms)=     .504
00508>
```

```
      PEAK FLOW       (cms)=     .049 (i)
      TIME TO PEAK    (hrs)=    3.183
      RUNOFF VOLUME    (mm)=   15.331
      TOTAL RAINFALL   (mm)=   42.240
      RUNOFF COEFFICIENT   =     .363

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

------------------------------------------------------------------------------
002:0013------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=81.00
| 05:C-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .300

      Unit Hyd Qpeak  (cms)=    1.145

      PEAK FLOW       (cms)=     .095 (i)
      TIME TO PEAK    (hrs)=    3.117
      RUNOFF VOLUME    (mm)=   16.545
      TOTAL RAINFALL   (mm)=   42.240
      RUNOFF COEFFICIENT   =     .392

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

------------------------------------------------------------------------------
002:0014------------------------------------------------------------------------
-------------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-------------------------                (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 04:EXC-3          5.15     .049    3.18  15.33    .000
                    +ID2 05:C-103          8.99     .095    3.12  16.54    .000
                     ==========================================================
                     SUM 10:CTR2           14.14     .143    3.13  16.10    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
002:0015------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=86.00
| 06:C-104  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .260

      Unit Hyd Qpeak  (cms)=     .854

      PEAK FLOW       (cms)=     .077 (i)
      TIME TO PEAK    (hrs)=    3.083
      RUNOFF VOLUME    (mm)=   20.219
      TOTAL RAINFALL   (mm)=   42.240
      RUNOFF COEFFICIENT   =     .479

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

------------------------------------------------------------------------------
002:0016------------------------------------------------------------------------
------------------------------------------------------------------------------
002:0002------------------------------------------------------------------------
  ** END OF RUN :   2

*******************************************************************************



---------------------
| START              |  Project  dir.: C:\TREVOR-1\$13356-1\AMCIII\
----------------------  Rainfall dir.: C:\TREVOR-1\$13356-1\AMCIII\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 003
    NSTORM=   1
           #  1=LYA5.1hr
------------------------------------------------------------------------------
003:0002------------------------------------------------------------------------
*#**************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/12/04
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
*#  License #   : 4730904
*#**************************************************************************
*#
*#                      Block C - EXISTING CONDITIONS
*#
*#**************************************************************************
------------------------------------------------------------------------------
003:0002------------------------------------------------------------------------
---------------------
| READ STORM         |    Filename: Belleville IDF (1-hr 30% AES - 5 Year)
| Ptotal=  28.00 mm  |    Comments: Belleville IDF (1-hr 30% AES - 5 Year)
---------------------
               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                .08  30.240 |    .33  36.960 |    .58  33.600 |    .83  10.080
                .17  47.040 |    .42  43.680 |    .67  16.800 |    .92   3.360
                .25  70.560 |    .50  30.240 |    .75  13.440 |   1.00    .000

------------------------------------------------------------------------------
003:0003------------------------------------------------------------------------
*#**************************************************************************
*#                            AMC III Conditions
*#**************************************************************************
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=73.00
| 01:C-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .270

      Unit Hyd Qpeak  (cms)=     .646

      PEAK FLOW       (cms)=     .100 (i)
      TIME TO PEAK    (hrs)=     .767
      RUNOFF VOLUME    (mm)=    5.830
      TOTAL RAINFALL   (mm)=   28.000
      RUNOFF COEFFICIENT   =     .208

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

------------------------------------------------------------------------------
003:0004------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=     .64   Curve Number   (CN)=79.00
| 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .340

      Unit Hyd Qpeak  (cms)=     .072

      PEAK FLOW       (cms)=     .016 (i)
      TIME TO PEAK    (hrs)=     .833
      RUNOFF VOLUME    (mm)=    7.469
      TOTAL RAINFALL   (mm)=   28.000
      RUNOFF COEFFICIENT   =     .267

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

------------------------------------------------------------------------------
003:0005------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=73.00
| 02:C-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .350

      Unit Hyd Qpeak  (cms)=     .914

      PEAK FLOW       (cms)=     .161 (i)
      TIME TO PEAK    (hrs)=     .850
      RUNOFF VOLUME    (mm)=    5.830
      TOTAL RAINFALL   (mm)=   28.000
      RUNOFF COEFFICIENT   =     .208

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

------------------------------------------------------------------------------
003:0006------------------------------------------------------------------------
-------------------------
| ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-------------------------                (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 01:EXC-1           .64     .016     .83   7.47    .000
                    +ID2 02:C-101          8.38     .161     .85   5.83    .000
                     ==========================================================
                     SUM 10:CTR1A          9.02     .177     .85   5.95    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0007------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=79.00
| 01:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .560

      Unit Hyd Qpeak  (cms)=     .981

      PEAK FLOW       (cms)=     .258 (i)
      TIME TO PEAK    (hrs)=    1.050
      RUNOFF VOLUME    (mm)=    7.469
      TOTAL RAINFALL   (mm)=   28.000
      RUNOFF COEFFICIENT   =     .267

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

------------------------------------------------------------------------------
003:0008------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=73.00
| 02:C-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .260

      Unit Hyd Qpeak  (cms)=     .469

      PEAK FLOW       (cms)=     .071 (i)
      TIME TO PEAK    (hrs)=     .750
      RUNOFF VOLUME    (mm)=    5.830
      TOTAL RAINFALL   (mm)=   28.000
      RUNOFF COEFFICIENT   =     .208

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

------------------------------------------------------------------------------
003:0009------------------------------------------------------------------------
-------------------------
| ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-------------------------                (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 01:EXC-2         14.38     .258    1.05   7.47    .000
                    +ID2 02:C-102          3.19     .071     .75   5.83    .000
                     ==========================================================
                     SUM 09:CTR1B         17.57     .309     .97   7.17    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0010------------------------------------------------------------------------
-----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>09:(CTR1B )    |
| OUT<08:(SWM1B )    |    =========  OUTLFOW STORAGE TABLE  =========
-----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000   .0000E+00    |     .000  .1618E+00
                            .000   .1259E-01    |     .000  .2671E+00
                            .000   .4269E-01    |     .000  .4058E+00
                            .000   .8978E-01    |     .000  .4888E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     ---------------------        (ha)     (cms)     (hrs)       (mm)
    INFLOW >09: (CTR1B )        17.57      .309      .967      7.172
    OUTFLOW<08: (SWM1B )        17.57      .000      .000       .000
   OVERFLOW<07: (OVSWMB)          .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
                    TIME SHIFT OF PEAK FLOW          (min)=    -58.00
                    MAXIMUM  STORAGE   USED        (ha.m.)=.1260E+00

      *** WARNING: Outflow volume is less than inflow volume.

------------------------------------------------------------------------------
003:0011------------------------------------------------------------------------
-------------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-------------------------                (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 10:CTR1A          9.02     .177     .85   5.95    .000
                    +ID2 08:SWM1B         17.57     .000     .00    .00    .000
                    +ID3 07:OVSWMB          .00     .000     .00    .00    .000
                     ==========================================================
                     SUM 06:CTR1          26.59     .177     .85   2.02    .000

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

```
00763>
00764> ------------------------------------------------------------------------------
00765> 003:0012-----------------------------------------------------------------------
00766> ----------------------
00767> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=79.00
00768> | 04:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00769> ----------------------   U.H. Tp(hrs)=    .390
00770>
00771>      Unit Hyd Qpeak  (cms)=     .504
00772>
00773>      PEAK FLOW       (cms)=     .119 (i)
00774>      TIME TO PEAK    (hrs)=     .900
00775>      RUNOFF VOLUME    (mm)=    7.469
00776>      TOTAL RAINFALL   (mm)=   28.000
00777>      RUNOFF COEFFICIENT   =     .267
00778>
00779>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00780>
00781> ------------------------------------------------------------------------------
00782> 003:0013-----------------------------------------------------------------------
00783> ----------------------
00784> | DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=81.00
00785> | 05:C-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00786> ----------------------   U.H. Tp(hrs)=    .300
00787>
00788>      Unit Hyd Qpeak  (cms)=    1.145
00789>
00790>      PEAK FLOW       (cms)=     .262 (i)
00791>      TIME TO PEAK    (hrs)=     .783
00792>      RUNOFF VOLUME    (mm)=    8.158
00793>      TOTAL RAINFALL   (mm)=   28.000
00794>      RUNOFF COEFFICIENT   =     .291
00795>
00796>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00797>
00798> ------------------------------------------------------------------------------
00799> 003:0014-----------------------------------------------------------------------
00800> ----------------------
00801> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00802> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00803>                        ID1 04:EXC-3          5.15     .119     .90   7.47    .000
00804>                       +ID2 05:C-103          8.99     .262     .78   8.16    .000
00805>                        ============================================================
00806>                        SUM 10:CTR2           14.14     .377     .82   7.91    .000
00807>
00808>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00809>
00810> ------------------------------------------------------------------------------
00811> 003:0015-----------------------------------------------------------------------
00812> ----------------------
00813> | DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=86.00
00814> | 06:C-104  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00815> ----------------------   U.H. Tp(hrs)=    .260
00816>
00817>      Unit Hyd Qpeak  (cms)=     .854
00818>
00819>      PEAK FLOW       (cms)=     .230 (i)
00820>      TIME TO PEAK    (hrs)=     .733
00821>      RUNOFF VOLUME    (mm)=   10.350
00822>      TOTAL RAINFALL   (mm)=   28.000
00823>      RUNOFF COEFFICIENT   =     .370
00824>
00825>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00826>
00827> ------------------------------------------------------------------------------
00828> 003:0016-----------------------------------------------------------------------
00829> ------------------------------------------------------------------------------
00830> 003:0002-----------------------------------------------------------------------
00831> ------------------------------------------------------------------------------
00832> 003:0002-----------------------------------------------------------------------
00833>   ** END OF RUN :   3
00834>
00835> ******************************************************************************
00836>
00837>
00838>
00839>
00840>
00841> --------------------
00842> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
00843> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
00844>     TZERO =   .00 hrs on        0
00845>     METOUT=   2 (output = METRIC)
00846>     NRUN  = 004
00847>     NSTORM=   1
00848>            #  1=LYA5.12h
00849> ------------------------------------------------------------------------------
00850> 004:0002-----------------------------------------------------------------------
00851> *#*************************************************************************
00852> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00853> *#  Date        : 2017/12/04
00854> *#  Modeller    : [C. Fischer]
00855> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00856> *#  License #   : 4730904
00857> *#*************************************************************************
00858> *#
00859> *#                      Block C - EXISTING CONDITIONS
00860> *#
00861> *#*************************************************************************
00862> ------------------------------------------------------------------------------
00863> 004:0002-----------------------------------------------------------------------
00864> --------------------
00865> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 5 Year)
00866> | Ptotal=  55.97 mm|    Comments: Belleville IDF (12-hr 30% AES - 5 Year)
00867> --------------------
00868>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00869>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00870>              1.00   5.247 |   4.00   8.745 |   7.00   1.749 |  10.00    .000
00871>              2.00  15.158 |   5.00   8.162 |   8.00    .583 |  11.00    .000
00872>              3.00  11.660 |   6.00   4.664 |   9.00    .000 |  12.00    .000
00873>
00874> ------------------------------------------------------------------------------
00875> 004:0003-----------------------------------------------------------------------
00876> *#*************************************************************************
00877> *#
00878> *#                              AMC III Conditions
00879> *#
00880> *#*************************************************************************
00881> ----------------------
00882> | DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=73.00
00883> | 01:C-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00884> ----------------------   U.H. Tp(hrs)=    .270
00885>
00886>      Unit Hyd Qpeak  (cms)=     .646
00887>
00888>      PEAK FLOW       (cms)=     .058 (i)
00889>      TIME TO PEAK    (hrs)=    3.100
00890>      RUNOFF VOLUME    (mm)=   19.990
00891>      TOTAL RAINFALL   (mm)=   55.968
00892>      RUNOFF COEFFICIENT   =     .357
00893>
00894>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00895>
00896> ------------------------------------------------------------------------------
00897> 004:0004-----------------------------------------------------------------------
00898> ----------------------
00899> | DESIGN NASHYD      |   Area    (ha)=     .64   Curve Number   (CN)=79.00
00900> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00901> ----------------------   U.H. Tp(hrs)=    .340
00902>
00903>      Unit Hyd Qpeak  (cms)=     .072
00904>
00905>      PEAK FLOW       (cms)=     .010 (i)
00906>      TIME TO PEAK    (hrs)=    3.133
00907>      RUNOFF VOLUME    (mm)=   24.320
00908>      TOTAL RAINFALL   (mm)=   55.968
00909>      RUNOFF COEFFICIENT   =     .435
00910>
00911>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00912>
00913> ------------------------------------------------------------------------------
00914> 004:0005-----------------------------------------------------------------------
00915> ----------------------
00916> | DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=73.00
00917> | 02:C-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00918> ----------------------   U.H. Tp(hrs)=    .350
00919>
00920>      Unit Hyd Qpeak  (cms)=     .914
00921>
00922>      PEAK FLOW       (cms)=     .104 (i)
00923>      TIME TO PEAK    (hrs)=    3.150
00924>      RUNOFF VOLUME    (mm)=   19.990
00925>      TOTAL RAINFALL   (mm)=   55.968
00926>      RUNOFF COEFFICIENT   =     .357
00927>
00928>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00929>
00930> ------------------------------------------------------------------------------
00931> 004:0006-----------------------------------------------------------------------
00932> ----------------------
00933> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00934> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00935>                        ID1 01:EXC-1           .64     .010    3.13  24.32    .000
00936>                       +ID2 02:C-101          8.38     .104    3.15  19.99    .000
00937>                        ============================================================
00938>                        SUM 10:CTR1A           9.02     .114    3.15  20.30    .000
00939>
00940>   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00941>
00942> ------------------------------------------------------------------------------
00943> 004:0007-----------------------------------------------------------------------
00944> ----------------------
00945> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=79.00
00946> | 01:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00947> ----------------------   U.H. Tp(hrs)=    .560
00948>
00949>      Unit Hyd Qpeak  (cms)=     .981
00950>
00951>      PEAK FLOW       (cms)=     .210 (i)
00952>      TIME TO PEAK    (hrs)=    3.367
00953>      RUNOFF VOLUME    (mm)=   24.320
00954>      TOTAL RAINFALL   (mm)=   55.968
00955>      RUNOFF COEFFICIENT   =     .435
00956>
00957>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00958>
00959> ------------------------------------------------------------------------------
00960> 004:0008-----------------------------------------------------------------------
00961> ----------------------
00962> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=73.00
00963> | 02:C-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00964> ----------------------   U.H. Tp(hrs)=    .260
00965>
00966>      Unit Hyd Qpeak  (cms)=     .469
00967>
00968>      PEAK FLOW       (cms)=     .041 (i)
00969>      TIME TO PEAK    (hrs)=    3.083
00970>      RUNOFF VOLUME    (mm)=   19.990
00971>      TOTAL RAINFALL   (mm)=   55.968
00972>      RUNOFF COEFFICIENT   =     .357
00973>
00974>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00975>
00976> ------------------------------------------------------------------------------
00977> 004:0009-----------------------------------------------------------------------
00978> ----------------------
00979> | ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00980> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00981>                        ID1 01:EXC-2          14.38     .210    3.37  24.32    .000
00982>                       +ID2 02:C-102           3.19     .041    3.08  19.99    .000
00983>                        ============================================================
00984>                        SUM 09:CTR1B          17.57     .248    3.27  23.53    .000
00985>
00986>   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00987>
00988> ------------------------------------------------------------------------------
00989> 004:0010-----------------------------------------------------------------------
00990> ----------------------
00991> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00992> |  IN>09:(CTR1B )    |
00993> | OUT<08:(SWM1B )    |    =========  OUTLPOW STORAGE TABLE  =========
00994> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00995>                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
00996>                             .000  .0000E+00     |     .000  .1618E+00
00997>                             .000  .1259E-01     |     .000  .2671E+00
00998>                             .000  .4269E-01     |     .000  .4058E+00
00999>                             .000  .8978E-01     |     .000  .4888E+00
01000>
01001>      ROUTING RESULTS            AREA     QPEAK     TPEAK        R.V.
01002>      ---------------           (ha)     (cms)     (hrs)        (mm)
01003>      INFLOW >09: (CTR1B )      17.57      .248     3.267      23.534
01004>      OUTFLOW<08: (SWM1B )      17.57      .000      .000       .000
01005>     OVERFLOW<07: (OVSWMB)        .00      .000      .000       .000
01006>
01007>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01008>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01009>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01010>
01011>
01012>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01013>                     TIME SHIFT OF PEAK FLOW          (min)=  -196.00
01014>                     MAXIMUM  STORAGE   USED        (ha.m.)=.4135E+00
01015>
01016>       *** WARNING: Outflow volume is less than inflow volume.
```

```
01017> --------------------------------------------------------------------------------
01018> 004:0011--------------------------------------------------------------------------
01019> ----------------------
01020> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01021> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
01022>                        ID1 10:CTR1A        9.02     .114    3.15  20.30    .000
01023>                       +ID2 08:SWM1B       17.57     .000     .00    .00    .000
01024>                       +ID3 07:OVSWMB        .00     .000     .00    .00    .000
01025>                        ============================================================
01026>                        SUM 06:CTR1         26.59     .114    3.15   6.89    .000
01027>
01028>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01029>
01030> --------------------------------------------------------------------------------
01031> 004:0012--------------------------------------------------------------------------
01032> ----------------------
01033> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=79.00
01034> | 04:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01035> ----------------------   U.H. Tp(hrs)=    .390
01036>
01037>      Unit Hyd Qpeak  (cms)=     .504
01038>
01039>      PEAK FLOW       (cms)=     .078 (i)
01040>      TIME TO PEAK    (hrs)=    3.167
01041>      RUNOFF VOLUME    (mm)=   24.320
01042>      TOTAL RAINFALL   (mm)=   55.968
01043>      RUNOFF COEFFICIENT   =     .435
01044>
01045>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01046>
01047> --------------------------------------------------------------------------------
01048> 004:0013--------------------------------------------------------------------------
01049> ----------------------
01050> | DESIGN NASHYD      |   Area     (ha)=    8.99   Curve Number   (CN)=81.00
01051> | 05:C-103  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01052> ----------------------   U.H. Tp(hrs)=    .300
01053>
01054>      Unit Hyd Qpeak  (cms)=    1.145
01055>
01056>      PEAK FLOW       (cms)=     .151 (i)
01057>      TIME TO PEAK    (hrs)=    3.100
01058>      RUNOFF VOLUME    (mm)=   26.013
01059>      TOTAL RAINFALL   (mm)=   55.968
01060>      RUNOFF COEFFICIENT   =     .465
01061>
01062>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01063>
01064> --------------------------------------------------------------------------------
01065> 004:0014--------------------------------------------------------------------------
01066> ----------------------
01067> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01068> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
01069>                        ID1 04:EXC-3        5.15     .078    3.17  24.32    .000
01070>                       +ID2 05:C-103        8.99     .151    3.10  26.01    .000
01071>                        ============================================================
01072>                        SUM 10:CTR2         14.14     .229    3.12  25.40    .000
01073>
01074>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01075>
01076> --------------------------------------------------------------------------------
01077> 004:0015--------------------------------------------------------------------------
01078> ----------------------
01079> | DESIGN NASHYD      |   Area     (ha)=    5.81   Curve Number   (CN)=86.00
01080> | 06:C-104  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01081> ----------------------   U.H. Tp(hrs)=    .260
01082>
01083>      Unit Hyd Qpeak  (cms)=     .854
01084>
01085>      PEAK FLOW       (cms)=     .118 (i)
01086>      TIME TO PEAK    (hrs)=    3.067
01087>      RUNOFF VOLUME    (mm)=   30.963
01088>      TOTAL RAINFALL   (mm)=   55.968
01089>      RUNOFF COEFFICIENT   =     .553
01090>
01091>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01092>
01093> --------------------------------------------------------------------------------
01094> 004:0016--------------------------------------------------------------------------
01095> --------------------------------------------------------------------------------
01096> 004:0002--------------------------------------------------------------------------
01097> --------------------------------------------------------------------------------
01098> 004:0002--------------------------------------------------------------------------
01099> --------------------------------------------------------------------------------
01100> 004:0002--------------------------------------------------------------------------
01101>   ** END OF RUN :   4
01102>
01103> ********************************************************************************
01104>
01105>
01106>
01107>
01108>
01109> --------------------
01110> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
01111> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
01112>     TZERO =   .00 hrs on        0
01113>     METOUT=   2 (output = METRIC)
01114>     NRUN  = 005
01115>     NSTORM=   1
01116>            #  1=LYA100.1hr
01117> --------------------------------------------------------------------------------
01118> 005:0002--------------------------------------------------------------------------
01119> *#*****************************************************************************
01120> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
01121> *#  Date       : 2017/12/04
01122> *#  Modeller   : [C. Fischer]
01123> *#  Company    : Stantec Consulting Ltd. (Waterloo)
01124> *#  License #  : 4730904
01125> *#*****************************************************************************
01126> *#
01127> *#                     Block C - EXISTING CONDITIONS
01128> *#
01129> *#*****************************************************************************
01130> --------------------------------------------------------------------------------
01131> 005:0002--------------------------------------------------------------------------
01132> --------------------
01133> | READ STORM       |    Filename: Belleville IDF (1-hr 30% AES - 100 Year)
01134> | Ptotal=  44.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 100 Year)
01135> --------------------
01136>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
01137>                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
01138>                .08  47.628 |    .33  58.212 |    .58  52.920 |    .83  15.876
01139>                .17  74.088 |    .42  68.796 |    .67  26.460 |    .92   5.292
01140>                .25 111.132 |    .50  47.628 |    .75  21.168 |   1.00    .000
01141>
01142> --------------------------------------------------------------------------------
01143> 005:0003--------------------------------------------------------------------------
01144> *#*****************************************************************************
01145> *#
01146> *#                              AMC III Conditions
01147> *#
01148> *#*****************************************************************************
01149> ----------------------
01150> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=73.00
01151> | 01:C-100  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01152> ----------------------   U.H. Tp(hrs)=    .270
01153>
01154>      Unit Hyd Qpeak  (cms)=     .646
01155>
01156>      PEAK FLOW       (cms)=     .227 (i)
01157>      TIME TO PEAK    (hrs)=     .750
01158>      RUNOFF VOLUME    (mm)=   13.291
01159>      TOTAL RAINFALL   (mm)=   44.100
01160>      RUNOFF COEFFICIENT   =     .301
01161>
01162>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01163>
01164> --------------------------------------------------------------------------------
01165> 005:0004--------------------------------------------------------------------------
01166> ----------------------
01167> | DESIGN NASHYD      |   Area     (ha)=     .64   Curve Number   (CN)=79.00
01168> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01169> ----------------------   U.H. Tp(hrs)=    .340
01170>
01171>      Unit Hyd Qpeak  (cms)=     .072
01172>
01173>      PEAK FLOW       (cms)=     .035 (i)
01174>      TIME TO PEAK    (hrs)=     .817
01175>      RUNOFF VOLUME    (mm)=   16.480
01176>      TOTAL RAINFALL   (mm)=   44.100
01177>      RUNOFF COEFFICIENT   =     .374
01178>
01179>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01180>
01181> --------------------------------------------------------------------------------
01182> 005:0005--------------------------------------------------------------------------
01183> ----------------------
01184> | DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number   (CN)=73.00
01185> | 02:C-101  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01186> ----------------------   U.H. Tp(hrs)=    .350
01187>
01188>      Unit Hyd Qpeak  (cms)=     .914
01189>
01190>      PEAK FLOW       (cms)=     .365 (i)
01191>      TIME TO PEAK    (hrs)=     .850
01192>      RUNOFF VOLUME    (mm)=   13.291
01193>      TOTAL RAINFALL   (mm)=   44.100
01194>      RUNOFF COEFFICIENT   =     .301
01195>
01196>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01197>
01198> --------------------------------------------------------------------------------
01199> 005:0006--------------------------------------------------------------------------
01200> ----------------------
01201> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01202> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
01203>                        ID1 01:EXC-1         .64     .035     .82  16.48    .000
01204>                       +ID2 02:C-101        8.38     .365     .85  13.29    .000
01205>                        ============================================================
01206>                        SUM 10:CTR1A         9.02     .400     .85  13.52    .000
01207>
01208>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01209>
01210> --------------------------------------------------------------------------------
01211> 005:0007--------------------------------------------------------------------------
01212> ----------------------
01213> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=79.00
01214> | 01:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01215> ----------------------   U.H. Tp(hrs)=    .560
01216>
01217>      Unit Hyd Qpeak  (cms)=     .981
01218>
01219>      PEAK FLOW       (cms)=     .567 (i)
01220>      TIME TO PEAK    (hrs)=    1.033
01221>      RUNOFF VOLUME    (mm)=   16.480
01222>      TOTAL RAINFALL   (mm)=   44.100
01223>      RUNOFF COEFFICIENT   =     .374
01224>
01225>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01226>
01227> --------------------------------------------------------------------------------
01228> 005:0008--------------------------------------------------------------------------
01229> ----------------------
01230> | DESIGN NASHYD      |   Area     (ha)=    3.19   Curve Number   (CN)=73.00
01231> | 02:C-102  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01232> ----------------------   U.H. Tp(hrs)=    .260
01233>
01234>      Unit Hyd Qpeak  (cms)=     .469
01235>
01236>      PEAK FLOW       (cms)=     .161 (i)
01237>      TIME TO PEAK    (hrs)=     .733
01238>      RUNOFF VOLUME    (mm)=   13.291
01239>      TOTAL RAINFALL   (mm)=   44.100
01240>      RUNOFF COEFFICIENT   =     .301
01241>
01242>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01243>
01244> --------------------------------------------------------------------------------
01245> 005:0009--------------------------------------------------------------------------
01246> ----------------------
01247> | ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01248> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
01249>                        ID1 01:EXC-2        14.38     .567    1.03  16.48    .000
01250>                       +ID2 02:C-102        3.19     .161     .73  13.29    .000
01251>                        ============================================================
01252>                        SUM 09:CTR1B        17.57     .684     .95  15.90    .000
01253>
01254>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01255>
01256> --------------------------------------------------------------------------------
01257> 005:0010--------------------------------------------------------------------------
01258> ----------------------
01259> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01260> |  IN>09:(CTR1B )    |
01261> | OUT<08:(SWM1B )    |    =========  OUTLFOW STORAGE TABLE  =========
01262> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01263>                             (cms)    (ha.m.)   |    (cms)    (ha.m.)
01264>                              .000  .0000E+00    |     .000  .1618E+00
01265>                              .000  .1259E-01    |     .000  .2671E+00
01266>                              .000  .4269E-01    |     .000  .4058E+00
01267>                              .000  .8978E-01    |     .000  .4888E+00
01268>
01269>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01270>      ---------------------      (ha)     (cms)     (hrs)       (mm)
```

```
      INFLOW >09: (CTR1B )      17.57      .684      .950     15.901
      OUTFLOW<08: (SWM1B )      17.57      .000      .000       .000
     OVERFLOW<07: (OVSWMB)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -57.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2794E+00

       *** WARNING: Outflow volume is less than inflow volume.
```

```
005:0011
```

ADD HYD (CTR1)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 10:CTR1A	9.02	.400	.85	13.52	.000
	+ID2 08:SWM1B	17.57	.000	.00	.00	.000
	+ID3 07:OVSWMB	.00	.000	.00	.00	.000
	SUM 06:CTR1	26.59	.400	.85	4.59	.000

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

```
005:0012
```

DESIGN NASHYD	Area (ha)= 5.15	Curve Number (CN)=79.00
04:EXC-3 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .390	

```
      Unit Hyd Qpeak  (cms)=     .504

      PEAK FLOW       (cms)=     .261 (i)
      TIME TO PEAK    (hrs)=     .883
      RUNOFF VOLUME    (mm)=   16.480
      TOTAL RAINFALL   (mm)=   44.100
      RUNOFF COEFFICIENT   =     .374

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

```
005:0013
```

DESIGN NASHYD	Area (ha)= 8.99	Curve Number (CN)=81.00
05:C-103 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .300	

```
      Unit Hyd Qpeak  (cms)=    1.145

      PEAK FLOW       (cms)=     .567 (i)
      TIME TO PEAK    (hrs)=     .767
      RUNOFF VOLUME    (mm)=   17.760
      TOTAL RAINFALL   (mm)=   44.100
      RUNOFF COEFFICIENT   =     .403

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

```
005:0014
```

ADD HYD (CTR2)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 04:EXC-3	5.15	.261	.88	16.48	.000
	+ID2 05:C-103	8.99	.567	.77	17.76	.000
	SUM 10:CTR2	14.14	.819	.80	17.29	.000

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

```
005:0015
```

DESIGN NASHYD	Area (ha)= 5.81	Curve Number (CN)=86.00
06:C-104 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .260	

```
      Unit Hyd Qpeak  (cms)=     .854

      PEAK FLOW       (cms)=     .477 (i)
      TIME TO PEAK    (hrs)=     .717
      RUNOFF VOLUME    (mm)=   21.617
      TOTAL RAINFALL   (mm)=   44.100
      RUNOFF COEFFICIENT   =     .490

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

```
005:0016
005:0002
005:0002
005:0002
005:0002
005:0002
   ** END OF RUN :   5
```

```
*******************************************************************************
```

```
| START | Project dir.: C:\TREVOR-1\$13356-1\AMCIII\
|       | Rainfall dir.: C:\TREVOR-1\$13356-1\AMCIII\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
            #  1=LYA100.12h
```

```
006:0002
*#*****************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/12/04
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
*#  License #   : 4730904
*#*****************************************************************************
*#
*#                     Block C - EXISTING CONDITIONS
*#
*#*****************************************************************************
*#*****************************************************************************
006:0002
```

READ STORM	Filename: Belleville IDF (12-hr 30% AES - 100 Year
Ptotal= 93.70 mm	Comments: Belleville IDF (12-hr 30% AES - 100 Year

	TIME (hrs)	RAIN (mm/hr)	TIME (hrs)	RAIN (mm/hr)	TIME (hrs)	RAIN (mm/hr)	TIME (hrs)	RAIN (mm/hr)
	1.00	8.784	4.00	14.640	7.00	2.928	10.00	.000
	2.00	25.376	5.00	13.664	8.00	.976	11.00	.000
	3.00	19.520	6.00	7.808	9.00	.000	12.00	.000

```
006:0003
*#*****************************************************************************
*#
*#                              AMC III Conditions
*#
*#*****************************************************************************
```

DESIGN NASHYD	Area (ha)= 4.57	Curve Number (CN)=73.00
01:C-100 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .270	

```
      Unit Hyd Qpeak  (cms)=     .646

      PEAK FLOW       (cms)=     .135 (i)
      TIME TO PEAK    (hrs)=    3.083
      RUNOFF VOLUME    (mm)=   45.665
      TOTAL RAINFALL   (mm)=   93.696
      RUNOFF COEFFICIENT   =     .487

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

```
006:0004
```

DESIGN NASHYD	Area (ha)= .64	Curve Number (CN)=79.00
01:EXC-1 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .340	

```
      Unit Hyd Qpeak  (cms)=     .072

      PEAK FLOW       (cms)=     .022 (i)
      TIME TO PEAK    (hrs)=    3.100
      RUNOFF VOLUME    (mm)=   53.221
      TOTAL RAINFALL   (mm)=   93.696
      RUNOFF COEFFICIENT   =     .568

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

```
006:0005
```

DESIGN NASHYD	Area (ha)= 8.38	Curve Number (CN)=73.00
02:C-101 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .350	

```
      Unit Hyd Qpeak  (cms)=     .914

      PEAK FLOW       (cms)=     .243 (i)
      TIME TO PEAK    (hrs)=    3.117
      RUNOFF VOLUME    (mm)=   45.665
      TOTAL RAINFALL   (mm)=   93.696
      RUNOFF COEFFICIENT   =     .487

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

```
006:0006
```

ADD HYD (CTR1A)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXC-1	.64	.022	3.10	53.22	.000
	+ID2 02:C-101	8.38	.243	3.12	45.66	.000
	SUM 10:CTR1A	9.02	.265	3.12	46.20	.000

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

```
006:0007
```

DESIGN NASHYD	Area (ha)= 14.38	Curve Number (CN)=79.00
01:EXC-2 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .560	

```
      Unit Hyd Qpeak  (cms)=     .981

      PEAK FLOW       (cms)=     .473 (i)
      TIME TO PEAK    (hrs)=    3.267
      RUNOFF VOLUME    (mm)=   53.221
      TOTAL RAINFALL   (mm)=   93.696
      RUNOFF COEFFICIENT   =     .568

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

```
006:0008
```

DESIGN NASHYD	Area (ha)= 3.19	Curve Number (CN)=73.00
02:C-102 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .260	

```
      Unit Hyd Qpeak  (cms)=     .469

      PEAK FLOW       (cms)=     .095 (i)
      TIME TO PEAK    (hrs)=    3.067
      RUNOFF VOLUME    (mm)=   45.665
      TOTAL RAINFALL   (mm)=   93.696
      RUNOFF COEFFICIENT   =     .487

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

```
006:0009
```

ADD HYD (CTR1B)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXC-2	14.38	.473	3.27	53.22	.000
	+ID2 02:C-102	3.19	.095	3.07	45.66	.000
	SUM 09:CTR1B	17.57	.565	3.18	51.85	.000

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

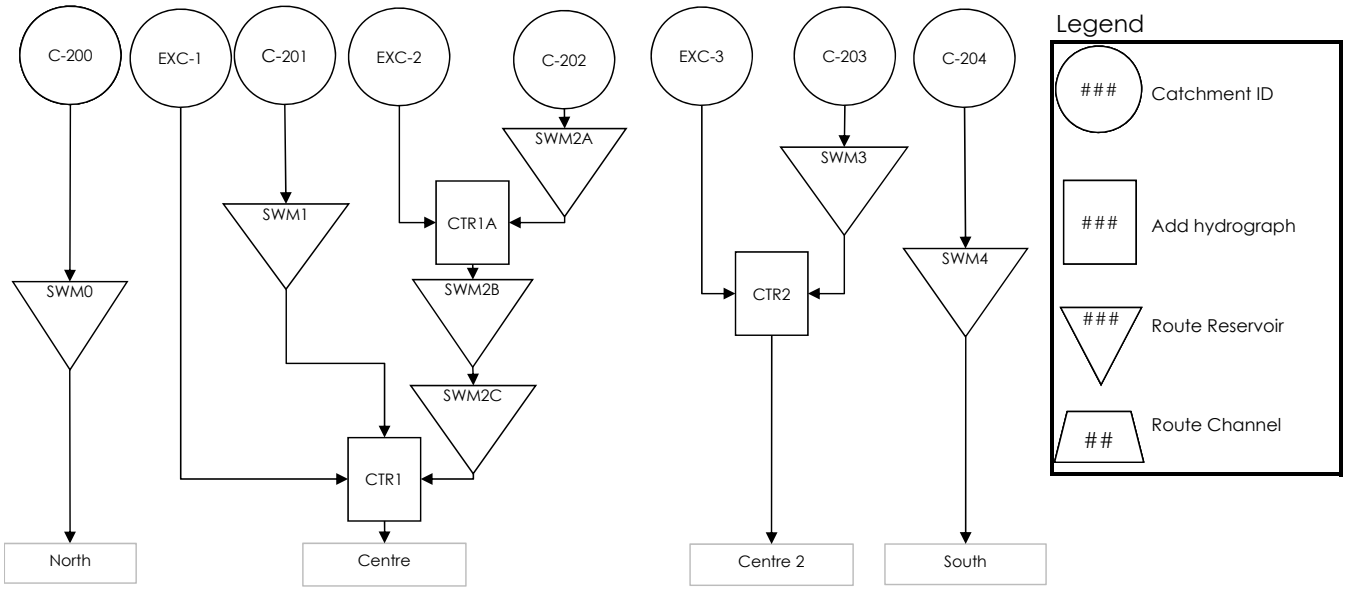
```
01525>
01526> ------------------------------------------------------------------------------
01527> 006:0010------------------------------------------------------------------------
01528> ---------------------
01529> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01530> |  IN>09:(CTR1B )   |
01531> | OUT<08:(SWM1B )   |    =========  OUTLFOW STORAGE TABLE  =========
01532> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01533>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01534>                             .000  .0000E+00    |     .000  .1618E+00
01535>                             .000  .1259E-01    |     .000  .2671E+00
01536>                             .000  .4269E-01    |     .000  .4058E+00
01537>                             .000  .8978E-01    |     .000  .4888E+00
01538>
01539>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01540>     ---------------            (ha)     (cms)     (hrs)       (mm)
01541>     INFLOW >09: (CTR1B )      17.57      .565     3.183     51.849
01542>     OUTFLOW<08: (SWM1B )       9.43      .000      .000       .000
01543>    OVERFLOW<07: (OVSWMB)       8.14      .514     4.350     51.849
01544>
01545>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        4
01546>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=     6.52
01547>                    PERCENTAGE OF TIME OVERFLOWING    (%)=    54.16
01548>
01549>
01550>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01551>                    TIME SHIFT OF PEAK FLOW          (min)=  -191.00
01552>                    MAXIMUM  STORAGE   USED        (ha.m.)=.4888E+00
01553>
01554>      *** WARNING: Outflow volume is less than inflow volume.
01555> ------------------------------------------------------------------------------
01556> 006:0011------------------------------------------------------------------------
01557> ------------------------
01558> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01559> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
01560>                        ID1 10:CTR1A        9.02     .265    3.12  46.20    .000
01561>                       +ID2 08:SWM1B        9.43     .000     .00    .00    .000
01562>                       +ID3 07:OVSWMB       8.14     .514    4.35  51.85    .000
01563>                        ============================================================
01564>                        SUM 06:CTR1         26.59     .749    4.35  31.55    .000
01565>
01566>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01567>
01568> ------------------------------------------------------------------------------
01569> 006:0012------------------------------------------------------------------------
01570> ----------------------
01571> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=79.00
01572> | 04:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01573> ----------------------   U.H. Tp(hrs)=    .390
01574>
01575>      Unit Hyd Qpeak  (cms)=     .504
01576>
01577>      PEAK FLOW       (cms)=     .176 (i)
01578>      TIME TO PEAK    (hrs)=    3.117
01579>      RUNOFF VOLUME    (mm)=   53.221
01580>      TOTAL RAINFALL   (mm)=   93.696
01581>      RUNOFF COEFFICIENT   =     .568
01582>
01583>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01584>
01585> ------------------------------------------------------------------------------
01586> 006:0013------------------------------------------------------------------------
01587> ----------------------
01588> | DESIGN NASHYD      |   Area     (ha)=    8.99   Curve Number   (CN)=81.00
01589> | 05:C-103  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01590> ----------------------   U.H. Tp(hrs)=    .300
01591>
01592>      Unit Hyd Qpeak  (cms)=    1.145
01593>
01594>      PEAK FLOW       (cms)=     .328 (i)
01595>      TIME TO PEAK    (hrs)=    3.067
01596>      RUNOFF VOLUME    (mm)=   56.004
01597>      TOTAL RAINFALL   (mm)=   93.696
01598>      RUNOFF COEFFICIENT   =     .598
01599>
01600>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01601>
01602> ------------------------------------------------------------------------------
01603> 006:0014------------------------------------------------------------------------
01604> ------------------------
01605> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01606> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
01607>                        ID1 04:EXC-3        5.15     .176    3.12  53.22    .000
01608>                       +ID2 05:C-103        8.99     .328    3.07  56.00    .000
01609>                        ============================================================
01610>                        SUM 10:CTR2         14.14     .504    3.08  54.99    .000
01611>
01612>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01613>
01614> ------------------------------------------------------------------------------
01615> 006:0015------------------------------------------------------------------------
01616> ----------------------
01617> | DESIGN NASHYD      |   Area     (ha)=    5.81   Curve Number   (CN)=86.00
01618> | 06:C-104  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01619> ----------------------   U.H. Tp(hrs)=    .260
01620>
01621>      Unit Hyd Qpeak  (cms)=     .854
01622>
01623>      PEAK FLOW       (cms)=     .247 (i)
01624>      TIME TO PEAK    (hrs)=    2.150
01625>      RUNOFF VOLUME    (mm)=   63.650
01626>      TOTAL RAINFALL   (mm)=   93.696
01627>      RUNOFF COEFFICIENT   =     .679
01628>
01629>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01630>
01631> ------------------------------------------------------------------------------
01632> 006:0016------------------------------------------------------------------------
01633> ------------------------------------------------------------------------------
01634> 006:0002------------------------------------------------------------------------
01635> ------------------------------------------------------------------------------
01636> 006:0002------------------------------------------------------------------------
01637> ------------------------------------------------------------------------------
01638> 006:0002------------------------------------------------------------------------
01639> ------------------------------------------------------------------------------
01640> 006:0002------------------------------------------------------------------------
01641> ------------------------------------------------------------------------------
01642> 006:0002------------------------------------------------------------------------
01643>   ** END OF RUN :   6
01644>
01645> ******************************************************************************
01646>
01647>
01648>
01649>
01650>
01651> ---------------------
01652> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
01653> ---------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
01654>     TZERO =   .00 hrs on        0
01655>     METOUT=   2 (output = METRIC)
01656>     NRUN  = 007
01657>     NSTORM=   1
01658>              #  1=25mm.4hr
01659> ------------------------------------------------------------------------------
01660> 007:0002------------------------------------------------------------------------
01661> *#*************************************************************************
01662> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
01663> *#  Date        : 2017/12/04
01664> *#  Modeller    : [C. Fischer]
01665> *#  Company     : Stantec Consulting Ltd. (Waterloo)
01666> *#  License #   : 4730904
01667> *#*************************************************************************
01668> *#
01669> *#                     Block C - EXISTING CONDITIONS
01670> *#
01671> *#*************************************************************************
01672> ------------------------------------------------------------------------------
01673> 007:0002------------------------------------------------------------------------
01674> --------------------
01675> | READ STORM       |    Filename: 25 mm, 4hr Chicago Storm
01676> | Ptotal=  25.00 mm|    Comments: 25 mm, 4hr Chicago Storm
01677> --------------------
01678>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
01679>               hrs    mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
01680>               .08    1.465 |   1.08   4.024 |   2.08   5.764 |   3.08   2.074
01681>               .17    1.540 |   1.17   4.814 |   2.17   4.969 |   3.17   1.977
01682>               .25    1.625 |   1.25   6.025 |   2.25   4.374 |   3.25   1.889
01683>               .33    1.720 |   1.33   8.114 |   2.33   3.913 |   3.33   1.810
01684>               .42    1.829 |   1.42  12.526 |   2.42   3.545 |   3.42   1.737
01685>               .50    1.955 |   1.50  27.198 |   2.50   3.245 |   3.50   1.671
01686>               .58    2.101 |   1.58  74.855 |   2.58   2.994 |   3.58   1.610
01687>               .67    2.274 |   1.67  31.410 |   2.67   2.782 |   3.67   1.553
01688>               .75    2.482 |   1.75  16.819 |   2.75   2.601 |   3.75   1.501
01689>               .83    2.736 |   1.83  11.357 |   2.83   2.443 |   3.83   1.453
01690>               .92    3.055 |   1.92   8.563 |   2.92   2.305 |   3.92   1.408
01691>              1.00    3.468 |   2.00   6.882 |   3.00   2.183 |   4.00   1.366
01692>
01693> ------------------------------------------------------------------------------
01694> 007:0003------------------------------------------------------------------------
01695> *#*************************************************************************
01696> *#
01697> *#                              AMC III Conditions
01698> *#
01699> *#*************************************************************************
01700> ----------------------
01701> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=73.00
01702> | 01:C-100  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01703> ----------------------   U.H. Tp(hrs)=    .270
01704>
01705>      Unit Hyd Qpeak  (cms)=     .646
01706>
01707>      PEAK FLOW       (cms)=     .058 (i)
01708>      TIME TO PEAK    (hrs)=    1.917
01709>      RUNOFF VOLUME    (mm)=    4.702
01710>      TOTAL RAINFALL   (mm)=   25.000
01711>      RUNOFF COEFFICIENT   =     .188
01712>
01713>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01714>
01715> ------------------------------------------------------------------------------
01716> 007:0004------------------------------------------------------------------------
01717> ----------------------
01718> | DESIGN NASHYD      |   Area     (ha)=     .64   Curve Number   (CN)=79.00
01719> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01720> ----------------------   U.H. Tp(hrs)=    .340
01721>
01722>      Unit Hyd Qpeak  (cms)=     .072
01723>
01724>      PEAK FLOW       (cms)=     .009 (i)
01725>      TIME TO PEAK    (hrs)=    2.000
01726>      RUNOFF VOLUME    (mm)=    6.067
01727>      TOTAL RAINFALL   (mm)=   25.000
01728>      RUNOFF COEFFICIENT   =     .243
01729>
01730>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01731>
01732> ------------------------------------------------------------------------------
01733> 007:0005------------------------------------------------------------------------
01734> ----------------------
01735> | DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number   (CN)=73.00
01736> | 02:C-101  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01737> ----------------------   U.H. Tp(hrs)=    .350
01738>
01739>      Unit Hyd Qpeak  (cms)=     .914
01740>
01741>      PEAK FLOW       (cms)=     .090 (i)
01742>      TIME TO PEAK    (hrs)=    2.033
01743>      RUNOFF VOLUME    (mm)=    4.702
01744>      TOTAL RAINFALL   (mm)=   25.000
01745>      RUNOFF COEFFICIENT   =     .188
01746>
01747>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01748>
01749> ------------------------------------------------------------------------------
01750> 007:0006------------------------------------------------------------------------
01751> ----------------------
01752> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01753> ----------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
01754>                       ID1 01:EXC-1         .64      .009    2.00    6.07    .000
01755>                      +ID2 02:C-101        8.38      .090    2.03    4.70    .000
01756>                       ============================================================
01757>                       SUM 10:CTR1A         9.02      .099    2.02    4.80    .000
01758>
01759>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01760>
01761> ------------------------------------------------------------------------------
01762> 007:0007------------------------------------------------------------------------
01763> ----------------------
01764> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=79.00
01765> | 01:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01766> ----------------------   U.H. Tp(hrs)=    .560
01767>
01768>      Unit Hyd Qpeak  (cms)=     .981
01769>
01770>      PEAK FLOW       (cms)=     .147 (i)
01771>      TIME TO PEAK    (hrs)=    2.300
01772>      RUNOFF VOLUME    (mm)=    6.068
01773>      TOTAL RAINFALL   (mm)=   25.000
01774>      RUNOFF COEFFICIENT   =     .243
01775>
01776>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01777>
01778> ------------------------------------------------------------------------------
```

```
01779> 007:0008-----------------------------------------------------------------------
01780> ----------------------
01781> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=73.00
01782> | 02:C-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01783> ----------------------   U.H. Tp(hrs)=    .260
01784>
01785>      Unit Hyd Qpeak  (cms)=     .469
01786>
01787>      PEAK FLOW       (cms)=     .042 (i)
01788>      TIME TO PEAK    (hrs)=    1.900
01789>      RUNOFF VOLUME    (mm)=    4.702
01790>      TOTAL RAINFALL   (mm)=   25.000
01791>      RUNOFF COEFFICIENT   =     .188
01792>
01793>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01794>
01795> -----------------------------------------------------------------------------
01796> 007:0009-----------------------------------------------------------------------
01797> ------------------------
01798> | ADD HYD (CTR1B     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01799> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
01800>                        ID1 01:EXC-2        14.38     .147    2.30   6.07    .000
01801>                       +ID2 02:C-102         3.19     .042    1.90   4.70    .000
01802>                        ============================================================
01803>                        SUM 09:CTR1B        17.57     .174    2.20   5.82    .000
01804>
01805>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01806>
01807> -----------------------------------------------------------------------------
01808> 007:0010-----------------------------------------------------------------------
01809> ----------------------
01810> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01811> |  IN>09:(CTR1B )    |
01812> | OUT<08:(SWM1B )    |    =========  OUTLFOW STORAGE TABLE  =========
01813> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01814>                              (cms)     (ha.m.)   |    (cms)    (ha.m.)
01815>                               .000  .0000E+00    |     .000  .1618E+00
01816>                               .000  .1259E-01    |     .000  .2671E+00
01817>                               .000  .4269E-01    |     .000  .4058E+00
01818>                               .000  .8978E-01    |     .000  .4888E+00
01819>
01820>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
01821>      ---------------------        (ha)     (cms)     (hrs)       (mm)
01822>      INFLOW >09: (CTR1B )       17.57      .174     2.200      5.820
01823>      OUTFLOW<08: (SWM1B )       17.57      .000      .000       .000
01824>     OVERFLOW<07: (OVSWMB)         .00      .000      .000       .000
01825>
01826>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
01827>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01828>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01829>
01830>
01831>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01832>                     TIME SHIFT OF PEAK FLOW         (min)=  -132.00
01833>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1023E+00
01834>
01835>       *** WARNING: Outflow volume is less than inflow volume.
01836> -----------------------------------------------------------------------------
01837> 007:0011-----------------------------------------------------------------------
01838> ------------------------
01839> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01840> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
01841>                        ID1 10:CTR1A         9.02     .099    2.02   4.80    .000
01842>                       +ID2 08:SWM1B        17.57     .000     .00    .00    .000
01843>                       +ID3 07:OVSWMB         .00     .000     .00    .00    .000
01844>                        ============================================================
01845>                        SUM 06:CTR1         26.59     .099    2.02   1.63    .000
01846>
01847>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01848>
01849> -----------------------------------------------------------------------------
01850> 007:0012-----------------------------------------------------------------------
01851> ----------------------
01852> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=79.00
01853> | 04:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01854> ----------------------   U.H. Tp(hrs)=    .390
01855>
01856>      Unit Hyd Qpeak  (cms)=     .504
01857>
01858>      PEAK FLOW       (cms)=     .067 (i)
01859>      TIME TO PEAK    (hrs)=    2.067
01860>      RUNOFF VOLUME    (mm)=    6.068
01861>      TOTAL RAINFALL   (mm)=   25.000
01862>      RUNOFF COEFFICIENT   =     .243
01863>
01864>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01865>
01866> -----------------------------------------------------------------------------
01867> 007:0013-----------------------------------------------------------------------
01868> ----------------------
01869> | DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=81.00
01870> | 05:C-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01871> ----------------------   U.H. Tp(hrs)=    .300
01872>
01873>      Unit Hyd Qpeak  (cms)=    1.145
01874>
01875>      PEAK FLOW       (cms)=     .154 (i)
01876>      TIME TO PEAK    (hrs)=    1.950
01877>      RUNOFF VOLUME    (mm)=    6.647
01878>      TOTAL RAINFALL   (mm)=   25.000
01879>      RUNOFF COEFFICIENT   =     .266
01880>
01881>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01882>
01883> -----------------------------------------------------------------------------
01884> 007:0014-----------------------------------------------------------------------
01885> ------------------------
01886> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01887> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
01888>                        ID1 04:EXC-3         5.15     .067    2.07   6.07    .000
01889>                       +ID2 05:C-103         8.99     .154    1.95   6.65    .000
01890>                        ============================================================
01891>                        SUM 10:CTR2         14.14     .219    1.98   6.44    .000
01892>
01893>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01894>
01895> -----------------------------------------------------------------------------
01896> 007:0015-----------------------------------------------------------------------
01897> ----------------------
01898> | DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=86.00
01899> | 06:C-104  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01900> ----------------------   U.H. Tp(hrs)=    .260
01901>
01902>      Unit Hyd Qpeak  (cms)=     .854
01903>
01904>      PEAK FLOW       (cms)=     .143 (i)
01905>      TIME TO PEAK    (hrs)=    1.900
01906>      RUNOFF VOLUME    (mm)=    8.516
01907>      TOTAL RAINFALL   (mm)=   25.000
01908>      RUNOFF COEFFICIENT   =     .341
01909>
01910>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01911>
01912> -----------------------------------------------------------------------------
01913> 007:0016-----------------------------------------------------------------------
01914> -----------------------------------------------------------------------------
01915> 007:0002-----------------------------------------------------------------------
01916> -----------------------------------------------------------------------------
01917> 007:0002-----------------------------------------------------------------------
01918> -----------------------------------------------------------------------------
01919> 007:0002-----------------------------------------------------------------------
01920> -----------------------------------------------------------------------------
01921> 007:0002-----------------------------------------------------------------------
01922> -----------------------------------------------------------------------------
01923> 007:0002-----------------------------------------------------------------------
01924> -----------------------------------------------------------------------------
01925> 007:0002-----------------------------------------------------------------------
01926>       FINISH
01927> -----------------------------------------------------------------------------
01928> *****************************************************************************
01929>      WARNINGS / ERRORS / NOTES
01930>      -------------------------
01931>  001:0010 ROUTE RESERVOIR
01932>       *** WARNING: Outflow volume is less than inflow volume.
01933>       *** WARNING: Outflow volume is less than inflow volume.
01934>       *** WARNING: Outflow volume is less than inflow volume.
01935>       *** WARNING: Outflow volume is less than inflow volume.
01936>       *** WARNING: Outflow volume is less than inflow volume.
01937>       *** WARNING: Outflow volume is less than inflow volume.
01938>       *** WARNING: Outflow volume is less than inflow volume.
01939>    Simulation ended on 2017-12-21     at 12:50:51
01940> =============================================================================
01941>
```

APPENDIX C – INTERIM CONDITIONS

SWMHYMO Schematic – Interim Conditions
NRCS (SCS) Curve Number Determination – Interim Conditions
Interim Conditions SWMHYMO Output – AMC II
Interim Conditions SWMHYMO Output – AMC III

Subject: **Proposed Schematic**
Project: **Loyalist Solar Project**
Project No.: **1335-60220**
Client: **Loyalist Solar LP**
Date: **January 12, 2018**



V:\01614\active\133560220\design\analysis\SWM\Block C\[20171212_133560220_BlockC_PondDesignV4.xlsx]Interim Schematic

Subject: **NRCS (SCS) Curve Number Determination - Interim Conditions**
Project: **Loyalist Solar Project**
Site: **Block C**
Project No.: **1335-60220**
Client: **Loyalist Solar LP**
Date: **January 16, 2018**

TABLE OF CURVE NUMBERS (CN's)									Source
Land Use		Hydrologic Soil Type							
		A	AB	B	BC	C	CD	D	
Meadow	"Good"	30	44	58	65	71	75	78	USDA
Woodlot	"Fair"	36	48	60	67	73	76	79	USDA
Lawns	"Good"	39	50	61	68	74	77	80	USDA
Pasture/Range	"Fair"	49	55	60	70	79	82	84	USDA
Crop - SR + CR	"Good"	64	70	75	79	82	84	85	USDA
Gravel		76	81	85	87	89	90	91	USDA
Scarified Soil		69	74	78	81	83	85	87	USDA
Wetland/Lake		100	100	100	100	100	100	100	USDA
Impervious		98	98	98	98	98	98	98	USDA

USDA - United States Department of Agriculture (2004), National Engineering Handbook, Part 630 Hydrology, Chapter 9 Hydrologic Soil Cover Compexes

Scarified Soil CNs based on contour plowing & crop residue in poor hydrologic condition

HYDROLOGIC SOIL TYPE (%) - Interim Conditions								
	Hydrologic Soil Type							
Catchment	A	AB	B	BC	C	CD	D	TOTAL
C-200		85					15	100
C-201		100						100
C-202		100						100
C-203			85				15	100
C-204			50				50	100
EX C-1			90				10	100
EX C-2			90				10	100
EX C-3			90				10	100

LAND USE (%) - Interim Conditions										
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Scarified Soil	Wetland	Impervious	Total
C-200							91		9	100
C-201							94		6	100
C-202							95		5	100
C-203							92		8	100
C-204							92		8	100
EX C-1		15		85						100
EX C-2		15		85						100
EX C-3		15		85						100

CURVE NUMBER (CN) - Interim Conditions											
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Bare Soil	Wetland/ Lakes	Impervious	Weighted CN (AMC II)	Weighted CN (AMC III)
C-200							69		9	78	90
C-201							70		6	75	88
C-202							70		5	75	88
C-203							73		8	81	92
C-204							76		8	84	93
EX C-1		9		53						62	79
EX C-2		9		53						62	79
EX C-3		9		53						62	79

Notes: AMC II assumed - AMC III Conversion Per Soil Conservation Service Curve Number (SCS-CN) Methodology (Mishra, Surendra and Hydrological Soil Groups based on guidance presented in National Engineering Handbook

V:\01614\active\133560220\design\analysis\SWM\Block C\20180111 - Revisions\[SWMHYMO_parameters_133560220_BlockC_v3.xlsx]CN Number - Prop

```
00001> ================================================================================
00002>
00003>    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
00004>    S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
00006>        S  W W  M   M  M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
00007>    SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9    =========
00008>                                                          9   9  9   9   # 4730904
00009>          StormWater Management HYdrologic Model           999    999    =========
00010>
00011> ********************************************************************************
00012> ***************************** SWMHYMO Ver/4.05  ********************************
00013> *********  A single event and continuous hydrologic simulation model  *********
00014> *********     based on the principles of HYMO and its successors      *********
00015> *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
00016> ********************************************************************************
00017> ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
00018> *********                  Ottawa,  Ontario: (613) 836-3884            *********
00019> *********                  Gatineau, Quebec: (819) 243-6858            *********
00020> *********                  E-Mail: swmhymo@jfsa.com                    *********
00021> ********************************************************************************
00022>
00023> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024> +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
00025> +++++++++                 Kitchener            SERIAL#:4730904        +++++++++
00026> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028> ********************************************************************************
00029> **********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++              **********
00030> **********           Maximum value for ID numbers  :     10             **********
00031> **********           Max. number of rainfall points: 105408             **********
00032> **********           Max. number of flow points    : 105408             **********
00033> ********************************************************************************
00034>
00035>
00036> **********************   D E T A I L E D   O U T P U T   **********************
00037> ********************************************************************************
00038> *         DATE: 2017-12-21     TIME: 13:37:49     RUN COUNTER: 001815         *
00039> ********************************************************************************
00040> * Input   filename: C:\TREVOR-1\$13356~1\AMCII\CINT-1.dat                       *
00041> * Output  filename: C:\TREVOR-1\$13356~1\AMCII\CINT-1.out                       *
00042> * Summary filename: C:\TREVOR-1\$13356~1\AMCII\CINT-1.sum                       *
00043> * User comments:                                                               *
00044> * 1:_____________________________________________________________________________*
00045> * 2:_____________________________________________________________________________*
00046> * 3:_____________________________________________________________________________*
00047> ********************************************************************************
00048>
00049> ------------------------------------------------------------------------------
00050> 001:0001----------------------------------------------------------------------
00051> *#*****************************************************************************
00052> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00053> *#  Date        : 2017/11/24
00054> *#  Modeller    : [C. Fischer]
00055> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00056> *#  License #   : 4730904
00057> *#*****************************************************************************
00058> *#
00059> *#                        Block C - CONSTRUCTION CONDITIONS
00060> *#
00061> *#*****************************************************************************
00062> ---------------------
00063> | START           |  Project  dir.: C:\TREVOR-1\$13356~1\AMCII\
00064> ------------------   Rainfall dir.: C:\TREVOR-1\$13356~1\AMCII\
00065>     TZERO =   .00 hrs on      0
00066>     METOUT=   2 (output = METRIC)
00067>     NRUN  = 001
00068>     NSTORM=   1
00069>              #  1=LYA2.1hr
00070> ------------------------------------------------------------------------------
00071> 001:0002----------------------------------------------------------------------
00072> ---------------------
00073> | READ STORM       |    Filename: Belleville IDF (1-hr 30% AES - 2 Year)
00074> | Ptotal=  22.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 2 Year)
00075> ---------------------
00076>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>               .08  23.868 |    .33  29.172 |    .58  26.520 |    .83   7.956
00079>               .17  37.128 |    .42  34.476 |    .67  13.260 |    .92   2.652
00080>               .25  55.692 |    .50  23.868 |    .75  10.608 |   1.00    .000
00081>
00082> ------------------------------------------------------------------------------
00083> 001:0003----------------------------------------------------------------------
00084> *#*****************************************************************************
00085> *#
00086> *#                              AMC II Conditions
00087> *#
00088> *#*****************************************************************************
00089> ----------------------
00090> | CALIB NASHYD       |   Area     (ha)=    4.57   Curve Number   (CN)=78.00
00091> | 01:C-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00092> ----------------------   U.H. Tp(hrs)=    .250
00093>
00094>     Unit Hyd Qpeak  (cms)=     .698
00095>
00096>     PEAK FLOW       (cms)=     .062 (i)
00097>     TIME TO PEAK    (hrs)=     .783
00098>     RUNOFF VOLUME    (mm)=   3.295
00099>     TOTAL RAINFALL   (mm)=  22.100
00100>     RUNOFF COEFFICIENT   =     .149
00101>
00102>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00103>
00104> ------------------------------------------------------------------------------
00105> 001:0004----------------------------------------------------------------------
00106> ---------------------
00107> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00108> |  IN>01:(C-200 )   |
00109> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
00110> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00111>                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
00112>                            .000  .0000E+00    |   2.000  .1546E+00
00113>                            .000  .1448E+00    |   5.000  .1647E+00
00114>
00115>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00116>     --------------------        (ha)     (cms)     (hrs)       (mm)
00117>     INFLOW >01: (C-200 )       4.57      .062      .783      3.295
00118>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
00119>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
00120>
00121>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00122>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00123>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00124>
00125>
00126>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00127>                    TIME SHIFT OF PEAK FLOW         (min)=   -47.00
00128>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1506E-01
00129>
00130>      *** WARNING: Outflow volume is less than inflow volume.
00131> ------------------------------------------------------------------------------
00132> 001:0005----------------------------------------------------------------------
00133> ---------------------
00134> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=62.00
00135> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00136> ---------------------   U.H. Tp(hrs)=    .340
00137>
00138>     Unit Hyd Qpeak  (cms)=     .073
00139>
00140>     PEAK FLOW       (cms)=     .005 (i)
00141>     TIME TO PEAK    (hrs)=     .867
00142>     RUNOFF VOLUME    (mm)=    2.407
00143>     TOTAL RAINFALL   (mm)=   22.100
00144>     RUNOFF COEFFICIENT   =     .109
00145>
00146>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00147>
00148> ------------------------------------------------------------------------------
00149> 001:0006----------------------------------------------------------------------
00150> ---------------------
00151> | CALIB NASHYD       |   Area     (ha)=    8.38   Curve Number   (CN)=75.00
00152> | 02:C-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00153> ---------------------   U.H. Tp(hrs)=    .320
00154>
00155>     Unit Hyd Qpeak  (cms)=    1.000
00156>
00157>     PEAK FLOW       (cms)=     .087 (i)
00158>     TIME TO PEAK    (hrs)=     .867
00159>     RUNOFF VOLUME    (mm)=    2.873
00160>     TOTAL RAINFALL   (mm)=   22.100
00161>     RUNOFF COEFFICIENT   =     .130
00162>
00163>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00164>
00165> ------------------------------------------------------------------------------
00166> 001:0007----------------------------------------------------------------------
00167> ---------------------
00168> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00169> |  IN>02:(C-201 )   |
00170> | OUT<03:(SWM1  )   |    =========  OUTLFOW STORAGE TABLE  =========
00171> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00172>                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
00173>                            .000  .0000E+00    |   2.000  .2309E+00
00174>                            .000  .2162E+00    |   5.000  .2460E+00
00175>
00176>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00177>     --------------------        (ha)     (cms)     (hrs)       (mm)
00178>     INFLOW >02: (C-201 )       8.38      .087      .867      2.873
00179>     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
00180>    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
00181>
00182>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00183>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00184>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00185>
00186>
00187>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00188>                    TIME SHIFT OF PEAK FLOW         (min)=   -52.00
00189>                    MAXIMUM  STORAGE   USED       (ha.m.)=.2408E-01
00190>
00191>      *** WARNING: Outflow volume is less than inflow volume.
00192> ------------------------------------------------------------------------------
00193> 001:0008----------------------------------------------------------------------
00194> ---------------------
00195> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=62.00
00196> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00197> ---------------------   U.H. Tp(hrs)=    .560
00198>
00199>     Unit Hyd Qpeak  (cms)=     .981
00200>
00201>     PEAK FLOW       (cms)=     .083 (i)
00202>     TIME TO PEAK    (hrs)=    1.067
00203>     RUNOFF VOLUME    (mm)=    2.407
00204>     TOTAL RAINFALL   (mm)=   22.100
00205>     RUNOFF COEFFICIENT   =     .109
00206>
00207>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00208>
00209> ------------------------------------------------------------------------------
00210> 001:0009----------------------------------------------------------------------
00211> ---------------------
00212> | CALIB NASHYD       |   Area     (ha)=    3.19   Curve Number   (CN)=75.00
00213> | 05:C-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00214> ---------------------   U.H. Tp(hrs)=    .230
00215>
00216>     Unit Hyd Qpeak  (cms)=     .530
00217>
00218>     PEAK FLOW       (cms)=     .039 (i)
00219>     TIME TO PEAK    (hrs)=     .767
00220>     RUNOFF VOLUME    (mm)=    2.873
00221>     TOTAL RAINFALL   (mm)=   22.100
00222>     RUNOFF COEFFICIENT   =     .130
00223>
00224>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00225>
00226> ------------------------------------------------------------------------------
00227> 001:0010----------------------------------------------------------------------
00228> ---------------------
00229> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00230> |  IN>05:(C-202 )   |
00231> | OUT<06:(SWM2A )   |    =========  OUTLFOW STORAGE TABLE  =========
00232> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00233>                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
00234>                            .000  .0000E+00    |    .000  .5990E-01
00235>                            .000  .5600E-01    |   1.000  .6400E-01
00236>
00237>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00238>     --------------------        (ha)     (cms)     (hrs)       (mm)
00239>     INFLOW >05: (C-202 )       3.19      .039      .767      2.873
00240>     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
00241>    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
00242>
00243>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00244>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00245>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00246>
00247>
00248>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00249>                    TIME SHIFT OF PEAK FLOW         (min)=   -46.00
00250>                    MAXIMUM  STORAGE   USED       (ha.m.)=.9166E-02
00251>
00252>      *** WARNING: Outflow volume is less than inflow volume.
00253> ------------------------------------------------------------------------------
00254> 001:0011----------------------------------------------------------------------
```

```
00255> ----------------------
00256> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00257> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00258>                        ID1 04:EXC-2       14.38     .083    1.07   2.41    .000
00259>                       +ID2 06:SWM2A        3.19     .000     .00    .00    .000
00260>                        ============================================================
00261>                        SUM 07:CTR1A       17.57     .083    1.07   1.97    .000
00262>
00263>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00264>
00265> ------------------------------------------------------------------------------
00266> 001:0012-------------------------------------------------------------------------
00267> ----------------------
00268> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00269> |  IN>07:(CTR1A )   |
00270> | OUT<08:(SWM2B )   |    =========  OUTLFOW STORAGE TABLE  =========
00271> ----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00272>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00273>                             .000  .0000E+00    |     .000  .1618E+00
00274>                             .000  .1260E-01    |     .862  .2671E+00
00275>                             .000  .4270E-01    |    2.728  .4058E+00
00276>                             .000  .8980E-01    |    4.016  .4888E+00
00277>
00278>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00279>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00280>      INFLOW >07: (CTR1A )      17.57      .083     1.067      1.970
00281>      OUTFLOW<08: (SWM2B )      17.57      .000      .000       .000
00282>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
00283>
00284>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00285>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00286>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00287>
00288>
00289>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00290>                     TIME SHIFT OF PEAK FLOW          (min)=   -64.00
00291>                     MAXIMUM  STORAGE   USED        (ha.m.)=.3462E-01
00292>
00293>       *** WARNING: Outflow volume is less than inflow volume.
00294> ------------------------------------------------------------------------------
00295> 001:0013-------------------------------------------------------------------------
00296> ----------------------
00297> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
00298> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00299> ----------------------   U.H. Tp(hrs)=    .500
00300>
00301>      Unit Hyd Qpeak  (cms)=     .000
00302>
00303>      PEAK FLOW       (cms)=     .000 (i)
00304>      TIME TO PEAK    (hrs)=    1.000
00305>      RUNOFF VOLUME    (mm)=     .006
00306>      TOTAL RAINFALL   (mm)=   22.100
00307>      RUNOFF COEFFICIENT   =     .000
00308>
00309>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00310>
00311> ------------------------------------------------------------------------------
00312> 001:0014-------------------------------------------------------------------------
00313> ----------------------
00314> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00315> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00316>                        ID1 08:SWM2B       17.57     .000     .00    .00    .000
00317>                       +ID2 09:BLANK         .00     .000    1.00    .01    .000
00318>                        ============================================================
00319>                        SUM 04:SB&BLK      17.57     .000    1.00    .00    .000
00320>
00321>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00322>
00323> ------------------------------------------------------------------------------
00324> 001:0015-------------------------------------------------------------------------
00325> ----------------------
00326> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00327> |  IN>04:(SB&BLK)   |
00328> | OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
00329> ----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00330>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00331>                             .000  .0000E+00    |     .500  .1004E+00
00332>                             .000  .9410E-01    |    1.300  .1070E+00
00333>
00334>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00335>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00336>      INFLOW >04: (SB&BLK)      17.57      .000     1.000       .000
00337>      OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
00338>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
00339>
00340>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00341>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00342>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00343>
00344>
00345>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00346>                     TIME SHIFT OF PEAK FLOW          (min)=   -60.00
00347>                     MAXIMUM  STORAGE   USED        (ha.m.)=.6353E-10
00348>
00349> ------------------------------------------------------------------------------
00350> 001:0016-------------------------------------------------------------------------
00351> ----------------------
00352> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00353> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00354>                        ID1 01:CTR1          .65     .005     .87   2.41    .000
00355>                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
00356>                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
00357>                        ============================================================
00358>                        SUM 01:CTR1        26.60     .005     .87    .06    .000
00359>
00360>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00361>
00362> ------------------------------------------------------------------------------
00363> 001:0017-------------------------------------------------------------------------
00364> ----------------------
00365> | CALIB NASHYD       |   Area    (ha)=    8.99   Curve Number   (CN)=81.00
00366> | 01:C-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
00367> ----------------------   U.H. Tp(hrs)=    .270
00368>
00369>      Unit Hyd Qpeak  (cms)=    1.272
00370>
00371>      PEAK FLOW       (cms)=     .135 (i)
00372>      TIME TO PEAK    (hrs)=     .800
00373>      RUNOFF VOLUME    (mm)=    3.813
00374>      TOTAL RAINFALL   (mm)=   22.100
00375>      RUNOFF COEFFICIENT   =     .173
00376>
00377>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00378>
00379> ------------------------------------------------------------------------------
00380> 001:0018-------------------------------------------------------------------------
00381> ----------------------
00382> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00383> |  IN>01:(C-203 )   |
00384> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
00385> ----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00386>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00387>                             .000  .0000E+00    |    3.000  .3271E+00
00388>                             .000  .3063E+00    |    9.000  .3485E+00
00389>
00390>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00391>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00392>      INFLOW >01: (C-203 )       8.99      .135      .800      3.813
00393>      OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
00394>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
00395>
00396>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00397>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00398>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00399>
00400>
00401>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00402>                     TIME SHIFT OF PEAK FLOW          (min)=   -48.00
00403>                     MAXIMUM  STORAGE   USED        (ha.m.)=.3428E-01
00404>
00405>      *** WARNING: Outflow volume is less than inflow volume.
00406> ------------------------------------------------------------------------------
00407> 001:0019-------------------------------------------------------------------------
00408> ----------------------
00409> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=62.00
00410> | 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00411> ----------------------   U.H. Tp(hrs)=    .390
00412>
00413>      Unit Hyd Qpeak  (cms)=     .504
00414>
00415>      PEAK FLOW       (cms)=     .038 (i)
00416>      TIME TO PEAK    (hrs)=     .917
00417>      RUNOFF VOLUME    (mm)=    2.407
00418>      TOTAL RAINFALL   (mm)=   22.100
00419>      RUNOFF COEFFICIENT   =     .109
00420>
00421>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00422>
00423> ------------------------------------------------------------------------------
00424> 001:0020-------------------------------------------------------------------------
00425> ----------------------
00426> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00427> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00428>                        ID1 02:SWM3         8.99     .000     .00    .00    .000
00429>                       +ID2 03:EXC-3        5.15     .038     .92   2.41    .000
00430>                        ============================================================
00431>                        SUM 01:CTR2        14.14     .038     .92    .88    .000
00432>
00433>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00434>
00435> ------------------------------------------------------------------------------
00436> 001:0021-------------------------------------------------------------------------
00437> ----------------------
00438> | CALIB NASHYD       |   Area    (ha)=    5.81   Curve Number   (CN)=84.00
00439> | 01:C-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
00440> ----------------------   U.H. Tp(hrs)=    .240
00441>
00442>      Unit Hyd Qpeak  (cms)=     .925
00443>
00444>      PEAK FLOW       (cms)=     .108 (i)
00445>      TIME TO PEAK    (hrs)=     .767
00446>      RUNOFF VOLUME    (mm)=    4.466
00447>      TOTAL RAINFALL   (mm)=   22.100
00448>      RUNOFF COEFFICIENT   =     .202
00449>
00450>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00451>
00452> ------------------------------------------------------------------------------
00453> 001:0022-------------------------------------------------------------------------
00454> ----------------------
00455> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00456> |  IN>01:(C-204 )   |
00457> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
00458> ----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00459>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00460>                             .000  .0000E+00    |    1.000  .2444E+00
00461>                             .000  .2289E+00    |    3.000  .2604E+00
00462>
00463>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00464>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00465>      INFLOW >01: (C-204 )       5.81      .108      .767      4.466
00466>      OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
00467>     OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
00468>
00469>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00470>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00471>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00472>
00473>
00474>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00475>                     TIME SHIFT OF PEAK FLOW          (min)=   -46.00
00476>                     MAXIMUM  STORAGE   USED        (ha.m.)=.2595E-01
00477>
00478>      *** WARNING: Outflow volume is less than inflow volume.
00479> ------------------------------------------------------------------------------
00480> 001:0023-------------------------------------------------------------------------
00481>   ** END OF RUN :   1
00482>
00483> ******************************************************************************
00484>
00485>
00486>
00487>
00488>
00489> ----------------------
00490> | START              |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
00491> ----------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
00492>     TZERO =   .00 hrs on        0
00493>     METOUT=   2 (output = METRIC)
00494>     NRUN  = 002
00495>     NSTORM=   1
00496>              #  1=LYA2.12h
00497> ------------------------------------------------------------------------------
00498> 002:0002-------------------------------------------------------------------------
00499> *#*****************************************************************************
00500> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00501> *#  Date        : 2017/11/24
00502> *#  Modeller    : [C. Fischer]
00503> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00504> *#  License #   : 4730904
00505> *#*****************************************************************************
00506> *#
00507> *#                     Block C - CONSTRUCTION CONDITIONS
00508> *#
```

```
00509> *#*************************************************************************
00510> ---------------------------------------------------------------------------
00511> 002:0002-----------------------------------------------------------------
00512> --------------------
00513> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 2 Year)
00514> | Ptotal=  42.24 mm|    Comments: Belleville IDF (12-hr 30% AES - 2 Year)
00515> --------------------
00516>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00517>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00518>              1.00   3.960 |   4.00   6.600 |   7.00   1.320 |  10.00    .000
00519>              2.00  11.440 |   5.00   6.160 |   8.00    .440 |  11.00    .000
00520>              3.00   8.800 |   6.00   3.520 |   9.00    .000 |  12.00    .000
00521>
00522> ---------------------------------------------------------------------------
00523> 002:0003-----------------------------------------------------------------
00524> *#*************************************************************************
00525> *#
00526> *#                              AMC II Conditions
00527> *#
00528> *#*************************************************************************
00529> ----------------------
00530> | CALIB NASHYD       |   Area     (ha)=    4.57   Curve Number   (CN)=78.00
00531> | 01:C-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00532> ----------------------   U.H. Tp(hrs)=    .250
00533>
00534>      Unit Hyd Qpeak  (cms)=     .698
00535>
00536>      PEAK FLOW       (cms)=     .039 (i)
00537>      TIME TO PEAK    (hrs)=    5.033
00538>      RUNOFF VOLUME    (mm)=   12.737
00539>      TOTAL RAINFALL   (mm)=   42.240
00540>      RUNOFF COEFFICIENT   =     .302
00541>
00542>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00543>
00544> ---------------------------------------------------------------------------
00545> 002:0004-----------------------------------------------------------------
00546> ----------------------
00547> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00548> |  IN>01:(C-200 )    |
00549> | OUT<02:(SWM0  )    |    =========  OUTLFOW STORAGE TABLE  =========
00550> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00551>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00552>                              .000  .0000E+00     |    2.000  .1546E+00
00553>                              .000  .1448E+00     |    5.000  .1647E+00
00554>
00555>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00556>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00557>      INFLOW >01: (C-200 )       4.57      .039     5.033     12.737
00558>      OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
00559>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
00560>
00561>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00562>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00563>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00564>
00565>
00566>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00567>                     TIME SHIFT OF PEAK FLOW          (min)=  -302.00
00568>                     MAXIMUM  STORAGE   USED       (ha.m.)=.5821E-01
00569>
00570>       *** WARNING: Outflow volume is less than inflow volume.
00571> ---------------------------------------------------------------------------
00572> 002:0005-----------------------------------------------------------------
00573> ----------------------
00574> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=62.00
00575> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00576> ----------------------   U.H. Tp(hrs)=    .340
00577>
00578>      Unit Hyd Qpeak  (cms)=     .073
00579>
00580>      PEAK FLOW       (cms)=     .004 (i)
00581>      TIME TO PEAK    (hrs)=    5.050
00582>      RUNOFF VOLUME    (mm)=    8.450
00583>      TOTAL RAINFALL   (mm)=   42.240
00584>      RUNOFF COEFFICIENT   =     .200
00585>
00586>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00587>
00588> ---------------------------------------------------------------------------
00589> 002:0006-----------------------------------------------------------------
00590> ----------------------
00591> | CALIB NASHYD       |   Area     (ha)=    8.38   Curve Number   (CN)=75.00
00592> | 02:C-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00593> ----------------------   U.H. Tp(hrs)=    .320
00594>
00595>      Unit Hyd Qpeak  (cms)=    1.000
00596>
00597>      PEAK FLOW       (cms)=     .064 (i)
00598>      TIME TO PEAK    (hrs)=    5.050
00599>      RUNOFF VOLUME    (mm)=   11.376
00600>      TOTAL RAINFALL   (mm)=   42.240
00601>      RUNOFF COEFFICIENT   =     .269
00602>
00603>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00604>
00605> ---------------------------------------------------------------------------
00606> 002:0007-----------------------------------------------------------------
00607> ----------------------
00608> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00609> |  IN>02:(C-201 )    |
00610> | OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
00611> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00612>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00613>                              .000  .0000E+00     |    2.000  .2309E+00
00614>                              .000  .2162E+00     |    5.000  .2460E+00
00615>
00616>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00617>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00618>      INFLOW >02: (C-201 )       8.38      .064     5.050     11.376
00619>      OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
00620>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
00621>
00622>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00623>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00624>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00625>
00626>
00627>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00628>                     TIME SHIFT OF PEAK FLOW          (min)=  -303.00
00629>                     MAXIMUM  STORAGE   USED       (ha.m.)=.9533E-01
00630>
00631>       *** WARNING: Outflow volume is less than inflow volume.
00632> ---------------------------------------------------------------------------
00633> 002:0008-----------------------------------------------------------------
00634> ----------------------
00635> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=62.00
00636> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00637> ----------------------   U.H. Tp(hrs)=    .560
00638>
00639>      Unit Hyd Qpeak  (cms)=     .981
00640>
00641>      PEAK FLOW       (cms)=     .076 (i)
00642>      TIME TO PEAK    (hrs)=    5.117
00643>      RUNOFF VOLUME    (mm)=    8.450
00644>      TOTAL RAINFALL   (mm)=   42.240
00645>      RUNOFF COEFFICIENT   =     .200
00646>
00647>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00648>
00649> ---------------------------------------------------------------------------
00650> 002:0009-----------------------------------------------------------------
00651> ----------------------
00652> | CALIB NASHYD       |   Area     (ha)=    3.19   Curve Number   (CN)=75.00
00653> | 05:C-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00654> ----------------------   U.H. Tp(hrs)=    .230
00655>
00656>      Unit Hyd Qpeak  (cms)=     .530
00657>
00658>      PEAK FLOW       (cms)=     .025 (i)
00659>      TIME TO PEAK    (hrs)=    5.033
00660>      RUNOFF VOLUME    (mm)=   11.376
00661>      TOTAL RAINFALL   (mm)=   42.240
00662>      RUNOFF COEFFICIENT   =     .269
00663>
00664>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00665>
00666> ---------------------------------------------------------------------------
00667> 002:0010-----------------------------------------------------------------
00668> ----------------------
00669> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00670> |  IN>05:(C-202 )    |
00671> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
00672> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00673>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00674>                              .000  .0000E+00     |     .000  .5990E-01
00675>                              .000  .5600E-01     |    1.000  .6400E-01
00676>
00677>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00678>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00679>      INFLOW >05: (C-202 )       3.19      .025     5.033     11.376
00680>      OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
00681>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
00682>
00683>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00684>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00685>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00686>
00687>
00688>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00689>                     TIME SHIFT OF PEAK FLOW          (min)=  -302.00
00690>                     MAXIMUM  STORAGE   USED       (ha.m.)=.3629E-01
00691>
00692>       *** WARNING: Outflow volume is less than inflow volume.
00693> ---------------------------------------------------------------------------
00694> 002:0011-----------------------------------------------------------------
00695> ----------------------
00696> | ADD HYD (CTR1A     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
00697> ----------------------                     (ha)     (cms)   (hrs)   (mm)    (cms)
00698>                          ID1 04:EXC-2       14.38     .076    5.12   8.45    .000
00699>                         +ID2 06:SWM2A        3.19     .000     .00    .00    .000
00700>                          ================================================
00701>                          SUM 07:CTR1A       17.57     .076    5.12   6.92    .000
00702>
00703>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00704>
00705> ---------------------------------------------------------------------------
00706> 002:0012-----------------------------------------------------------------
00707> ----------------------
00708> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00709> |  IN>07:(CTR1A )    |
00710> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
00711> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00712>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00713>                              .000  .0000E+00     |     .000  .1618E+00
00714>                              .000  .1260E-01     |     .862  .2671E+00
00715>                              .000  .4270E-01     |    2.728  .4058E+00
00716>                              .000  .8980E-01     |    4.016  .4888E+00
00717>
00718>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00719>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00720>      INFLOW >07: (CTR1A )       17.57      .076     5.117     6.916
00721>      OUTFLOW<08: (SWM2B )       17.57      .000      .000       .000
00722>     OVERFLOW<10: (OSWM2B)         .00      .000      .000       .000
00723>
00724>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00725>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00726>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00727>
00728>
00729>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00730>                     TIME SHIFT OF PEAK FLOW          (min)=  -307.00
00731>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1215E+00
00732>
00733>       *** WARNING: Outflow volume is less than inflow volume.
00734> ---------------------------------------------------------------------------
00735> 002:0013-----------------------------------------------------------------
00736> ----------------------
00737> | DESIGN NASHYD      |   Area     (ha)=     .00   Curve Number   (CN)= 1.00
00738> | 09:BLANK  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00739> ----------------------   U.H. Tp(hrs)=    .500
00740>
00741>      Unit Hyd Qpeak  (cms)=     .000
00742>
00743>      PEAK FLOW       (cms)=     .000 (i)
00744>      TIME TO PEAK    (hrs)=    5.133
00745>      RUNOFF VOLUME    (mm)=     .066
00746>      TOTAL RAINFALL   (mm)=   42.240
00747>      RUNOFF COEFFICIENT   =     .002
00748>
00749>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00750>
00751> ---------------------------------------------------------------------------
00752> 002:0014-----------------------------------------------------------------
00753> ----------------------
00754> | ADD HYD (SB&BLK    ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
00755> ----------------------                     (ha)     (cms)   (hrs)   (mm)    (cms)
00756>                          ID1 08:SWM2B       17.57     .000     .00    .00    .000
00757>                         +ID2 09:BLANK         .00     .000    5.13    .07    .000
00758>                          ================================================
00759>                          SUM 04:SB&BLK      17.57     .000    5.13    .00    .000
00760>
00761>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00762>
```

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00763> ------------------------------------------------------------------------------
00764> 002:0015------------------------------------------------------------------------
00765> ---------------------
00766> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00767> |  IN>04:(SB&BLK)   |
00768> | OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
00769> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00770>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00771>                             .000  .0000E+00    |     .500  .1004E+00
00772>                             .000  .9410E-01    |    1.300  .1070E+00
00773>
00774>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00775>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00776>     INFLOW >04: (SB&BLK)      17.57      .000     5.133       .000
00777>     OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
00778>    OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
00779>
00780>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00781>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00782>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00783>
00784>
00785>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00786>                    TIME SHIFT OF PEAK FLOW          (min)=  -308.00
00787>                    MAXIMUM  STORAGE   USED       (ha.m.)=.6590E-09
00788>
00789> ------------------------------------------------------------------------------
00790> 002:0016------------------------------------------------------------------------
00791> ----------------------
00792> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00793> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00794>                       ID1 01:CTR1          .65     .004    5.05   8.45    .000
00795>                      +ID2 03:SWM1         8.38     .000     .00    .00    .000
00796>                      +ID3 09:SWM2C       17.57     .000     .00    .00    .000
00797>                       ============================================================
00798>                       SUM 01:CTR1         26.60     .004    5.05    .21    .000
00799>
00800>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00801>
00802> ------------------------------------------------------------------------------
00803> 002:0017------------------------------------------------------------------------
00804> ----------------------
00805> | CALIB NASHYD       |   Area    (ha)=    8.99   Curve Number   (CN)=81.00
00806> | 01:C-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
00807> ----------------------   U.H. Tp(hrs)=    .270
00808>
00809>     Unit Hyd Qpeak  (cms)=    1.272
00810>
00811>     PEAK FLOW       (cms)=     .085 (i)
00812>     TIME TO PEAK    (hrs)=    5.033
00813>     RUNOFF VOLUME    (mm)=   14.324
00814>     TOTAL RAINFALL   (mm)=   42.240
00815>     RUNOFF COEFFICIENT   =     .339
00816>
00817>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00818>
00819> ------------------------------------------------------------------------------
00820> 002:0018------------------------------------------------------------------------
00821> ----------------------
00822> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00823> |  IN>01:(C-203 )   |
00824> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
00825> ----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00826>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00827>                             .000  .0000E+00    |    3.000  .3271E+00
00828>                             .000  .3063E+00    |    9.000  .3485E+00
00829>
00830>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00831>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00832>     INFLOW >01: (C-203 )       8.99      .085     5.033     14.324
00833>     OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
00834>    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
00835>
00836>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00837>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00838>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00839>
00840>
00841>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00842>                    TIME SHIFT OF PEAK FLOW          (min)=  -302.00
00843>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1288E+00
00844>
00845>      *** WARNING: Outflow volume is less than inflow volume.
00846> ------------------------------------------------------------------------------
00847> 002:0019------------------------------------------------------------------------
00848> ----------------------
00849> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=62.00
00850> | 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00851> ----------------------   U.H. Tp(hrs)=    .390
00852>
00853>     Unit Hyd Qpeak  (cms)=     .504
00854>
00855>     PEAK FLOW       (cms)=     .028 (i)
00856>     TIME TO PEAK    (hrs)=    5.067
00857>     RUNOFF VOLUME    (mm)=    8.450
00858>     TOTAL RAINFALL   (mm)=   42.240
00859>     RUNOFF COEFFICIENT   =     .200
00860>
00861>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00862>
00863> ------------------------------------------------------------------------------
00864> 002:0020------------------------------------------------------------------------
00865> ------------------------
00866> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00867> ------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00868>                        ID1 02:SWM3          8.99     .000     .00    .00    .000
00869>                       +ID2 03:EXC-3         5.15     .028    5.07   8.45    .000
00870>                        ============================================================
00871>                        SUM 01:CTR2         14.14     .028    5.07   3.08    .000
00872>
00873>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00874>
00875> ------------------------------------------------------------------------------
00876> 002:0021------------------------------------------------------------------------
00877> ----------------------
00878> | CALIB NASHYD       |   Area    (ha)=    5.81   Curve Number   (CN)=84.00
00879> | 01:C-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
00880> ----------------------   U.H. Tp(hrs)=    .240
00881>
00882>     Unit Hyd Qpeak  (cms)=     .925
00883>
00884>     PEAK FLOW       (cms)=     .063 (i)
00885>     TIME TO PEAK    (hrs)=    3.083
00886>     RUNOFF VOLUME    (mm)=   16.197
00887>     TOTAL RAINFALL   (mm)=   42.240
00888>     RUNOFF COEFFICIENT   =     .383
00889>
00890>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00891>
00892> ------------------------------------------------------------------------------
00893> 002:0022------------------------------------------------------------------------
00894> ---------------------
00895> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00896> |  IN>01:(C-204 )   |
00897> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
00898> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00899>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00900>                             .000  .0000E+00    |    1.000  .2444E+00
00901>                             .000  .2289E+00    |    3.000  .2604E+00
00902>
00903>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00904>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00905>     INFLOW >01: (C-204 )       5.81      .063     3.083     16.197
00906>     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
00907>    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
00908>
00909>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00910>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00911>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00912>
00913>
00914>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00915>                    TIME SHIFT OF PEAK FLOW          (min)=  -185.00
00916>                    MAXIMUM  STORAGE   USED       (ha.m.)=.9411E-01
00917>
00918>      *** WARNING: Outflow volume is less than inflow volume.
00919> ------------------------------------------------------------------------------
00920> 002:0023------------------------------------------------------------------------
00921> ------------------------------------------------------------------------------
00922> 002:0002------------------------------------------------------------------------
00923>   ** END OF RUN :   2
00924>
00925> ****************************************************************************
00926>
00927>
00928>
00929>
00930>
00931> ---------------------
00932> | START             |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
00933> ---------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
00934>     TZERO =   .00 hrs on        0
00935>     METOUT=   2 (output = METRIC)
00936>     NRUN  = 003
00937>     NSTORM=   1
00938>               #  1=LYA5.1hr
00939> ------------------------------------------------------------------------------
00940> 003:0002------------------------------------------------------------------------
00941> *#************************************************************************
00942> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00943> *#  Date        : 2017/11/24
00944> *#  Modeller    : [C. Fischer]
00945> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00946> *#  License #   : 4730904
00947> *#************************************************************************
00948> *#
00949> *#                     Block C - CONSTRUCTION CONDITIONS
00950> *#
00951> *#************************************************************************
00952> ------------------------------------------------------------------------------
00953> 003:0002------------------------------------------------------------------------
00954> ---------------------
00955> | READ STORM         |    Filename: Belleville IDF (1-hr 30% AES - 5 Year)
00956> | Ptotal=  28.00 mm  |    Comments: Belleville IDF (1-hr 30% AES - 5 Year)
00957> ---------------------
00958>                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
00959>                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
00960>                 .08  30.240 |   .33  36.960 |   .58  33.600 |   .83  10.080
00961>                 .17  47.040 |   .42  43.680 |   .67  16.800 |   .92   3.360
00962>                 .25  70.560 |   .50  30.240 |   .75  13.440 |  1.00    .000
00963>
00964> ------------------------------------------------------------------------------
00965> 003:0003------------------------------------------------------------------------
00966> *#************************************************************************
00967> *#
00968> *#                            AMC II Conditions
00969> *#
00970> *#************************************************************************
00971> ----------------------
00972> | CALIB NASHYD       |   Area    (ha)=    4.57   Curve Number   (CN)=78.00
00973> | 01:C-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
00974> ----------------------   U.H. Tp(hrs)=    .250
00975>
00976>     Unit Hyd Qpeak  (cms)=     .698
00977>
00978>     PEAK FLOW       (cms)=     .103 (i)
00979>     TIME TO PEAK    (hrs)=     .767
00980>     RUNOFF VOLUME    (mm)=    5.590
00981>     TOTAL RAINFALL   (mm)=   28.000
00982>     RUNOFF COEFFICIENT   =     .200
00983>
00984>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00985>
00986> ------------------------------------------------------------------------------
00987> 003:0004------------------------------------------------------------------------
00988> ---------------------
00989> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00990> |  IN>01:(C-200 )   |
00991> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
00992> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00993>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00994>                             .000  .0000E+00    |    2.000  .1546E+00
00995>                             .000  .1448E+00    |    5.000  .1647E+00
00996>
00997>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00998>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00999>     INFLOW >01: (C-200 )       4.57      .103      .767      5.590
01000>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
01001>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
01002>
01003>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01004>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01005>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01006>
01007>
01008>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01009>                    TIME SHIFT OF PEAK FLOW          (min)=   -46.00
01010>                    MAXIMUM  STORAGE   USED       (ha.m.)=.2554E-01
01011>
01012>      *** WARNING: Outflow volume is less than inflow volume.
01013> ------------------------------------------------------------------------------
01014> 003:0005------------------------------------------------------------------------
01015> ---------------------
01016> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=62.00
```

```
| 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
|                    |   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .008 (i)
     TIME TO PEAK    (hrs)=     .850
     RUNOFF VOLUME    (mm)=    3.854
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .138

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

003:0006
| CALIB NASHYD       |   Area     (ha)=    8.38   Curve Number   (CN)=75.00
| 02:C-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
|                    |   U.H. Tp(hrs)=    .320

     Unit Hyd Qpeak  (cms)=    1.000

     PEAK FLOW       (cms)=     .147 (i)
     TIME TO PEAK    (hrs)=     .850
     RUNOFF VOLUME    (mm)=    4.913
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .175

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

003:0007
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>02:(C-201 )    |
| OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
                           OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
                              .000  .0000E+00    |   2.000  .2309E+00
                              .000  .2162E+00    |   5.000  .2460E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (C-201 )       8.38      .147      .850      4.913
     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -51.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4117E-01

      *** WARNING: Outflow volume is less than inflow volume.

003:0008
| DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=62.00
| 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
|                    |   U.H. Tp(hrs)=    .560

     Unit Hyd Qpeak  (cms)=     .981

     PEAK FLOW       (cms)=     .133 (i)
     TIME TO PEAK    (hrs)=    1.067
     RUNOFF VOLUME    (mm)=    3.855
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .138

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

003:0009
| CALIB NASHYD       |   Area     (ha)=    3.19   Curve Number   (CN)=75.00
| 05:C-202  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
|                    |   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .530

     PEAK FLOW       (cms)=     .066 (i)
     TIME TO PEAK    (hrs)=     .750
     RUNOFF VOLUME    (mm)=    4.913
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .175

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

003:0010
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>05:(C-202 )    |
| OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
                           OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
                              .000  .0000E+00    |    .000  .5990E-01
                              .000  .5600E-01    |   1.000  .6400E-01

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (C-202 )       3.19      .066      .750      4.913
     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -45.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1567E-01

      *** WARNING: Outflow volume is less than inflow volume.

003:0011
| ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 04:EXC-2       14.38     .133    1.07   3.85    .000
                      +ID2 06:SWM2A        3.19     .000     .00    .00    .000
                       ==========================================================
                       SUM 07:CTR1A       17.57     .133    1.07   3.15    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

003:0012
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>07:(CTR1A )    |
| OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
                           OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
                              .000  .0000E+00    |    .000  .1618E+00
                              .000  .1260E-01    |    .862  .2671E+00
                              .000  .4270E-01    |   2.728  .4058E+00
                              .000  .8980E-01    |   4.016  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >07: (CTR1A )       17.57      .133     1.067      3.155
     OUTFLOW<08: (SWM2B )       17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2B)         .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -64.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.5543E-01

      *** WARNING: Outflow volume is less than inflow volume.

003:0013
| DESIGN NASHYD      |   Area     (ha)=     .00   Curve Number   (CN)= 1.00
| 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
|                    |   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .000

     PEAK FLOW       (cms)=     .000 (i)
     TIME TO PEAK    (hrs)=    1.000
     RUNOFF VOLUME    (mm)=     .011
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .000

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

003:0014
| ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 08:SWM2B       17.57     .000     .00    .00    .000
                      +ID2 09:BLANK         .00     .000    1.00    .01    .000
                       ==========================================================
                       SUM 04:SB&BLK      17.57     .000    1.00    .00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

003:0015
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(SB&BLK)    |
| OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
                           OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
                              .000  .0000E+00    |    .500  .1004E+00
                              .000  .9410E-01    |   1.300  .1070E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (SB&BLK)       17.57      .000     1.000       .000
     OUTFLOW<09: (SWM2C )       17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2C)         .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -60.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1060E-09

003:0016
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:CTR1          .65     .008     .85   3.85    .000
                      +ID2 03:SWM1         8.38     .000     .00    .00    .000
                      +ID3 09:SWM2C       17.57     .000     .00    .00    .000
                       ==========================================================
                       SUM 01:CTR1         26.60     .008     .85    .09    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

003:0017
| CALIB NASHYD       |   Area     (ha)=    8.99   Curve Number   (CN)=81.00
| 01:C-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
|                    |   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=    1.272

     PEAK FLOW       (cms)=     .224 (i)
     TIME TO PEAK    (hrs)=     .783
     RUNOFF VOLUME    (mm)=    6.406
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .229

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

003:0018
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(C-203 )    |
| OUT<02:(SWM3  )    |    =========  OUTLFOW STORAGE TABLE  =========
                           OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
                              .000  .0000E+00    |   3.000  .3271E+00
                              .000  .3063E+00    |   9.000  .3485E+00
```

```
01271>
01272>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01273>      --------------------        (ha)     (cms)     (hrs)       (mm)
01274>      INFLOW >01: (C-203 )       8.99      .224      .783      6.406
01275>      OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
01276>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
01277>
01278>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01279>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01280>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01281>
01282>
01283>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01284>                     TIME SHIFT OF PEAK FLOW          (min)=   -47.00
01285>                     MAXIMUM  STORAGE   USED       (ha.m.)=.5759E-01
01286>
01287>       *** WARNING: Outflow volume is less than inflow volume.
01288> ------------------------------------------------------------------------------
01289> 003:0019-----------------------------------------------------------------------
01290> ----------------------
01291> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=62.00
01292> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01293> ----------------------   U.H. Tp(hrs)=    .390
01294>
01295>      Unit Hyd Qpeak  (cms)=     .504
01296>
01297>      PEAK FLOW       (cms)=     .061 (i)
01298>      TIME TO PEAK    (hrs)=     .900
01299>      RUNOFF VOLUME    (mm)=    3.855
01300>      TOTAL RAINFALL   (mm)=   28.000
01301>      RUNOFF COEFFICIENT   =     .138
01302>
01303>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01304>
01305> ------------------------------------------------------------------------------
01306> 003:0020-----------------------------------------------------------------------
01307> ------------------------
01308> | ADD HYD (CTR2      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
01309> ------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
01310>                        ID1 02:SWM3           8.99     .000     .00    .00     .000
01311>                       +ID2 03:EXC-3          5.15     .061     .90   3.85     .000
01312>                        ========================================================
01313>                        SUM 01:CTR2           14.14     .061     .90   1.40     .000
01314>
01315>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01316>
01317> ------------------------------------------------------------------------------
01318> 003:0021-----------------------------------------------------------------------
01319> ----------------------
01320> | CALIB NASHYD       |   Area     (ha)=    5.81   Curve Number   (CN)=84.00
01321> | 01:C-204  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01322> ----------------------   U.H. Tp(hrs)=    .240
01323>
01324>      Unit Hyd Qpeak  (cms)=     .925
01325>
01326>      PEAK FLOW       (cms)=     .177 (i)
01327>      TIME TO PEAK    (hrs)=     .750
01328>      RUNOFF VOLUME    (mm)=    7.411
01329>      TOTAL RAINFALL   (mm)=   28.000
01330>      RUNOFF COEFFICIENT   =     .265
01331>
01332>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01333>
01334> ------------------------------------------------------------------------------
01335> 003:0022-----------------------------------------------------------------------
01336> ---------------------
01337> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01338> |  IN>01:(C-204 )   |
01339> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
01340> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01341>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01342>                             .000  .0000E+00    |   1.000  .2444E+00
01343>                             .000  .2289E+00    |   3.000  .2604E+00
01344>
01345>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01346>      --------------------        (ha)     (cms)     (hrs)       (mm)
01347>      INFLOW >01: (C-204 )       5.81      .177      .750      7.411
01348>      OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
01349>     OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
01350>
01351>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01352>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01353>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01354>
01355>
01356>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01357>                     TIME SHIFT OF PEAK FLOW          (min)=   -45.00
01358>                     MAXIMUM  STORAGE   USED       (ha.m.)=.4306E-01
01359>
01360>       *** WARNING: Outflow volume is less than inflow volume.
01361> ------------------------------------------------------------------------------
01362> 003:0023-----------------------------------------------------------------------
01363> ------------------------------------------------------------------------------
01364> 003:0002-----------------------------------------------------------------------
01365> ------------------------------------------------------------------------------
01366> 003:0002-----------------------------------------------------------------------
01367>   ** END OF RUN :   3
01368>
01369> ******************************************************************************
01370>
01371>
01372>
01373>
01374>
01375> --------------------
01376> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
01377> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
01378>     TZERO =   .00 hrs on        0
01379>     METOUT=   2 (output = METRIC)
01380>     NRUN  = 004
01381>     NSTORM=   1
01382>            #  1=LYA5.12h
01383> ------------------------------------------------------------------------------
01384> 004:0002-----------------------------------------------------------------------
01385> *#*****************************************************************************
01386> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
01387> *#  Date        : 2017/11/24
01388> *#  Modeller    : [C. Fischer]
01389> *#  Company     : Stantec Consulting Ltd. (Waterloo)
01390> *#  License #   : 4730904
01391> *#*****************************************************************************
01392> *#
01393> *#                      Block C - CONSTRUCTION CONDITIONS
01394> *#
01395> *#*****************************************************************************
01396> ------------------------------------------------------------------------------
01397> 004:0002-----------------------------------------------------------------------
01398> --------------------
01399> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 5 Year)
01400> | Ptotal=  55.97 mm|    Comments: Belleville IDF (12-hr 30% AES - 5 Year)
01401> --------------------
01402>               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
01403>                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
01404>               1.00   5.247 |  4.00   8.745 |  7.00   1.749 | 10.00    .000
01405>               2.00  15.158 |  5.00   8.162 |  8.00    .583 | 11.00    .000
01406>               3.00  11.660 |  6.00   4.664 |  9.00    .000 | 12.00    .000
01407>
01408> ------------------------------------------------------------------------------
01409> 004:0003-----------------------------------------------------------------------
01410> *#*****************************************************************************
01411> *#
01412> *#                              AMC II Conditions
01413> *#
01414> *#*****************************************************************************
01415> ----------------------
01416> | CALIB NASHYD       |   Area     (ha)=    4.57   Curve Number   (CN)=78.00
01417> | 01:C-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01418> ----------------------   U.H. Tp(hrs)=    .250
01419>
01420>      Unit Hyd Qpeak  (cms)=     .698
01421>
01422>      PEAK FLOW       (cms)=     .064 (i)
01423>      TIME TO PEAK    (hrs)=    3.083
01424>      RUNOFF VOLUME    (mm)=   21.187
01425>      TOTAL RAINFALL   (mm)=   55.968
01426>      RUNOFF COEFFICIENT   =     .379
01427>
01428>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01429>
01430> ------------------------------------------------------------------------------
01431> 004:0004-----------------------------------------------------------------------
01432> ---------------------
01433> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01434> |  IN>01:(C-200 )   |
01435> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
01436> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01437>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01438>                             .000  .0000E+00    |   2.000  .1546E+00
01439>                             .000  .1448E+00    |   5.000  .1647E+00
01440>
01441>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01442>      --------------------        (ha)     (cms)     (hrs)       (mm)
01443>      INFLOW >01: (C-200 )       4.57      .064     3.083     21.187
01444>      OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
01445>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
01446>
01447>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01448>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01449>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01450>
01451>
01452>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01453>                     TIME SHIFT OF PEAK FLOW          (min)=  -185.00
01454>                     MAXIMUM  STORAGE   USED       (ha.m.)=.9683E-01
01455>
01456>       *** WARNING: Outflow volume is less than inflow volume.
01457> ------------------------------------------------------------------------------
01458> 004:0005-----------------------------------------------------------------------
01459> ----------------------
01460> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=62.00
01461> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01462> ----------------------   U.H. Tp(hrs)=    .340
01463>
01464>      Unit Hyd Qpeak  (cms)=     .073
01465>
01466>      PEAK FLOW       (cms)=     .006 (i)
01467>      TIME TO PEAK    (hrs)=    5.050
01468>      RUNOFF VOLUME    (mm)=   14.118
01469>      TOTAL RAINFALL   (mm)=   55.968
01470>      RUNOFF COEFFICIENT   =     .252
01471>
01472>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01473>
01474> ------------------------------------------------------------------------------
01475> 004:0006-----------------------------------------------------------------------
01476> ----------------------
01477> | CALIB NASHYD       |   Area     (ha)=    8.38   Curve Number   (CN)=75.00
01478> | 02:C-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01479> ----------------------   U.H. Tp(hrs)=    .320
01480>
01481>      Unit Hyd Qpeak  (cms)=    1.000
01482>
01483>      PEAK FLOW       (cms)=     .103 (i)
01484>      TIME TO PEAK    (hrs)=    5.033
01485>      RUNOFF VOLUME    (mm)=   19.152
01486>      TOTAL RAINFALL   (mm)=   55.968
01487>      RUNOFF COEFFICIENT   =     .342
01488>
01489>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01490>
01491> ------------------------------------------------------------------------------
01492> 004:0007-----------------------------------------------------------------------
01493> ---------------------
01494> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01495> |  IN>02:(C-201 )   |
01496> | OUT<03:(SWM1  )   |    =========  OUTLFOW STORAGE TABLE  =========
01497> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01498>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01499>                             .000  .0000E+00    |   2.000  .2309E+00
01500>                             .000  .2162E+00    |   5.000  .2460E+00
01501>
01502>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01503>      --------------------        (ha)     (cms)     (hrs)       (mm)
01504>      INFLOW >02: (C-201 )       8.38      .103     5.033     19.152
01505>      OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
01506>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
01507>
01508>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01509>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01510>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01511>
01512>
01513>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01514>                     TIME SHIFT OF PEAK FLOW          (min)=  -302.00
01515>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1605E+00
01516>
01517>       *** WARNING: Outflow volume is less than inflow volume.
01518> ------------------------------------------------------------------------------
01519> 004:0008-----------------------------------------------------------------------
01520> ----------------------
01521> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=62.00
01522> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01523> ----------------------   U.H. Tp(hrs)=    .560
01524>
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```
01525>      Unit Hyd Qpeak  (cms)=     .981
01526>
01527>      PEAK FLOW       (cms)=     .125 (i)
01528>      TIME TO PEAK    (hrs)=    5.100
01529>      RUNOFF VOLUME    (mm)=   14.118
01530>      TOTAL RAINFALL   (mm)=   55.968
01531>      RUNOFF COEFFICIENT   =     .252
01532>
01533>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01534>
01535> ------------------------------------------------------------------------------
01536> 004:0009-----------------------------------------------------------------------
01537> ---------------------
01538> | CALIB NASHYD       |   Area    (ha)=    3.19   Curve Number   (CN)=75.00
01539> | 05:C-202  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
01540> ---------------------   U.H. Tp(hrs)=    .230
01541>
01542>      Unit Hyd Qpeak  (cms)=     .530
01543>
01544>      PEAK FLOW       (cms)=     .040 (i)
01545>      TIME TO PEAK    (hrs)=    3.083
01546>      RUNOFF VOLUME    (mm)=   19.152
01547>      TOTAL RAINFALL   (mm)=   55.968
01548>      RUNOFF COEFFICIENT   =     .342
01549>
01550>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01551>
01552> ------------------------------------------------------------------------------
01553> 004:0010-----------------------------------------------------------------------
01554> ---------------------
01555> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01556> |  IN>05:(C-202 )    |
01557> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
01558> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01559>                            (cms)     (ha.m.)  |    (cms)    (ha.m.)
01560>                            .000  .0000E+00    |     .000  .5990E-01
01561>                            .000  .5600E-01    |    1.000  .6400E-01
01562>
01563>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01564>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01565>      INFLOW >05: (C-202 )       3.19      .040     3.083     19.152
01566>      OUTFLOW<06: (SWM2A )       3.19      .005     7.433       .428
01567>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
01568>
01569>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01570>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01571>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01572>
01573>
01574>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   11.974
01575>                     TIME SHIFT OF PEAK FLOW          (min)=   261.00
01576>                     MAXIMUM  STORAGE   USED       (ha.m.)=.5992E-01
01577>
01578>       *** WARNING: Outflow volume is less than inflow volume.
01579> ------------------------------------------------------------------------------
01580> 004:0011-----------------------------------------------------------------------
01581> ------------------------
01582> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01583> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
01584>                        ID1 04:EXC-2       14.38     .125    5.10  14.12    .000
01585>                       +ID2 06:SWM2A        3.19     .005    7.43    .43    .000
01586>                        ========================================================
01587>                        SUM 07:CTR1A       17.57     .125    5.10  11.62    .000
01588>
01589>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01590>
01591> ------------------------------------------------------------------------------
01592> 004:0012-----------------------------------------------------------------------
01593> ---------------------
01594> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01595> |  IN>07:(CTR1A )    |
01596> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
01597> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01598>                            (cms)     (ha.m.)  |    (cms)    (ha.m.)
01599>                            .000  .0000E+00    |     .000  .1618E+00
01600>                            .000  .1260E-01    |     .862  .2671E+00
01601>                            .000  .4270E-01    |    2.728  .4058E+00
01602>                            .000  .8980E-01    |    4.016  .4888E+00
01603>
01604>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01605>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01606>      INFLOW >07: (CTR1A )      17.57      .125     5.100     11.623
01607>      OUTFLOW<08: (SWM2B )      17.57      .064     6.617      2.445
01608>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
01609>
01610>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01611>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01612>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01613>
01614>
01615>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   51.767
01616>                     TIME SHIFT OF PEAK FLOW          (min)=    91.00
01617>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1697E+00
01618>
01619>       *** WARNING: Outflow volume is less than inflow volume.
01620> ------------------------------------------------------------------------------
01621> 004:0013-----------------------------------------------------------------------
01622> ---------------------
01623> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
01624> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01625> ---------------------   U.H. Tp(hrs)=    .500
01626>
01627>      Unit Hyd Qpeak  (cms)=     .000
01628>
01629>      PEAK FLOW       (cms)=     .000 (i)
01630>      TIME TO PEAK    (hrs)=    5.117
01631>      RUNOFF VOLUME    (mm)=     .118
01632>      TOTAL RAINFALL   (mm)=   55.968
01633>      RUNOFF COEFFICIENT   =     .002
01634>
01635>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01636>
01637> ------------------------------------------------------------------------------
01638> 004:0014-----------------------------------------------------------------------
01639> ------------------------
01640> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01641> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
01642>                        ID1 08:SWM2B       17.57     .064    6.62   2.44    .000
01643>                       +ID2 09:BLANK         .00     .000    5.12    .12    .000
01644>                        ========================================================
01645>                        SUM 04:SB&BLK      17.57     .064    6.62   2.44    .000
01646>
01647>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01648>
01649> ------------------------------------------------------------------------------
01650> 004:0015-----------------------------------------------------------------------
01651> ---------------------
01652> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01653> |  IN>04:(SB&BLK)    |
01654> | OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
01655> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01656>                            (cms)     (ha.m.)  |    (cms)    (ha.m.)
01657>                             .000  .0000E+00    |     .500  .1004E+00
01658>                             .000  .9410E-01    |    1.300  .1070E+00
01659>
01660>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01661>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01662>      INFLOW >04: (SB&BLK)      17.57      .064     6.617      2.445
01663>      OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
01664>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
01665>
01666>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01667>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01668>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01669>
01670>
01671>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01672>                     TIME SHIFT OF PEAK FLOW          (min)= -397.00
01673>                     MAXIMUM  STORAGE   USED       (ha.m.)=.4295E-01
01674>
01675>       *** WARNING: Outflow volume is less than inflow volume.
01676> ------------------------------------------------------------------------------
01677> 004:0016-----------------------------------------------------------------------
01678> ------------------------
01679> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01680> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
01681>                        ID1 01:CTR1          .65     .006    5.05  14.12    .000
01682>                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
01683>                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
01684>                        ========================================================
01685>                        SUM 01:CTR1         26.60     .006    5.05    .34    .000
01686>
01687>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01688>
01689> ------------------------------------------------------------------------------
01690> 004:0017-----------------------------------------------------------------------
01691> ---------------------
01692> | CALIB NASHYD       |   Area    (ha)=    8.99   Curve Number   (CN)=81.00
01693> | 01:C-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
01694> ---------------------   U.H. Tp(hrs)=    .270
01695>
01696>      Unit Hyd Qpeak  (cms)=    1.272
01697>
01698>      PEAK FLOW       (cms)=     .140 (i)
01699>      TIME TO PEAK    (hrs)=    3.100
01700>      RUNOFF VOLUME    (mm)=   23.499
01701>      TOTAL RAINFALL   (mm)=   55.968
01702>      RUNOFF COEFFICIENT   =     .420
01703>
01704>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01705>
01706> ------------------------------------------------------------------------------
01707> 004:0018-----------------------------------------------------------------------
01708> ---------------------
01709> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01710> |  IN>01:(C-203 )    |
01711> | OUT<02:(SWM3  )    |    =========  OUTLFOW STORAGE TABLE  =========
01712> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01713>                            (cms)     (ha.m.)  |    (cms)    (ha.m.)
01714>                             .000  .0000E+00    |    3.000  .3271E+00
01715>                             .000  .3063E+00    |    9.000  .3485E+00
01716>
01717>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01718>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01719>      INFLOW >01: (C-203 )       8.99      .140     3.100     23.499
01720>      OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
01721>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
01722>
01723>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01724>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01725>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01726>
01727>
01728>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01729>                     TIME SHIFT OF PEAK FLOW          (min)= -186.00
01730>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2113E+00
01731>
01732>       *** WARNING: Outflow volume is less than inflow volume.
01733> ------------------------------------------------------------------------------
01734> 004:0019-----------------------------------------------------------------------
01735> ---------------------
01736> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=62.00
01737> | 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01738> ---------------------   U.H. Tp(hrs)=    .390
01739>
01740>      Unit Hyd Qpeak  (cms)=     .504
01741>
01742>      PEAK FLOW       (cms)=     .045 (i)
01743>      TIME TO PEAK    (hrs)=    5.067
01744>      RUNOFF VOLUME    (mm)=   14.118
01745>      TOTAL RAINFALL   (mm)=   55.968
01746>      RUNOFF COEFFICIENT   =     .252
01747>
01748>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01749>
01750> ------------------------------------------------------------------------------
01751> 004:0020-----------------------------------------------------------------------
01752> ------------------------
01753> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01754> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
01755>                        ID1 02:SWM3         8.99     .000     .00    .00    .000
01756>                       +ID2 03:EXC-3        5.15     .045    5.07  14.12    .000
01757>                        ========================================================
01758>                        SUM 01:CTR2        14.14     .045    5.07   5.14    .000
01759>
01760>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01761>
01762> ------------------------------------------------------------------------------
01763> 004:0021-----------------------------------------------------------------------
01764> ---------------------
01765> | CALIB NASHYD       |   Area    (ha)=    5.81   Curve Number   (CN)=84.00
01766> | 01:C-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
01767> ---------------------   U.H. Tp(hrs)=    .240
01768>
01769>      Unit Hyd Qpeak  (cms)=     .925
01770>
01771>      PEAK FLOW       (cms)=     .103 (i)
01772>      TIME TO PEAK    (hrs)=    3.067
01773>      RUNOFF VOLUME    (mm)=   26.147
01774>      TOTAL RAINFALL   (mm)=   55.968
01775>      RUNOFF COEFFICIENT   =     .467
01776>
01777>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01778>
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01779> ------------------------------------------------------------------------------
01780> 004:0022------------------------------------------------------------------------
01781> --------------------
01782> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01783> |  IN>01:(C-204 )   |
01784> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
01785> --------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01786>                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
01787>                            .000  .0000E+00    |    1.000  .2444E+00
01788>                            .000  .2289E+00    |    3.000  .2604E+00
01789>
01790>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01791>     --------------------        (ha)     (cms)     (hrs)       (mm)
01792>     INFLOW >01: (C-204 )       5.81      .103     3.067     26.147
01793>     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
01794>    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
01795>
01796>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01797>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01798>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01799>
01800>
01801>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01802>                    TIME SHIFT OF PEAK FLOW          (min)=  -184.00
01803>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1519E+00
01804>
01805>       *** WARNING: Outflow volume is less than inflow volume.
01806> ------------------------------------------------------------------------------
01807> 004:0023------------------------------------------------------------------------
01808> ------------------------------------------------------------------------------
01809> 004:0002------------------------------------------------------------------------
01810> ------------------------------------------------------------------------------
01811> 004:0002------------------------------------------------------------------------
01812> ------------------------------------------------------------------------------
01813> 004:0002------------------------------------------------------------------------
01814>   ** END OF RUN :   4
01815>
01816> ******************************************************************************
01817>
01818>
01819>
01820>
01821>
01822> --------------------
01823> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
01824> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
01825>     TZERO =   .00 hrs on        0
01826>     METOUT=   2 (output = METRIC)
01827>     NRUN  = 005
01828>     NSTORM=   1
01829>            #  1=LYA100.1hr
01830> ------------------------------------------------------------------------------
01831> 005:0002------------------------------------------------------------------------
01832> *#**************************************************************************
01833> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
01834> *#  Date        : 2017/11/24
01835> *#  Modeller    : [C. Fischer]
01836> *#  Company     : Stantec Consulting Ltd. (Waterloo)
01837> *#  License #   : 4730904
01838> *#**************************************************************************
01839> *#
01840> *#                        Block C - CONSTRUCTION CONDITIONS
01841> *#
01842> *#**************************************************************************
01843> ------------------------------------------------------------------------------
01844> 005:0002------------------------------------------------------------------------
01845> --------------------
01846> | READ STORM        |    Filename: Belleville IDF (1-hr 30% AES - 100 Year)
01847> | Ptotal=  44.10 mm |    Comments: Belleville IDF (1-hr 30% AES - 100 Year)
01848> --------------------
01849>                TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
01850>                 hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
01851>                .08  47.628 |    .33  58.212 |    .58  52.920 |    .83  15.876
01852>                .17  74.088 |    .42  68.796 |    .67  26.460 |    .92   5.292
01853>                .25 111.132 |    .50  47.628 |    .75  21.168 |   1.00    .000
01854>
01855> ------------------------------------------------------------------------------
01856> 005:0003------------------------------------------------------------------------
01857> *#**************************************************************************
01858> *#
01859> *#                              AMC II Conditions
01860> *#
01861> *#**************************************************************************
01862> ----------------------
01863> | CALIB NASHYD       |   Area     (ha)=    4.57   Curve Number   (CN)=78.00
01864> | 01:C-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01865> ----------------------   U.H. Tp(hrs)=    .250
01866>
01867>     Unit Hyd Qpeak  (cms)=     .698
01868>
01869>     PEAK FLOW       (cms)=     .250 (i)
01870>     TIME TO PEAK    (hrs)=     .733
01871>     RUNOFF VOLUME    (mm)=   13.805
01872>     TOTAL RAINFALL   (mm)=   44.100
01873>     RUNOFF COEFFICIENT   =     .313
01874>
01875>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01876>
01877> ------------------------------------------------------------------------------
01878> 005:0004------------------------------------------------------------------------
01879> --------------------
01880> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01881> |  IN>01:(C-200 )   |
01882> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
01883> --------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01884>                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
01885>                            .000  .0000E+00    |    2.000  .1546E+00
01886>                            .000  .1448E+00    |    5.000  .1647E+00
01887>
01888>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01889>     --------------------        (ha)     (cms)     (hrs)       (mm)
01890>     INFLOW >01: (C-200 )       4.57      .250      .733     13.805
01891>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
01892>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
01893>
01894>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01895>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01896>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01897>
01898>
01899>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01900>                    TIME SHIFT OF PEAK FLOW          (min)=   -44.00
01901>                    MAXIMUM  STORAGE   USED       (ha.m.)=.6309E-01
01902>
01903>       *** WARNING: Outflow volume is less than inflow volume.
01904> ------------------------------------------------------------------------------
01905> 005:0005------------------------------------------------------------------------
01906> ----------------------
01907> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=62.00
01908> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01909> ----------------------   U.H. Tp(hrs)=    .340
01910>
01911>     Unit Hyd Qpeak  (cms)=     .073
01912>
01913>     PEAK FLOW       (cms)=     .020 (i)
01914>     TIME TO PEAK    (hrs)=     .850
01915>     RUNOFF VOLUME    (mm)=    9.152
01916>     TOTAL RAINFALL   (mm)=   44.100
01917>     RUNOFF COEFFICIENT   =     .208
01918>
01919>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01920>
01921> ------------------------------------------------------------------------------
01922> 005:0006------------------------------------------------------------------------
01923> ----------------------
01924> | CALIB NASHYD       |   Area     (ha)=    8.38   Curve Number   (CN)=75.00
01925> | 02:C-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01926> ----------------------   U.H. Tp(hrs)=    .320
01927>
01928>     Unit Hyd Qpeak  (cms)=    1.000
01929>
01930>     PEAK FLOW       (cms)=     .362 (i)
01931>     TIME TO PEAK    (hrs)=     .833
01932>     RUNOFF VOLUME    (mm)=   12.352
01933>     TOTAL RAINFALL   (mm)=   44.100
01934>     RUNOFF COEFFICIENT   =     .280
01935>
01936>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01937>
01938> ------------------------------------------------------------------------------
01939> 005:0007------------------------------------------------------------------------
01940> --------------------
01941> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01942> |  IN>02:(C-201 )   |
01943> | OUT<03:(SWM1  )   |    =========  OUTLFOW STORAGE TABLE  =========
01944> --------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01945>                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
01946>                            .000  .0000E+00    |    2.000  .2309E+00
01947>                            .000  .2162E+00    |    5.000  .2460E+00
01948>
01949>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01950>     --------------------        (ha)     (cms)     (hrs)       (mm)
01951>     INFLOW >02: (C-201 )       8.38      .362      .833     12.352
01952>     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
01953>    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
01954>
01955>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01956>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01957>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01958>
01959>
01960>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01961>                    TIME SHIFT OF PEAK FLOW          (min)=   -50.00
01962>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1035E+00
01963>
01964>       *** WARNING: Outflow volume is less than inflow volume.
01965> ------------------------------------------------------------------------------
01966> 005:0008------------------------------------------------------------------------
01967> ----------------------
01968> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=62.00
01969> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01970> ----------------------   U.H. Tp(hrs)=    .560
01971>
01972>     Unit Hyd Qpeak  (cms)=     .981
01973>
01974>     PEAK FLOW       (cms)=     .315 (i)
01975>     TIME TO PEAK    (hrs)=    1.050
01976>     RUNOFF VOLUME    (mm)=    9.153
01977>     TOTAL RAINFALL   (mm)=   44.100
01978>     RUNOFF COEFFICIENT   =     .208
01979>
01980>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01981>
01982> ------------------------------------------------------------------------------
01983> 005:0009------------------------------------------------------------------------
01984> ----------------------
01985> | CALIB NASHYD       |   Area     (ha)=    3.19   Curve Number   (CN)=75.00
01986> | 05:C-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01987> ----------------------   U.H. Tp(hrs)=    .230
01988>
01989>     Unit Hyd Qpeak  (cms)=     .530
01990>
01991>     PEAK FLOW       (cms)=     .162 (i)
01992>     TIME TO PEAK    (hrs)=     .717
01993>     RUNOFF VOLUME    (mm)=   12.352
01994>     TOTAL RAINFALL   (mm)=   44.100
01995>     RUNOFF COEFFICIENT   =     .280
01996>
01997>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01998>
01999> ------------------------------------------------------------------------------
02000> 005:0010------------------------------------------------------------------------
02001> ----------------------
02002> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02003> |  IN>05:(C-202 )   |
02004> | OUT<06:(SWM2A )   |    =========  OUTLFOW STORAGE TABLE  =========
02005> --------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02006>                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
02007>                            .000  .0000E+00    |    .000  .5990E-01
02008>                            .000  .5600E-01    |   1.000  .6400E-01
02009>
02010>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02011>     --------------------        (ha)     (cms)     (hrs)       (mm)
02012>     INFLOW >05: (C-202 )       3.19      .162      .717     12.352
02013>     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
02014>    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
02015>
02016>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02017>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02018>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02019>
02020>
02021>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
02022>                    TIME SHIFT OF PEAK FLOW          (min)=   -43.00
02023>                    MAXIMUM  STORAGE   USED       (ha.m.)=.3940E-01
02024>
02025>       *** WARNING: Outflow volume is less than inflow volume.
02026> ------------------------------------------------------------------------------
02027> 005:0011------------------------------------------------------------------------
02028> ------------------------
02029> | ADD HYD (CTR1A     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02030> ------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
02031>                        ID1 04:EXC-2        14.38     .315    1.05    9.15    .000
02032>                       +ID2 06:SWM2A         3.19     .000     .00     .00    .000
```

```
                    ============================================================
                    SUM 07:CTR1A         17.57     .315    1.05    7.49    .000
                    ============================================================

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0012--------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>07:(CTR1A )   |
| OUT<08:(SWM2B )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
                            .000  .0000E+00     |     .000  .1618E+00
                            .000  .1260E-01     |     .862  .2671E+00
                            .000  .4270E-01     |    2.728  .4058E+00
                            .000  .8980E-01     |    4.016  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >07: (CTR1A )      17.57      .315     1.050      7.491
     OUTFLOW<08: (SWM2B )      17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -63.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1316E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0013--------------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area     (ha)=     .00   Curve Number    (CN)= 1.00
| 09:BLANK  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .000

     PEAK FLOW       (cms)=     .000 (i)
     TIME TO PEAK    (hrs)=    1.000
     RUNOFF VOLUME    (mm)=     .028
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .001

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

--------------------------------------------------------------------------------
005:0014--------------------------------------------------------------------------
------------------------
| ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 08:SWM2B       17.57     .000     .00    .00    .000
                       +ID2 09:BLANK         .00     .000    1.00    .03    .000
                        ============================================================
                        SUM 04:SB&BLK      17.57     .000    1.00    .00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0015--------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>04:(SB&BLK)   |
| OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
                            .000  .0000E+00     |     .500  .1004E+00
                            .000  .9410E-01     |    1.300  .1070E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (SB&BLK)      17.57      .000     1.000       .000
     OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -60.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2769E-09

--------------------------------------------------------------------------------
005:0016--------------------------------------------------------------------------
------------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 01:CTR1          .65     .020     .85   9.15    .000
                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
                        ============================================================
                        SUM 01:CTR1         26.60     .020     .85    .22    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0017--------------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area     (ha)=    8.99   Curve Number    (CN)=81.00
| 01:C-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=    1.272

     PEAK FLOW       (cms)=     .531 (i)
     TIME TO PEAK    (hrs)=     .750
     RUNOFF VOLUME    (mm)=   15.493
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .351

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

--------------------------------------------------------------------------------
005:0018--------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-203 )   |
| OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
                                .000  .0000E+00     |    3.000  .3271E+00
                                .000  .3063E+00     |    9.000  .3485E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-203 )       8.99      .531      .750     15.493
     OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -45.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1393E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0019--------------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area     (ha)=    5.15   Curve Number    (CN)=62.00
| 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .145 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    9.153
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .208

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

--------------------------------------------------------------------------------
005:0020--------------------------------------------------------------------------
------------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 02:SWM3        8.99     .000     .00    .00    .000
                       +ID2 03:EXC-3       5.15     .145     .90   9.15    .000
                        ============================================================
                        SUM 01:CTR2        14.14     .145     .90   3.33    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0021--------------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area     (ha)=    5.81   Curve Number    (CN)=84.00
| 01:C-204  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .240

     Unit Hyd Qpeak  (cms)=     .925

     PEAK FLOW       (cms)=     .409 (i)
     TIME TO PEAK    (hrs)=     .717
     RUNOFF VOLUME    (mm)=   17.476
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .396

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

--------------------------------------------------------------------------------
005:0022--------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-204 )   |
| OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
                            .000  .0000E+00     |    1.000  .2444E+00
                            .000  .2289E+00     |    3.000  .2604E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-204 )       5.81      .409      .717     17.476
     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -43.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1015E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0023--------------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
  ** END OF RUN :   5

********************************************************************************




---------------------
| START             |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
---------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
           #  1=LYA100.12h
--------------------------------------------------------------------------------
006:0002--------------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/11/24
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
*#  License #   : 4730904
*#*****************************************************************************
```

```
02287> *#
02288> *#                    Block C - CONSTRUCTION CONDITIONS
02289> *#
02290> *#*************************************************************************
02291> -------------------------------------------------------------------------
02292> 006:0002-------------------------------------------------------------------
02293> --------------------
02294> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 100 Year
02295> | Ptotal=  93.70 mm|    Comments: Belleville IDF (12-hr 30% AES - 100 Year
02296> --------------------
02297>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
02298>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
02299>              1.00   8.784 |   4.00  14.640 |   7.00   2.928 |  10.00    .000
02300>              2.00  25.376 |   5.00  13.664 |   8.00    .976 |  11.00    .000
02301>              3.00  19.520 |   6.00   7.808 |   9.00    .000 |  12.00    .000
02302>
02303> -------------------------------------------------------------------------
02304> 006:0003-------------------------------------------------------------------
02305> *#*************************************************************************
02306> *#
02307> *#                          AMC II Conditions
02308> *#
02309> *#*************************************************************************
02310> ----------------------
02311> | CALIB NASHYD       |   Area    (ha)=    4.57   Curve Number   (CN)=78.00
02312> | 01:C-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02313> ----------------------   U.H. Tp(hrs)=    .250
02314>
02315>      Unit Hyd Qpeak  (cms)=     .698
02316>
02317>      PEAK FLOW       (cms)=     .150 (i)
02318>      TIME TO PEAK    (hrs)=    3.067
02319>      RUNOFF VOLUME    (mm)=   49.065
02320>      TOTAL RAINFALL   (mm)=   93.696
02321>      RUNOFF COEFFICIENT   =     .524
02322>
02323>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02324>
02325> -------------------------------------------------------------------------
02326> 006:0004-------------------------------------------------------------------
02327> ----------------------
02328> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02329> |  IN>01:(C-200 )    |
02330> | OUT<02:(SWM0  )    |    =========  OUTLFOW STORAGE TABLE  =========
02331> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02332>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
02333>                              .000  .0000E+00     |   2.000  .1546E+00
02334>                              .000  .1448E+00     |   5.000  .1647E+00
02335>
02336>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02337>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02338>      INFLOW >01: (C-200 )       4.57      .150     3.067     49.065
02339>      OUTFLOW<02: (SWM0  )       4.57      .130     5.033     17.381
02340>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
02341>
02342>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02343>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02344>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02345>
02346>
02347>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   87.100
02348>                     TIME SHIFT OF PEAK FLOW          (min)=   118.00
02349>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1454E+00
02350>
02351>       *** WARNING: Outflow volume is less than inflow volume.
02352> -------------------------------------------------------------------------
02353> 006:0005-------------------------------------------------------------------
02354> ----------------------
02355> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=62.00
02356> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02357> ----------------------   U.H. Tp(hrs)=    .340
02358>
02359>      Unit Hyd Qpeak  (cms)=     .073
02360>
02361>      PEAK FLOW       (cms)=     .014 (i)
02362>      TIME TO PEAK    (hrs)=    3.133
02363>      RUNOFF VOLUME    (mm)=   34.292
02364>      TOTAL RAINFALL   (mm)=   93.696
02365>      RUNOFF COEFFICIENT   =     .366
02366>
02367>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02368>
02369> -------------------------------------------------------------------------
02370> 006:0006-------------------------------------------------------------------
02371> ----------------------
02372> | CALIB NASHYD       |   Area    (ha)=    8.38   Curve Number   (CN)=75.00
02373> | 02:C-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02374> ----------------------   U.H. Tp(hrs)=    .320
02375>
02376>      Unit Hyd Qpeak  (cms)=    1.000
02377>
02378>      PEAK FLOW       (cms)=     .248 (i)
02379>      TIME TO PEAK    (hrs)=    3.117
02380>      RUNOFF VOLUME    (mm)=   45.379
02381>      TOTAL RAINFALL   (mm)=   93.696
02382>      RUNOFF COEFFICIENT   =     .484
02383>
02384>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02385>
02386> -------------------------------------------------------------------------
02387> 006:0007-------------------------------------------------------------------
02388> ----------------------
02389> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02390> |  IN>02:(C-201 )    |
02391> | OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
02392> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02393>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
02394>                              .000  .0000E+00     |   2.000  .2309E+00
02395>                              .000  .2162E+00     |   5.000  .2460E+00
02396>
02397>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02398>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02399>      INFLOW >02: (C-201 )       8.38      .248     3.117     45.379
02400>      OUTFLOW<03: (SWM1  )       8.38      .224     5.050     19.709
02401>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
02402>
02403>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02404>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02405>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02406>
02407>
02408>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   90.446
02409>                     TIME SHIFT OF PEAK FLOW          (min)=   116.00
02410>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2178E+00
02411>
02412>       *** WARNING: Outflow volume is less than inflow volume.
02413> -------------------------------------------------------------------------
02414> 006:0008-------------------------------------------------------------------
02415> ----------------------
02416> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=62.00
02417> | 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02418> ----------------------   U.H. Tp(hrs)=    .560
02419>
02420>      Unit Hyd Qpeak  (cms)=     .981
02421>
02422>      PEAK FLOW       (cms)=     .291 (i)
02423>      TIME TO PEAK    (hrs)=    5.083
02424>      RUNOFF VOLUME    (mm)=   34.292
02425>      TOTAL RAINFALL   (mm)=   93.696
02426>      RUNOFF COEFFICIENT   =     .366
02427>
02428>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02429>
02430> -------------------------------------------------------------------------
02431> 006:0009-------------------------------------------------------------------
02432> ----------------------
02433> | CALIB NASHYD       |   Area    (ha)=    3.19   Curve Number   (CN)=75.00
02434> | 05:C-202  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02435> ----------------------   U.H. Tp(hrs)=    .230
02436>
02437>      Unit Hyd Qpeak  (cms)=     .530
02438>
02439>      PEAK FLOW       (cms)=     .097 (i)
02440>      TIME TO PEAK    (hrs)=    3.067
02441>      RUNOFF VOLUME    (mm)=   45.379
02442>      TOTAL RAINFALL   (mm)=   93.696
02443>      RUNOFF COEFFICIENT   =     .484
02444>
02445>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02446>
02447> -------------------------------------------------------------------------
02448> 006:0010-------------------------------------------------------------------
02449> ----------------------
02450> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02451> |  IN>05:(C-202 )    |
02452> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
02453> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02454>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
02455>                              .000  .0000E+00     |    .000  .5990E-01
02456>                              .000  .5600E-01     |   1.000  .6400E-01
02457>
02458>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02459>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02460>      INFLOW >05: (C-202 )       3.19      .097     3.067     45.379
02461>      OUTFLOW<06: (SWM2A )       3.19      .086     5.033     26.602
02462>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
02463>
02464>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02465>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02466>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02467>
02468>
02469>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   88.998
02470>                     TIME SHIFT OF PEAK FLOW          (min)=   118.00
02471>                     MAXIMUM  STORAGE   USED       (ha.m.)=.6025E-01
02472>
02473>       *** WARNING: Outflow volume is less than inflow volume.
02474> -------------------------------------------------------------------------
02475> 006:0011-------------------------------------------------------------------
02476> ------------------------
02477> | ADD HYD (CTR1A     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02478> ------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
02479>                         ID1 04:EXC-2       14.38     .291    5.08  34.29    .000
02480>                        +ID2 06:SWM2A        3.19     .086    5.03  26.60    .000
02481>                         ========================================================
02482>                         SUM 07:CTR1A       17.57     .377    5.05  32.90    .000
02483>
02484>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02485>
02486> -------------------------------------------------------------------------
02487> 006:0012-------------------------------------------------------------------
02488> ----------------------
02489> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02490> |  IN>07:(CTR1A )    |
02491> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
02492> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02493>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
02494>                              .000  .0000E+00     |    .000  .1618E+00
02495>                              .000  .1260E-01     |    .862  .2671E+00
02496>                              .000  .4270E-01     |   2.728  .4058E+00
02497>                              .000  .8980E-01     |   4.016  .4888E+00
02498>
02499>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02500>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02501>      INFLOW >07: (CTR1A )       17.57      .377     5.050     32.896
02502>      OUTFLOW<08: (SWM2B )       17.57      .370     5.167     23.687
02503>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
02504>
02505>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02506>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02507>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02508>
02509>
02510>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   98.157
02511>                     TIME SHIFT OF PEAK FLOW          (min)=    7.00
02512>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2070E+00
02513>
02514>       *** WARNING: Outflow volume is less than inflow volume.
02515> -------------------------------------------------------------------------
02516> 006:0013-------------------------------------------------------------------
02517> ----------------------
02518> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
02519> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02520> ----------------------   U.H. Tp(hrs)=    .500
02521>
02522>      Unit Hyd Qpeak  (cms)=     .000
02523>
02524>      PEAK FLOW       (cms)=     .000 (i)
02525>      TIME TO PEAK    (hrs)=    5.117
02526>      RUNOFF VOLUME    (mm)=    .337
02527>      TOTAL RAINFALL   (mm)=   93.696
02528>      RUNOFF COEFFICIENT   =     .004
02529>
02530>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02531>
02532> -------------------------------------------------------------------------
02533> 006:0014-------------------------------------------------------------------
02534> ------------------------
02535> | ADD HYD (SB&BLK    ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02536> ------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
02537>                         ID1 08:SWM2B       17.57     .370    5.17  23.69    .000
02538>                        +ID2 09:BLANK         .00     .000    5.12    .34    .000
02539>                         ========================================================
02540>                         SUM 04:SB&BLK      17.57     .370    5.17  23.69    .000
```

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02541>
02542>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02543>
02544> ---------------------------------------------------------------------------
02545> 006:0015-----------------------------------------------------------------
02546> ---------------------
02547> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02548> |  IN>04:(SB&BLK)   |
02549> | OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
02550> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02551>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02552>                             .000  .0000E+00    |     .500  .1004E+00
02553>                             .000  .9410E-01    |    1.300  .1070E+00
02554>
02555>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02556>      ---------------            (ha)     (cms)     (hrs)       (mm)
02557>      INFLOW >04: (SB&BLK)      17.57      .370     5.167     23.687
02558>      OUTFLOW<09: (SWM2C )      17.57      .370     5.200     18.331
02559>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
02560>
02561>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02562>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02563>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02564>
02565>
02566>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   99.954
02567>                     TIME SHIFT OF PEAK FLOW          (min)=     2.00
02568>                     MAXIMUM  STORAGE   USED       (ha.m.)=.9876E-01
02569>
02570>       *** WARNING: Outflow volume is less than inflow volume.
02571> ---------------------------------------------------------------------------
02572> 006:0016-----------------------------------------------------------------
02573> ------------------------
02574> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02575> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
02576>                        ID1 01:CTR1          .65      .014    3.13  34.29    .000
02577>                       +ID2 03:SWM1         8.38      .224    5.05  19.71    .000
02578>                       +ID3 09:SWM2C       17.57      .370    5.20  18.33    .000
02579>                        ============================================================
02580>                        SUM 01:CTR1         26.60      .605    5.08  19.11    .000
02581>
02582>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02583>
02584> ---------------------------------------------------------------------------
02585> 006:0017-----------------------------------------------------------------
02586> ----------------------
02587> | CALIB NASHYD       |   Area    (ha)=    8.99   Curve Number   (CN)=81.00
02588> | 01:C-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02589> ----------------------   U.H. Tp(hrs)=    .270
02590>
02591>      Unit Hyd Qpeak  (cms)=    1.272
02592>
02593>      PEAK FLOW       (cms)=     .319 (i)
02594>      TIME TO PEAK    (hrs)=    3.067
02595>      RUNOFF VOLUME    (mm)=   53.056
02596>      TOTAL RAINFALL   (mm)=   93.696
02597>      RUNOFF COEFFICIENT   =     .566
02598>
02599>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02600>
02601> ---------------------------------------------------------------------------
02602> 006:0018-----------------------------------------------------------------
02603> ----------------------
02604> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02605> |  IN>01:(C-203 )   |
02606> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
02607> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02608>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02609>                             .000  .0000E+00    |    3.000  .3271E+00
02610>                             .000  .3063E+00    |    9.000  .3485E+00
02611>
02612>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02613>      ---------------            (ha)     (cms)     (hrs)       (mm)
02614>      INFLOW >01: (C-203 )       8.99      .319     3.067     53.056
02615>      OUTFLOW<02: (SWM3  )       8.99      .271     5.033     19.106
02616>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
02617>
02618>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02619>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02620>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02621>
02622>
02623>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   84.999
02624>                     TIME SHIFT OF PEAK FLOW          (min)=   118.00
02625>                     MAXIMUM  STORAGE   USED       (ha.m.)=.3082E+00
02626>
02627>       *** WARNING: Outflow volume is less than inflow volume.
02628> ---------------------------------------------------------------------------
02629> 006:0019-----------------------------------------------------------------
02630> ----------------------
02631> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=62.00
02632> | 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02633> ----------------------   U.H. Tp(hrs)=    .390
02634>
02635>      Unit Hyd Qpeak  (cms)=     .504
02636>
02637>      PEAK FLOW       (cms)=     .109 (i)
02638>      TIME TO PEAK    (hrs)=    3.183
02639>      RUNOFF VOLUME    (mm)=   34.292
02640>      TOTAL RAINFALL   (mm)=   93.696
02641>      RUNOFF COEFFICIENT   =     .366
02642>
02643>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02644>
02645> ---------------------------------------------------------------------------
02646> 006:0020-----------------------------------------------------------------
02647> ------------------------
02648> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02649> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
02650>                        ID1 02:SWM3          8.99      .271    5.03  19.11    .000
02651>                       +ID2 03:EXC-3         5.15      .109    3.18  34.29    .000
02652>                        ============================================================
02653>                        SUM 01:CTR2         14.14      .376    5.03  24.56    .000
02654>
02655>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02656>
02657> ---------------------------------------------------------------------------
02658> 006:0021-----------------------------------------------------------------
02659> ----------------------
02660> | CALIB NASHYD       |   Area    (ha)=    5.81   Curve Number   (CN)=84.00
02661> | 01:C-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02662> ----------------------   U.H. Tp(hrs)=    .240
02663>
02664>      Unit Hyd Qpeak  (cms)=     .925
02665>
02666>      PEAK FLOW       (cms)=     .225 (i)
02667>      TIME TO PEAK    (hrs)=    3.050
02668>      RUNOFF VOLUME    (mm)=   57.391
02669>      TOTAL RAINFALL   (mm)=   93.696
02670>      RUNOFF COEFFICIENT   =     .613
02671>
02672>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02673>
02674> ---------------------------------------------------------------------------
02675> 006:0022-----------------------------------------------------------------
02676> ---------------------
02677> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02678> |  IN>01:(C-204 )   |
02679> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
02680> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02681>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02682>                             .000  .0000E+00    |    1.000  .2444E+00
02683>                             .000  .2289E+00    |    3.000  .2604E+00
02684>
02685>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02686>      ---------------            (ha)     (cms)     (hrs)       (mm)
02687>      INFLOW >01: (C-204 )       5.81      .225     3.050     57.391
02688>      OUTFLOW<02: (SWM4  )       5.81      .185     5.033     18.181
02689>     OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
02690>
02691>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02692>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02693>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02694>
02695>
02696>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   82.039
02697>                     TIME SHIFT OF PEAK FLOW          (min)=   119.00
02698>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2318E+00
02699>
02700>       *** WARNING: Outflow volume is less than inflow volume.
02701> ---------------------------------------------------------------------------
02702> 006:0023-----------------------------------------------------------------
02703> ---------------------------------------------------------------------------
02704> 006:0002-----------------------------------------------------------------
02705> ---------------------------------------------------------------------------
02706> 006:0002-----------------------------------------------------------------
02707> ---------------------------------------------------------------------------
02708> 006:0002-----------------------------------------------------------------
02709> ---------------------------------------------------------------------------
02710> 006:0002-----------------------------------------------------------------
02711> ---------------------------------------------------------------------------
02712> 006:0002-----------------------------------------------------------------
02713>   ** END OF RUN :   6
02714>
02715> ***************************************************************************
02716>
02717>
02718>
02719>
02720>
02721> --------------------
02722> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
02723> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
02724>     TZERO =   .00 hrs on       0
02725>     METOUT=   2 (output = METRIC)
02726>     NRUN  = 007
02727>     NSTORM=   1
02728>               #  1=25mm.4hr
02729> ---------------------------------------------------------------------------
02730> 007:0002-----------------------------------------------------------------
02731> *#**************************************************************************
02732> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
02733> *#  Date       : 2017/11/24
02734> *#  Modeller   : [C. Fischer]
02735> *#  Company    : Stantec Consulting Ltd. (Waterloo)
02736> *#  License #  : 4730904
02737> *#**************************************************************************
02738> *#
02739> *#                     Block C - CONSTRUCTION CONDITIONS
02740> *#
02741> *#**************************************************************************
02742> ---------------------------------------------------------------------------
02743> 007:0002-----------------------------------------------------------------
02744> --------------------
02745> | READ STORM        |    Filename: 25 mm, 4hr Chicago Storm
02746> | Ptotal=  25.00 mm |    Comments: 25 mm, 4hr Chicago Storm
02747> --------------------
02748>               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
02749>               hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
02750>               .08   1.465 |  1.08   4.024 |  2.08   5.764 |  3.08   2.074
02751>               .17   1.540 |  1.17   4.814 |  2.17   4.969 |  3.17   1.977
02752>               .25   1.625 |  1.25   6.025 |  2.25   4.374 |  3.25   1.889
02753>               .33   1.720 |  1.33   8.114 |  2.33   3.913 |  3.33   1.810
02754>               .42   1.829 |  1.42  12.526 |  2.42   3.545 |  3.42   1.737
02755>               .50   1.955 |  1.50  27.198 |  2.50   3.245 |  3.50   1.671
02756>               .58   2.101 |  1.58  74.855 |  2.58   2.994 |  3.58   1.610
02757>               .67   2.274 |  1.67  31.410 |  2.67   2.782 |  3.67   1.553
02758>               .75   2.482 |  1.75  16.819 |  2.75   2.601 |  3.75   1.501
02759>               .83   2.736 |  1.83  11.357 |  2.83   2.443 |  3.83   1.453
02760>               .92   3.055 |  1.92   8.563 |  2.92   2.305 |  3.92   1.408
02761>              1.00   3.468 |  2.00   6.882 |  3.00   2.183 |  4.00   1.366
02762>
02763> ---------------------------------------------------------------------------
02764> 007:0003-----------------------------------------------------------------
02765> *#**************************************************************************
02766> *#
02767> *#                              AMC II Conditions
02768> *#
02769> *#**************************************************************************
02770> ----------------------
02771> | CALIB NASHYD       |   Area    (ha)=    4.57   Curve Number   (CN)=78.00
02772> | 01:C-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
02773> ----------------------   U.H. Tp(hrs)=    .250
02774>
02775>      Unit Hyd Qpeak  (cms)=     .698
02776>
02777>      PEAK FLOW       (cms)=     .053 (i)
02778>      TIME TO PEAK    (hrs)=    1.933
02779>      RUNOFF VOLUME    (mm)=    4.365
02780>      TOTAL RAINFALL   (mm)=   25.000
02781>      RUNOFF COEFFICIENT   =     .175
02782>
02783>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02784>
02785> ---------------------------------------------------------------------------
02786> 007:0004-----------------------------------------------------------------
02787> ---------------------
02788> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02789> |  IN>01:(C-200 )   |
02790> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
02791> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02792>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02793>                             .000  .0000E+00    |    2.000  .1546E+00
02794>                             .000  .1448E+00    |    5.000  .1647E+00
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02795>
02796>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02797>      --------------------       (ha)     (cms)     (hrs)       (mm)
02798>      INFLOW >01: (C-200 )       4.57      .053     1.933      4.365
02799>      OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
02800>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
02801>
02802>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02803>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02804>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02805>
02806>
02807>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
02808>                      TIME SHIFT OF PEAK FLOW          (min)=  -116.00
02809>                      MAXIMUM  STORAGE   USED       (ha.m.)=.1995E-01
02810>
02811>       *** WARNING: Outflow volume is less than inflow volume.
02812> --------------------------------------------------------------------------------
02813> 007:0005-----------------------------------------------------------------------
02814> ----------------------
02815> | DESIGN NASHYD       |   Area     (ha)=     .65   Curve Number   (CN)=62.00
02816> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02817> ----------------------   U.H. Tp(hrs)=    .340
02818>
02819>      Unit Hyd Qpeak  (cms)=     .073
02820>
02821>      PEAK FLOW       (cms)=     .005 (i)
02822>      TIME TO PEAK    (hrs)=    2.017
02823>      RUNOFF VOLUME    (mm)=    3.081
02824>      TOTAL RAINFALL   (mm)=   25.000
02825>      RUNOFF COEFFICIENT   =     .123
02826>
02827>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02828>
02829> --------------------------------------------------------------------------------
02830> 007:0006-----------------------------------------------------------------------
02831> ----------------------
02832> | CALIB NASHYD        |   Area     (ha)=    8.38   Curve Number   (CN)=75.00
02833> | 02:C-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
02834> ----------------------   U.H. Tp(hrs)=    .320
02835>
02836>      Unit Hyd Qpeak  (cms)=    1.000
02837>
02838>      PEAK FLOW       (cms)=     .073 (i)
02839>      TIME TO PEAK    (hrs)=    2.033
02840>      RUNOFF VOLUME    (mm)=    3.822
02841>      TOTAL RAINFALL   (mm)=   25.000
02842>      RUNOFF COEFFICIENT   =     .153
02843>
02844>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02845>
02846> --------------------------------------------------------------------------------
02847> 007:0007-----------------------------------------------------------------------
02848> ----------------------
02849> | ROUTE RESERVOIR     |    Requested routing time step =  1.0 min.
02850> |  IN>02:(C-201 )     |
02851> | OUT<03:(SWM1  )     |    =========  OUTLFOW STORAGE TABLE  =========
02852> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02853>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02854>                              .000  .0000E+00     |   2.000  .2309E+00
02855>                              .000  .2162E+00     |   5.000  .2460E+00
02856>
02857>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02858>      --------------------       (ha)     (cms)     (hrs)       (mm)
02859>      INFLOW >02: (C-201 )       8.38      .073     2.033      3.822
02860>      OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
02861>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
02862>
02863>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02864>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02865>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02866>
02867>
02868>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
02869>                      TIME SHIFT OF PEAK FLOW          (min)=  -122.00
02870>                      MAXIMUM  STORAGE   USED       (ha.m.)=.3203E-01
02871>
02872>       *** WARNING: Outflow volume is less than inflow volume.
02873> --------------------------------------------------------------------------------
02874> 007:0008-----------------------------------------------------------------------
02875> ----------------------
02876> | DESIGN NASHYD       |   Area     (ha)=   14.38   Curve Number   (CN)=62.00
02877> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02878> ----------------------   U.H. Tp(hrs)=    .560
02879>
02880>      Unit Hyd Qpeak  (cms)=     .981
02881>
02882>      PEAK FLOW       (cms)=     .073 (i)
02883>      TIME TO PEAK    (hrs)=    2.317
02884>      RUNOFF VOLUME    (mm)=    3.082
02885>      TOTAL RAINFALL   (mm)=   25.000
02886>      RUNOFF COEFFICIENT   =     .123
02887>
02888>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02889>
02890> --------------------------------------------------------------------------------
02891> 007:0009-----------------------------------------------------------------------
02892> ----------------------
02893> | CALIB NASHYD        |   Area     (ha)=    3.19   Curve Number   (CN)=75.00
02894> | 05:C-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
02895> ----------------------   U.H. Tp(hrs)=    .230
02896>
02897>      Unit Hyd Qpeak  (cms)=     .530
02898>
02899>      PEAK FLOW       (cms)=     .034 (i)
02900>      TIME TO PEAK    (hrs)=    1.900
02901>      RUNOFF VOLUME    (mm)=    3.822
02902>      TOTAL RAINFALL   (mm)=   25.000
02903>      RUNOFF COEFFICIENT   =     .153
02904>
02905>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02906>
02907> --------------------------------------------------------------------------------
02908> 007:0010-----------------------------------------------------------------------
02909> ----------------------
02910> | ROUTE RESERVOIR     |    Requested routing time step =  1.0 min.
02911> |  IN>05:(C-202 )     |
02912> | OUT<06:(SWM2A )     |    =========  OUTLFOW STORAGE TABLE  =========
02913> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02914>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02915>                              .000  .0000E+00     |    .000  .5990E-01
02916>                              .000  .5600E-01     |   1.000  .6400E-01
02917>
02918>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02919>      --------------------       (ha)     (cms)     (hrs)       (mm)
02920>      INFLOW >05: (C-202 )       3.19      .034     1.900      3.822
02921>      OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
02922>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
02923>
02924>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02925>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02926>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02927>
02928>
02929>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
02930>                      TIME SHIFT OF PEAK FLOW          (min)=  -114.00
02931>                      MAXIMUM  STORAGE   USED       (ha.m.)=.1219E-01
02932>
02933>       *** WARNING: Outflow volume is less than inflow volume.
02934> --------------------------------------------------------------------------------
02935> 007:0011-----------------------------------------------------------------------
02936> ----------------------
02937> | ADD HYD (CTR1A      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02938> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
02939>                          ID1 04:EXC-2      14.38     .073    2.32   3.08    .000
02940>                         +ID2 06:SWM2A       3.19     .000     .00    .00    .000
02941>                          ============================================================
02942>                          SUM 07:CTR1A      17.57     .073    2.32   2.52    .000
02943>
02944>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02945>
02946> --------------------------------------------------------------------------------
02947> 007:0012-----------------------------------------------------------------------
02948> ----------------------
02949> | ROUTE RESERVOIR     |    Requested routing time step =  1.0 min.
02950> |  IN>07:(CTR1A )     |
02951> | OUT<08:(SWM2B )     |    =========  OUTLFOW STORAGE TABLE  =========
02952> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02953>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02954>                              .000  .0000E+00     |    .000  .1618E+00
02955>                              .000  .1260E-01     |    .862  .2671E+00
02956>                              .000  .4270E-01     |   2.728  .4058E+00
02957>                              .000  .8980E-01     |   4.016  .4888E+00
02958>
02959>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02960>      --------------------       (ha)     (cms)     (hrs)       (mm)
02961>      INFLOW >07: (CTR1A )       17.57      .073     2.317      2.523
02962>      OUTFLOW<08: (SWM2B )       17.57      .000      .000       .000
02963>     OVERFLOW<10: (OSWM2B)         .00      .000      .000       .000
02964>
02965>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02966>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02967>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02968>
02969>
02970>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
02971>                      TIME SHIFT OF PEAK FLOW          (min)=  -139.00
02972>                      MAXIMUM  STORAGE   USED       (ha.m.)=.4432E-01
02973>
02974>       *** WARNING: Outflow volume is less than inflow volume.
02975> --------------------------------------------------------------------------------
02976> 007:0013-----------------------------------------------------------------------
02977> ----------------------
02978> | DESIGN NASHYD       |   Area     (ha)=     .00   Curve Number   (CN)= 1.00
02979> | 09:BLANK  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02980> ----------------------   U.H. Tp(hrs)=    .500
02981>
02982>      Unit Hyd Qpeak  (cms)=     .000
02983>
02984>      PEAK FLOW       (cms)=     .000 (i)
02985>      TIME TO PEAK    (hrs)=    2.250
02986>      RUNOFF VOLUME    (mm)=     .020
02987>      TOTAL RAINFALL   (mm)=   25.000
02988>      RUNOFF COEFFICIENT   =     .001
02989>
02990>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02991>
02992> --------------------------------------------------------------------------------
02993> 007:0014-----------------------------------------------------------------------
02994> ----------------------
02995> | ADD HYD (SB&BLK     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02996> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
02997>                          ID1 08:SWM2B      17.57     .000     .00    .00    .000
02998>                         +ID2 09:BLANK        .00     .000    2.25    .02    .000
02999>                          ============================================================
03000>                          SUM 04:SB&BLK     17.57     .000    2.25    .00    .000
03001>
03002>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
03003>
03004> --------------------------------------------------------------------------------
03005> 007:0015-----------------------------------------------------------------------
03006> ----------------------
03007> | ROUTE RESERVOIR     |    Requested routing time step =  1.0 min.
03008> |  IN>04:(SB&BLK)     |
03009> | OUT<09:(SWM2C )     |    =========  OUTLFOW STORAGE TABLE  =========
03010> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
03011>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
03012>                              .000  .0000E+00     |    .500  .1004E+00
03013>                              .000  .9410E-01     |   1.300  .1070E+00
03014>
03015>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
03016>      --------------------       (ha)     (cms)     (hrs)       (mm)
03017>      INFLOW >04: (SB&BLK)       17.57      .000     2.250      .000
03018>      OUTFLOW<09: (SWM2C )       17.57      .000      .000      .000
03019>     OVERFLOW<10: (OSWM2C)         .00      .000      .000      .000
03020>
03021>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
03022>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
03023>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
03024>
03025>
03026>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
03027>                      TIME SHIFT OF PEAK FLOW          (min)=  -135.00
03028>                      MAXIMUM  STORAGE   USED       (ha.m.)=.1968E-09
03029>
03030> --------------------------------------------------------------------------------
03031> 007:0016-----------------------------------------------------------------------
03032> ----------------------
03033> | ADD HYD (CTR1       ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
03034> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
03035>                          ID1 01:CTR1         .65     .005    2.02   3.08    .000
03036>                         +ID2 03:SWM1        8.38     .000     .00    .00    .000
03037>                         +ID3 09:SWM2C      17.57     .000     .00    .00    .000
03038>                          ============================================================
03039>                          SUM 01:CTR1        26.60     .005    2.02    .08    .000
03040>
03041>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
03042>
03043> --------------------------------------------------------------------------------
03044> 007:0017-----------------------------------------------------------------------
03045> ----------------------
03046> | CALIB NASHYD        |   Area     (ha)=    8.99   Curve Number   (CN)=81.00
03047> | 01:C-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
03048> ----------------------   U.H. Tp(hrs)=    .270
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03049>
03050>      Unit Hyd Qpeak  (cms)=    1.272
03051>
03052>      PEAK FLOW       (cms)=     .116 (i)
03053>      TIME TO PEAK    (hrs)=    1.950
03054>      RUNOFF VOLUME    (mm)=    5.026
03055>      TOTAL RAINFALL   (mm)=   25.000
03056>      RUNOFF COEFFICIENT   =     .201
03057>
03058>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03059>
03060> ------------------------------------------------------------------------------
03061> 007:0018--------------------------------------------------------------------------
03062> --------------------
03063> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
03064> |  IN>01:(C-203 )   |
03065> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
03066> --------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
03067>                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
03068>                            .000  .0000E+00     |    3.000  .3271E+00
03069>                            .000  .3063E+00     |    9.000  .3485E+00
03070>
03071>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
03072>      ---------------------        (ha)     (cms)     (hrs)       (mm)
03073>      INFLOW >01: (C-203 )        8.99      .116     1.950      5.026
03074>      OUTFLOW<02: (SWM3  )        8.99      .000      .000       .000
03075>     OVERFLOW<10: (OVSWM3)         .00      .000      .000       .000
03076>
03077>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
03078>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
03079>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
03080>
03081>
03082>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
03083>                     TIME SHIFT OF PEAK FLOW          (min)=  -117.00
03084>                     MAXIMUM  STORAGE   USED        (ha.m.)=.4519E-01
03085>
03086>       *** WARNING: Outflow volume is less than inflow volume.
03087> ------------------------------------------------------------------------------
03088> 007:0019--------------------------------------------------------------------------
03089> ---------------------
03090> | DESIGN NASHYD     |   Area     (ha)=    5.15   Curve Number    (CN)=62.00
03091> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
03092> ---------------------   U.H. Tp(hrs)=    .390
03093>
03094>      Unit Hyd Qpeak  (cms)=     .504
03095>
03096>      PEAK FLOW       (cms)=     .033 (i)
03097>      TIME TO PEAK    (hrs)=    2.083
03098>      RUNOFF VOLUME    (mm)=    3.082
03099>      TOTAL RAINFALL   (mm)=   25.000
03100>      RUNOFF COEFFICIENT   =     .123
03101>
03102>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03103>
03104> ------------------------------------------------------------------------------
03105> 007:0020--------------------------------------------------------------------------
03106> ------------------------
03107> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
03108> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
03109>                        ID1 02:SWM3          8.99     .000     .00    .00    .000
03110>                       +ID2 03:EXC-3         5.15     .033    2.08   3.08    .000
03111>                        ============================================================
03112>                        SUM 01:CTR2          14.14     .033    2.08   1.12    .000
03113>
03114>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
03115>
03116> ------------------------------------------------------------------------------
03117> 007:0021--------------------------------------------------------------------------
03118> ---------------------
03119> | CALIB NASHYD      |   Area     (ha)=    5.81   Curve Number    (CN)=84.00
03120> | 01:C-204  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
03121> ---------------------   U.H. Tp(hrs)=    .240
03122>
03123>      Unit Hyd Qpeak  (cms)=     .925
03124>
03125>      PEAK FLOW       (cms)=     .095 (i)
03126>      TIME TO PEAK    (hrs)=    1.900
03127>      RUNOFF VOLUME    (mm)=    5.850
03128>      TOTAL RAINFALL   (mm)=   25.000
03129>      RUNOFF COEFFICIENT   =     .234
03130>
03131>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03132>
03133> ------------------------------------------------------------------------------
03134> 007:0022--------------------------------------------------------------------------
03135> --------------------
03136> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
03137> |  IN>01:(C-204 )   |
03138> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
03139> --------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
03140>                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
03141>                            .000  .0000E+00     |    1.000  .2444E+00
03142>                            .000  .2289E+00     |    3.000  .2604E+00
03143>
03144>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
03145>      ---------------------        (ha)     (cms)     (hrs)       (mm)
03146>      INFLOW >01: (C-204 )        5.81      .095     1.900      5.850
03147>      OUTFLOW<02: (SWM4  )        5.81      .000      .000       .000
03148>     OVERFLOW<05: (OVSWM4)         .00      .000      .000       .000
03149>
03150>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
03151>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
03152>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
03153>
03154>
03155>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
03156>                     TIME SHIFT OF PEAK FLOW          (min)=  -114.00
03157>                     MAXIMUM  STORAGE   USED        (ha.m.)=.3399E-01
03158>
03159>       *** WARNING: Outflow volume is less than inflow volume.
03160> ------------------------------------------------------------------------------
03161> 007:0023--------------------------------------------------------------------------
03162> ------------------------------------------------------------------------------
03163> 007:0002--------------------------------------------------------------------------
03164> ------------------------------------------------------------------------------
03165> 007:0002--------------------------------------------------------------------------
03166> ------------------------------------------------------------------------------
03167> 007:0002--------------------------------------------------------------------------
03168> ------------------------------------------------------------------------------
03169> 007:0002--------------------------------------------------------------------------
03170> ------------------------------------------------------------------------------
03171> 007:0002--------------------------------------------------------------------------
03172> ------------------------------------------------------------------------------
03173> 007:0002--------------------------------------------------------------------------
03174>       FINISH
03175> ------------------------------------------------------------------------------
03176> ******************************************************************************
03177>      WARNINGS / ERRORS / NOTES
03178>      -------------------------
03179>  001:0004 ROUTE RESERVOIR
03180>       *** WARNING: Outflow volume is less than inflow volume.
03181>  001:0007 ROUTE RESERVOIR
03182>       *** WARNING: Outflow volume is less than inflow volume.
03183>  001:0010 ROUTE RESERVOIR
03184>       *** WARNING: Outflow volume is less than inflow volume.
03185>  001:0012 ROUTE RESERVOIR
03186>       *** WARNING: Outflow volume is less than inflow volume.
03187>  001:0018 ROUTE RESERVOIR
03188>       *** WARNING: Outflow volume is less than inflow volume.
03189>  001:0022 ROUTE RESERVOIR
03190>       *** WARNING: Outflow volume is less than inflow volume.
03191>  002:0004 ROUTE RESERVOIR
03192>       *** WARNING: Outflow volume is less than inflow volume.
03193>  002:0007 ROUTE RESERVOIR
03194>       *** WARNING: Outflow volume is less than inflow volume.
03195>  002:0010 ROUTE RESERVOIR
03196>       *** WARNING: Outflow volume is less than inflow volume.
03197>  002:0012 ROUTE RESERVOIR
03198>       *** WARNING: Outflow volume is less than inflow volume.
03199>  002:0018 ROUTE RESERVOIR
03200>       *** WARNING: Outflow volume is less than inflow volume.
03201>  002:0022 ROUTE RESERVOIR
03202>       *** WARNING: Outflow volume is less than inflow volume.
03203>  003:0004 ROUTE RESERVOIR
03204>       *** WARNING: Outflow volume is less than inflow volume.
03205>  003:0007 ROUTE RESERVOIR
03206>       *** WARNING: Outflow volume is less than inflow volume.
03207>  003:0010 ROUTE RESERVOIR
03208>       *** WARNING: Outflow volume is less than inflow volume.
03209>  003:0012 ROUTE RESERVOIR
03210>       *** WARNING: Outflow volume is less than inflow volume.
03211>  003:0018 ROUTE RESERVOIR
03212>       *** WARNING: Outflow volume is less than inflow volume.
03213>  003:0022 ROUTE RESERVOIR
03214>       *** WARNING: Outflow volume is less than inflow volume.
03215>  004:0004 ROUTE RESERVOIR
03216>       *** WARNING: Outflow volume is less than inflow volume.
03217>  004:0007 ROUTE RESERVOIR
03218>       *** WARNING: Outflow volume is less than inflow volume.
03219>  004:0010 ROUTE RESERVOIR
03220>       *** WARNING: Outflow volume is less than inflow volume.
03221>  004:0012 ROUTE RESERVOIR
03222>       *** WARNING: Outflow volume is less than inflow volume.
03223>  004:0015 ROUTE RESERVOIR
03224>       *** WARNING: Outflow volume is less than inflow volume.
03225>  004:0018 ROUTE RESERVOIR
03226>       *** WARNING: Outflow volume is less than inflow volume.
03227>  004:0022 ROUTE RESERVOIR
03228>       *** WARNING: Outflow volume is less than inflow volume.
03229>  005:0004 ROUTE RESERVOIR
03230>       *** WARNING: Outflow volume is less than inflow volume.
03231>  005:0007 ROUTE RESERVOIR
03232>       *** WARNING: Outflow volume is less than inflow volume.
03233>  005:0010 ROUTE RESERVOIR
03234>       *** WARNING: Outflow volume is less than inflow volume.
03235>  005:0012 ROUTE RESERVOIR
03236>       *** WARNING: Outflow volume is less than inflow volume.
03237>  005:0018 ROUTE RESERVOIR
03238>       *** WARNING: Outflow volume is less than inflow volume.
03239>  005:0022 ROUTE RESERVOIR
03240>       *** WARNING: Outflow volume is less than inflow volume.
03241>  006:0004 ROUTE RESERVOIR
03242>       *** WARNING: Outflow volume is less than inflow volume.
03243>  006:0007 ROUTE RESERVOIR
03244>       *** WARNING: Outflow volume is less than inflow volume.
03245>  006:0010 ROUTE RESERVOIR
03246>       *** WARNING: Outflow volume is less than inflow volume.
03247>  006:0012 ROUTE RESERVOIR
03248>       *** WARNING: Outflow volume is less than inflow volume.
03249>  006:0015 ROUTE RESERVOIR
03250>       *** WARNING: Outflow volume is less than inflow volume.
03251>  006:0018 ROUTE RESERVOIR
03252>       *** WARNING: Outflow volume is less than inflow volume.
03253>  006:0022 ROUTE RESERVOIR
03254>       *** WARNING: Outflow volume is less than inflow volume.
03255>  007:0004 ROUTE RESERVOIR
03256>       *** WARNING: Outflow volume is less than inflow volume.
03257>  007:0007 ROUTE RESERVOIR
03258>       *** WARNING: Outflow volume is less than inflow volume.
03259>  007:0010 ROUTE RESERVOIR
03260>       *** WARNING: Outflow volume is less than inflow volume.
03261>  007:0012 ROUTE RESERVOIR
03262>       *** WARNING: Outflow volume is less than inflow volume.
03263>  007:0018 ROUTE RESERVOIR
03264>       *** WARNING: Outflow volume is less than inflow volume.
03265>  007:0022 ROUTE RESERVOIR
03266>       *** WARNING: Outflow volume is less than inflow volume.
03267>    Simulation ended on 2017-12-21     at 13:37:52
03268> ==============================================================================
03269>
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00001> ================================================================================
00002>
00003>    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
00004>    S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
00006>        S  W W  M   M  M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
00007>    SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9    =========
00008>                                                          9   9  9   9   # 4730904
00009>          StormWater Management HYdrologic Model           999    999    =========
00010>
00011> ********************************************************************************
00012> ****************************** SWMHYMO Ver/4.05  *******************************
00013> *********  A single event and continuous hydrologic simulation model  *********
00014> *********     based on the principles of HYMO and its successors      *********
00015> *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
00016> ********************************************************************************
00017> ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
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00019> *********                  Gatineau, Quebec: (819) 243-6858            *********
00020> *********                  E-Mail: swmhymo@jfsa.com                    *********
00021> ********************************************************************************
00022>
00023> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024> +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
00025> +++++++++                  Kitchener            SERIAL#:4730904       +++++++++
00026> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028> ********************************************************************************
00029> **********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++              **********
00030> **********           Maximum value for ID numbers  :     10             **********
00031> **********           Max. number of rainfall points: 105408             **********
00032> **********           Max. number of flow points    : 105408             **********
00033> ********************************************************************************
00034>
00035>
00036> **********************   D E T A I L E D   O U T P U T   **********************
00037> ********************************************************************************
00038> *         DATE: 2017-12-21     TIME: 14:51:20     RUN COUNTER: 001823          *
00039> ********************************************************************************
00040> * Input   filename: C:\TREVOR-1\$13356~1\AMCIII\CINT-1.dat                      *
00041> * Output  filename: C:\TREVOR-1\$13356~1\AMCIII\CINT-1.out                     *
00042> * Summary filename: C:\TREVOR-1\$13356~1\AMCIII\CINT-1.sum                     *
00043> * User comments:                                                              *
00044> * 1:_____________________________________________________________________     *
00045> * 2:_____________________________________________________________________     *
00046> * 3:_____________________________________________________________________     *
00047> ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001--------------------------------------------------------------------------
00051> *#*****************************************************************************
00052> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00053> *#  Date        : 2017/11/24
00054> *#  Modeller    : [C. Fischer]
00055> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00056> *#  License #   : 4730904
00057> *#*****************************************************************************
00058> *#
00059> *#                       Block C - CONSTRUCTION CONDITIONS
00060> *#
00061> *#*****************************************************************************
00062> ---------------------
00063> | START             |  Project  dir.: C:\TREVOR-1\$13356~1\AMCIII\
00064> ---------------------  Rainfall dir.: C:\TREVOR-1\$13356~1\AMCIII\
00065>     TZERO =   .00 hrs on      0
00066>     METOUT=   2 (output = METRIC)
00067>     NRUN  = 001
00068>     NSTORM=   1
00069>               #  1=LYA2.1hr
00070> --------------------------------------------------------------------------------
00071> 001:0002--------------------------------------------------------------------------
00072> ---------------------
00073> | READ STORM        |    Filename: Belleville IDF (1-hr 30% AES - 2 Year)
00074> | Ptotal=  22.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 2 Year)
00075> ---------------------
00076>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>               .08  23.868 |    .33  29.172 |    .58  26.520 |    .83   7.956
00079>               .17  37.128 |    .42  34.476 |    .67  13.260 |    .92   2.652
00080>               .25  55.692 |    .50  23.868 |    .75  10.608 |   1.00    .000
00081>
00082> --------------------------------------------------------------------------------
00083> 001:0003--------------------------------------------------------------------------
00084> *#*****************************************************************************
00085> *#
00086> *#                                AMC III Conditions
00087> *#
00088> *#*****************************************************************************
00089> ----------------------
00090> | CALIB NASHYD       |   Area     (ha)=    4.57   Curve Number   (CN)=90.00
00091> | 01:C-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00092> ----------------------   U.H. Tp(hrs)=    .250
00093>
00094>     Unit Hyd Qpeak  (cms)=     .698
00095>
00096>     PEAK FLOW       (cms)=     .120 (i)
00097>     TIME TO PEAK    (hrs)=     .767
00098>     RUNOFF VOLUME    (mm)=    6.452
00099>     TOTAL RAINFALL   (mm)=   22.100
00100>     RUNOFF COEFFICIENT   =     .292
00101>
00102>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00103>
00104> --------------------------------------------------------------------------------
00105> 001:0004--------------------------------------------------------------------------
00106> ---------------------
00107> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00108> |  IN>01:(C-200 )   |
00109> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
00110> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00111>                           (cms)     (ha.m.)  |    (cms)     (ha.m.)
00112>                            .000  .0000E+00   |   2.000  .1546E+00
00113>                            .000  .1448E+00   |   5.000  .1647E+00
00114>
00115>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00116>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00117>     INFLOW >01: (C-200 )       4.57      .120      .767      6.452
00118>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
00119>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
00120>
00121>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00122>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00123>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00124>
00125>
00126>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00127>                    TIME SHIFT OF PEAK FLOW         (min)=   -46.00
00128>                    MAXIMUM  STORAGE   USED       (ha.m.)=.2948E-01
00129>
00130>      *** WARNING: Outflow volume is less than inflow volume.
00131> --------------------------------------------------------------------------------
00132> 001:0005--------------------------------------------------------------------------
00133> ---------------------
00134> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=79.00
00135> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00136> ---------------------   U.H. Tp(hrs)=    .340
00137>
00138>     Unit Hyd Qpeak  (cms)=     .073
00139>
00140>     PEAK FLOW       (cms)=     .011 (i)
00141>     TIME TO PEAK    (hrs)=     .850
00142>     RUNOFF VOLUME    (mm)=    4.815
00143>     TOTAL RAINFALL   (mm)=   22.100
00144>     RUNOFF COEFFICIENT   =     .218
00145>
00146>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00147>
00148> --------------------------------------------------------------------------------
00149> 001:0006--------------------------------------------------------------------------
00150> ---------------------
00151> | CALIB NASHYD       |   Area     (ha)=    8.38   Curve Number   (CN)=88.00
00152> | 02:C-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00153> ---------------------   U.H. Tp(hrs)=    .320
00154>
00155>     Unit Hyd Qpeak  (cms)=    1.000
00156>
00157>     PEAK FLOW       (cms)=     .170 (i)
00158>     TIME TO PEAK    (hrs)=     .850
00159>     RUNOFF VOLUME    (mm)=    5.652
00160>     TOTAL RAINFALL   (mm)=   22.100
00161>     RUNOFF COEFFICIENT   =     .256
00162>
00163>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00164>
00165> --------------------------------------------------------------------------------
00166> 001:0007--------------------------------------------------------------------------
00167> ---------------------
00168> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00169> |  IN>02:(C-201 )   |
00170> | OUT<03:(SWM1  )   |    =========  OUTLFOW STORAGE TABLE  =========
00171> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00172>                           (cms)     (ha.m.)  |    (cms)     (ha.m.)
00173>                            .000  .0000E+00   |   2.000  .2309E+00
00174>                            .000  .2162E+00   |   5.000  .2460E+00
00175>
00176>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00177>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00178>     INFLOW >02: (C-201 )       8.38      .170      .850      5.652
00179>     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
00180>    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
00181>
00182>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00183>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00184>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00185>
00186>
00187>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00188>                    TIME SHIFT OF PEAK FLOW         (min)=   -51.00
00189>                    MAXIMUM  STORAGE   USED       (ha.m.)=.4736E-01
00190>
00191>      *** WARNING: Outflow volume is less than inflow volume.
00192> --------------------------------------------------------------------------------
00193> 001:0008--------------------------------------------------------------------------
00194> ---------------------
00195> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=79.00
00196> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00197> ---------------------   U.H. Tp(hrs)=    .560
00198>
00199>     Unit Hyd Qpeak  (cms)=     .981
00200>
00201>     PEAK FLOW       (cms)=     .167 (i)
00202>     TIME TO PEAK    (hrs)=    1.067
00203>     RUNOFF VOLUME    (mm)=    4.816
00204>     TOTAL RAINFALL   (mm)=   22.100
00205>     RUNOFF COEFFICIENT   =     .218
00206>
00207>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00208>
00209> --------------------------------------------------------------------------------
00210> 001:0009--------------------------------------------------------------------------
00211> ---------------------
00212> | CALIB NASHYD       |   Area     (ha)=    3.19   Curve Number   (CN)=88.00
00213> | 05:C-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00214> ---------------------   U.H. Tp(hrs)=    .230
00215>
00216>     Unit Hyd Qpeak  (cms)=     .530
00217>
00218>     PEAK FLOW       (cms)=     .077 (i)
00219>     TIME TO PEAK    (hrs)=     .750
00220>     RUNOFF VOLUME    (mm)=    5.652
00221>     TOTAL RAINFALL   (mm)=   22.100
00222>     RUNOFF COEFFICIENT   =     .256
00223>
00224>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00225>
00226> --------------------------------------------------------------------------------
00227> 001:0010--------------------------------------------------------------------------
00228> ---------------------
00229> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00230> |  IN>05:(C-202 )   |
00231> | OUT<06:(SWM2A )   |    =========  OUTLFOW STORAGE TABLE  =========
00232> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00233>                           (cms)     (ha.m.)  |    (cms)     (ha.m.)
00234>                            .000  .0000E+00   |    .000  .5990E-01
00235>                            .000  .5600E-01   |   1.000  .6400E-01
00236>
00237>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00238>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00239>     INFLOW >05: (C-202 )       3.19      .077      .750      5.652
00240>     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
00241>    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
00242>
00243>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00244>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00245>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00246>
00247>
00248>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00249>                    TIME SHIFT OF PEAK FLOW         (min)=   -45.00
00250>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1803E-01
00251>
00252>      *** WARNING: Outflow volume is less than inflow volume.
00253> --------------------------------------------------------------------------------
00254> 001:0011--------------------------------------------------------------------------
```

```
00255> ----------------------
00256> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00257> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00258>                        ID1 04:EXC-2       14.38     .167    1.07   4.82    .000
00259>                       +ID2 06:SWM2A        3.19     .000     .00    .00    .000
00260>                        ============================================================
00261>                        SUM 07:CTR1A       17.57     .167    1.07   3.94    .000
00262>
00263>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00264>
00265> ---------------------------------------------------------------------------------
00266> 001:0012-----------------------------------------------------------------------
00267> ----------------------
00268> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00269> |  IN>07:(CTR1A )    |
00270> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
00271> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00272>                            (cms)     (ha.m.)    |    (cms)    (ha.m.)
00273>                             .000  .0000E+00     |     .000  .1618E+00
00274>                             .000  .1260E-01     |     .862  .2671E+00
00275>                             .000  .4270E-01     |    2.728  .4058E+00
00276>                             .000  .8980E-01     |    4.016  .4888E+00
00277>
00278>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00279>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00280>      INFLOW >07: (CTR1A )      17.57      .167     1.067      3.941
00281>      OUTFLOW<08: (SWM2B )      17.57      .000      .000       .000
00282>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
00283>
00284>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00285>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00286>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00287>
00288>
00289>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00290>                     TIME SHIFT OF PEAK FLOW          (min)=   -64.00
00291>                     MAXIMUM  STORAGE   USED        (ha.m.)=.6925E-01
00292>
00293>       *** WARNING: Outflow volume is less than inflow volume.
00294> ---------------------------------------------------------------------------------
00295> 001:0013-----------------------------------------------------------------------
00296> ----------------------
00297> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
00298> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00299> ----------------------   U.H. Tp(hrs)=     .500
00300>
00301>      Unit Hyd Qpeak  (cms)=     .000
00302>
00303>      PEAK FLOW       (cms)=     .000 (i)
00304>      TIME TO PEAK    (hrs)=    1.000
00305>      RUNOFF VOLUME    (mm)=     .006
00306>      TOTAL RAINFALL   (mm)=   22.100
00307>      RUNOFF COEFFICIENT   =     .000
00308>
00309>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00310>
00311> ---------------------------------------------------------------------------------
00312> 001:0014-----------------------------------------------------------------------
00313> ----------------------
00314> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00315> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00316>                        ID1 08:SWM2B       17.57     .000     .00    .00    .000
00317>                       +ID2 09:BLANK         .00     .000    1.00    .01    .000
00318>                        ============================================================
00319>                        SUM 04:SB&BLK      17.57     .000    1.00    .00    .000
00320>
00321>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00322>
00323> ---------------------------------------------------------------------------------
00324> 001:0015-----------------------------------------------------------------------
00325> ----------------------
00326> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00327> |  IN>04:(SB&BLK)    |
00328> | OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
00329> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00330>                            (cms)     (ha.m.)    |    (cms)    (ha.m.)
00331>                             .000  .0000E+00     |     .500  .1004E+00
00332>                             .000  .9410E-01     |    1.300  .1070E+00
00333>
00334>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00335>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00336>      INFLOW >04: (SB&BLK)      17.57      .000     1.000       .000
00337>      OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
00338>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
00339>
00340>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00341>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00342>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00343>
00344>
00345>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00346>                     TIME SHIFT OF PEAK FLOW          (min)=   -60.00
00347>                     MAXIMUM  STORAGE   USED        (ha.m.)=.6353E-10
00348>
00349> ---------------------------------------------------------------------------------
00350> 001:0016-----------------------------------------------------------------------
00351> ----------------------
00352> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00353> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00354>                        ID1 01:CTR1          .65     .011     .85   4.82    .000
00355>                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
00356>                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
00357>                        ============================================================
00358>                        SUM 01:CTR1        26.60     .011     .85    .12    .000
00359>
00360>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00361>
00362> ---------------------------------------------------------------------------------
00363> 001:0017-----------------------------------------------------------------------
00364> ----------------------
00365> | CALIB NASHYD       |   Area    (ha)=    8.99   Curve Number   (CN)=92.00
00366> | 01:C-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
00367> ----------------------   U.H. Tp(hrs)=    .270
00368>
00369>      Unit Hyd Qpeak  (cms)=    1.272
00370>
00371>      PEAK FLOW       (cms)=     .264 (i)
00372>      TIME TO PEAK    (hrs)=     .783
00373>      RUNOFF VOLUME    (mm)=    7.462
00374>      TOTAL RAINFALL   (mm)=   22.100
00375>      RUNOFF COEFFICIENT   =     .338
00376>
00377>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00378>
00379> ---------------------------------------------------------------------------------
00380> 001:0018-----------------------------------------------------------------------
00381> ----------------------
00382> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00383> |  IN>01:(C-203 )    |
00384> | OUT<02:(SWM3  )    |    =========  OUTLFOW STORAGE TABLE  =========
00385> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00386>                            (cms)     (ha.m.)    |    (cms)    (ha.m.)
00387>                             .000  .0000E+00     |    3.000  .3271E+00
00388>                             .000  .3063E+00     |    9.000  .3485E+00
00389>
00390>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00391>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00392>      INFLOW >01: (C-203 )       8.99      .264      .783      7.462
00393>      OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
00394>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
00395>
00396>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00397>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00398>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00399>
00400>
00401>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00402>                     TIME SHIFT OF PEAK FLOW          (min)=   -47.00
00403>                     MAXIMUM  STORAGE   USED        (ha.m.)=.6708E-01
00404>
00405>       *** WARNING: Outflow volume is less than inflow volume.
00406> ---------------------------------------------------------------------------------
00407> 001:0019-----------------------------------------------------------------------
00408> ----------------------
00409> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=79.00
00410> | 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00411> ----------------------   U.H. Tp(hrs)=    .390
00412>
00413>      Unit Hyd Qpeak  (cms)=     .504
00414>
00415>      PEAK FLOW       (cms)=     .077 (i)
00416>      TIME TO PEAK    (hrs)=     .900
00417>      RUNOFF VOLUME    (mm)=    4.816
00418>      TOTAL RAINFALL   (mm)=   22.100
00419>      RUNOFF COEFFICIENT   =     .218
00420>
00421>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00422>
00423> ---------------------------------------------------------------------------------
00424> 001:0020-----------------------------------------------------------------------
00425> ----------------------
00426> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00427> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00428>                        ID1 02:SWM3          8.99     .000     .00    .00    .000
00429>                       +ID2 03:EXC-3         5.15     .077     .90   4.82    .000
00430>                        ============================================================
00431>                        SUM 01:CTR2         14.14     .077     .90   1.75    .000
00432>
00433>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00434>
00435> ---------------------------------------------------------------------------------
00436> 001:0021-----------------------------------------------------------------------
00437> ----------------------
00438> | CALIB NASHYD       |   Area    (ha)=    5.81   Curve Number   (CN)=93.00
00439> | 01:C-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
00440> ----------------------   U.H. Tp(hrs)=    .240
00441>
00442>      Unit Hyd Qpeak  (cms)=     .925
00443>
00444>      PEAK FLOW       (cms)=     .195 (i)
00445>      TIME TO PEAK    (hrs)=     .733
00446>      RUNOFF VOLUME    (mm)=    8.074
00447>      TOTAL RAINFALL   (mm)=   22.100
00448>      RUNOFF COEFFICIENT   =     .365
00449>
00450>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00451>
00452> ---------------------------------------------------------------------------------
00453> 001:0022-----------------------------------------------------------------------
00454> ----------------------
00455> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00456> |  IN>01:(C-204 )    |
00457> | OUT<02:(SWM4  )    |    =========  OUTLFOW STORAGE TABLE  =========
00458> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00459>                            (cms)     (ha.m.)    |    (cms)    (ha.m.)
00460>                             .000  .0000E+00     |    1.000  .2444E+00
00461>                             .000  .2289E+00     |    3.000  .2604E+00
00462>
00463>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00464>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00465>      INFLOW >01: (C-204 )       5.81      .195      .733      8.074
00466>      OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
00467>     OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
00468>
00469>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00470>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00471>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00472>
00473>
00474>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00475>                     TIME SHIFT OF PEAK FLOW          (min)=   -44.00
00476>                     MAXIMUM  STORAGE   USED        (ha.m.)=.4691E-01
00477>
00478>       *** WARNING: Outflow volume is less than inflow volume.
00479> ---------------------------------------------------------------------------------
00480> 001:0023-----------------------------------------------------------------------
00481>   ** END OF RUN :   1
00482>  ********************************************************************************
00483>
00484>
00485>
00486>
00487>
00488>
00489> --------------------
00490> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
00491> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
00492>     TZERO =   .00 hrs on        0
00493>     METOUT=   2 (output = METRIC)
00494>     NRUN  = 002
00495>     NSTORM=   1
00496>              #  1=LYA2.12h
00497> ---------------------------------------------------------------------------------
00498> 002:0002-----------------------------------------------------------------------
00499> *#*******************************************************************************
00500> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00501> *#  Date        : 2017/11/24
00502> *#  Modeller    : [C. Fischer]
00503> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00504> *#  License #   : 4730904
00505> *#*******************************************************************************
00506> *#
00507> *#                     Block C - CONSTRUCTION CONDITIONS
00508> *#
```

```
00509> *#*************************************************************************
00510> ---------------------------------------------------------------------------
00511> 002:0002-----------------------------------------------------------------
00512> --------------------
00513> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 2 Year)
00514> | Ptotal=  42.24 mm|    Comments: Belleville IDF (12-hr 30% AES - 2 Year)
00515> --------------------
00516>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00517>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00518>              1.00   3.960 |   4.00   6.600 |   7.00   1.320 |  10.00    .000
00519>              2.00  11.440 |   5.00   6.160 |   8.00    .440 |  11.00    .000
00520>              3.00   8.800 |   6.00   3.520 |   9.00    .000 |  12.00    .000
00521>
00522> ---------------------------------------------------------------------------
00523> 002:0003-----------------------------------------------------------------
00524> *#*************************************************************************
00525> *#
00526> *#                              AMC III Conditions
00527> *#
00528> *#*************************************************************************
00529> ----------------------
00530> | CALIB NASHYD       |   Area     (ha)=    4.57   Curve Number   (CN)=90.00
00531> | 01:C-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00532> ----------------------   U.H. Tp(hrs)=    .250
00533>
00534>      Unit Hyd Qpeak  (cms)=     .698
00535>
00536>      PEAK FLOW       (cms)=     .067 (i)
00537>      TIME TO PEAK    (hrs)=    3.083
00538>      RUNOFF VOLUME    (mm)=   21.185
00539>      TOTAL RAINFALL   (mm)=   42.240
00540>      RUNOFF COEFFICIENT   =     .502
00541>
00542>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00543>
00544> ---------------------------------------------------------------------------
00545> 002:0004-----------------------------------------------------------------
00546> ----------------------
00547> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00548> |  IN>01:(C-200 )    |
00549> | OUT<02:(SWM0  )    |    =========  OUTLFOW STORAGE TABLE  =========
00550> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00551>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00552>                              .000  .0000E+00     |    2.000  .1546E+00
00553>                              .000  .1448E+00     |    5.000  .1647E+00
00554>
00555>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00556>      ----------------------      (ha)     (cms)     (hrs)       (mm)
00557>      INFLOW >01: (C-200 )       4.57      .067     3.083     21.185
00558>      OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
00559>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
00560>
00561>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00562>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00563>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00564>
00565>
00566>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00567>                     TIME SHIFT OF PEAK FLOW          (min)=  -185.00
00568>                     MAXIMUM  STORAGE   USED       (ha.m.)=.9682E-01
00569>
00570>       *** WARNING: Outflow volume is less than inflow volume.
00571> ---------------------------------------------------------------------------
00572> 002:0005-----------------------------------------------------------------
00573> ----------------------
00574> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=79.00
00575> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00576> ----------------------   U.H. Tp(hrs)=    .340
00577>
00578>      Unit Hyd Qpeak  (cms)=     .073
00579>
00580>      PEAK FLOW       (cms)=     .006 (i)
00581>      TIME TO PEAK    (hrs)=    3.150
00582>      RUNOFF VOLUME    (mm)=   15.331
00583>      TOTAL RAINFALL   (mm)=   42.240
00584>      RUNOFF COEFFICIENT   =     .363
00585>
00586>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00587>
00588> ---------------------------------------------------------------------------
00589> 002:0006-----------------------------------------------------------------
00590> ----------------------
00591> | CALIB NASHYD       |   Area     (ha)=    8.38   Curve Number   (CN)=88.00
00592> | 02:C-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00593> ----------------------   U.H. Tp(hrs)=    .320
00594>
00595>      Unit Hyd Qpeak  (cms)=    1.000
00596>
00597>      PEAK FLOW       (cms)=     .108 (i)
00598>      TIME TO PEAK    (hrs)=    3.133
00599>      RUNOFF VOLUME    (mm)=   19.295
00600>      TOTAL RAINFALL   (mm)=   42.240
00601>      RUNOFF COEFFICIENT   =     .457
00602>
00603>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00604>
00605> ---------------------------------------------------------------------------
00606> 002:0007-----------------------------------------------------------------
00607> ----------------------
00608> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00609> |  IN>02:(C-201 )    |
00610> | OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
00611> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00612>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00613>                              .000  .0000E+00     |    2.000  .2309E+00
00614>                              .000  .2162E+00     |    5.000  .2460E+00
00615>
00616>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00617>      ----------------------      (ha)     (cms)     (hrs)       (mm)
00618>      INFLOW >02: (C-201 )       8.38      .108     3.133     19.295
00619>      OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
00620>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
00621>
00622>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00623>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00624>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00625>
00626>
00627>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00628>                     TIME SHIFT OF PEAK FLOW          (min)=  -188.00
00629>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1617E+00
00630>
00631>       *** WARNING: Outflow volume is less than inflow volume.
00632> ---------------------------------------------------------------------------
00633> 002:0008-----------------------------------------------------------------
00634> ----------------------
00635> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=79.00
00636> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00637> ----------------------   U.H. Tp(hrs)=    .560
00638>
00639>      Unit Hyd Qpeak  (cms)=     .981
00640>
00641>      PEAK FLOW       (cms)=     .132 (i)
00642>      TIME TO PEAK    (hrs)=    5.083
00643>      RUNOFF VOLUME    (mm)=   15.331
00644>      TOTAL RAINFALL   (mm)=   42.240
00645>      RUNOFF COEFFICIENT   =     .363
00646>
00647>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00648>
00649> ---------------------------------------------------------------------------
00650> 002:0009-----------------------------------------------------------------
00651> ----------------------
00652> | CALIB NASHYD       |   Area     (ha)=    3.19   Curve Number   (CN)=88.00
00653> | 05:C-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00654> ----------------------   U.H. Tp(hrs)=    .230
00655>
00656>      Unit Hyd Qpeak  (cms)=     .530
00657>
00658>      PEAK FLOW       (cms)=     .042 (i)
00659>      TIME TO PEAK    (hrs)=    3.067
00660>      RUNOFF VOLUME    (mm)=   19.295
00661>      TOTAL RAINFALL   (mm)=   42.240
00662>      RUNOFF COEFFICIENT   =     .457
00663>
00664>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00665>
00666> ---------------------------------------------------------------------------
00667> 002:0010-----------------------------------------------------------------
00668> ----------------------
00669> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00670> |  IN>05:(C-202 )    |
00671> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
00672> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00673>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00674>                              .000  .0000E+00     |     .000  .5990E-01
00675>                              .000  .5600E-01     |    1.000  .6400E-01
00676>
00677>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00678>      ----------------------      (ha)     (cms)     (hrs)       (mm)
00679>      INFLOW >05: (C-202 )       3.19      .042     3.067     19.295
00680>      OUTFLOW<06: (SWM2A )       3.19      .007     7.200       .570
00681>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
00682>
00683>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00684>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00685>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00686>
00687>
00688>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   17.306
00689>                     TIME SHIFT OF PEAK FLOW          (min)=   248.00
00690>                     MAXIMUM  STORAGE   USED       (ha.m.)=.5993E-01
00691>
00692>       *** WARNING: Outflow volume is less than inflow volume.
00693> ---------------------------------------------------------------------------
00694> 002:0011-----------------------------------------------------------------
00695> ----------------------
00696> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00697> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00698>                         ID1 04:EXC-2      14.38     .132    5.08  15.33    .000
00699>                        +ID2 06:SWM2A       3.19     .007    7.20    .57    .000
00700>                         ================================================
00701>                         SUM 07:CTR1A       17.57     .132    5.08  12.64    .000
00702>
00703>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00704>
00705> ---------------------------------------------------------------------------
00706> 002:0012-----------------------------------------------------------------
00707> ----------------------
00708> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00709> |  IN>07:(CTR1A )    |
00710> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
00711> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00712>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00713>                              .000  .0000E+00     |     .000  .1618E+00
00714>                              .000  .1260E-01     |     .862  .2671E+00
00715>                              .000  .4270E-01     |    2.728  .4058E+00
00716>                              .000  .8980E-01     |    4.016  .4888E+00
00717>
00718>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00719>      ----------------------      (ha)     (cms)     (hrs)       (mm)
00720>      INFLOW >07: (CTR1A )      17.57      .132     5.083     12.642
00721>      OUTFLOW<08: (SWM2B )      17.57      .085     6.317      3.464
00722>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
00723>
00724>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00725>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00726>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00727>
00728>
00729>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   64.046
00730>                     TIME SHIFT OF PEAK FLOW          (min)=    74.00
00731>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1721E+00
00732>
00733>       *** WARNING: Outflow volume is less than inflow volume.
00734> ---------------------------------------------------------------------------
00735> 002:0013-----------------------------------------------------------------
00736> ----------------------
00737> | DESIGN NASHYD      |   Area     (ha)=     .00   Curve Number   (CN)= 1.00
00738> | 09:BLANK  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00739> ----------------------   U.H. Tp(hrs)=    .500
00740>
00741>      Unit Hyd Qpeak  (cms)=     .000
00742>
00743>      PEAK FLOW       (cms)=     .000 (i)
00744>      TIME TO PEAK    (hrs)=    5.133
00745>      RUNOFF VOLUME    (mm)=     .066
00746>      TOTAL RAINFALL   (mm)=   42.240
00747>      RUNOFF COEFFICIENT   =     .002
00748>
00749>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00750>
00751> ---------------------------------------------------------------------------
00752> 002:0014-----------------------------------------------------------------
00753> ----------------------
00754> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00755> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00756>                         ID1 08:SWM2B      17.57     .085    6.32    3.46    .000
00757>                        +ID2 09:BLANK        .00     .000    5.13     .07    .000
00758>                         ================================================
00759>                         SUM 04:SB&BLK     17.57     .085    6.32    3.46    .000
00760>
00761>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00762>
```

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00763> ---------------------------------------------------------------------------
00764> 002:0015-----------------------------------------------------------------
00765> ---------------------
00766> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00767> |  IN>04:(SB&BLK)   |
00768> | OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
00769> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00770>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00771>                             .000  .0000E+00    |     .500  .1004E+00
00772>                             .000  .9410E-01    |    1.300  .1070E+00
00773>
00774>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00775>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00776>     INFLOW >04: (SB&BLK)      17.57      .085     6.317      3.464
00777>     OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
00778>    OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
00779>
00780>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00781>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00782>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00783>
00784>
00785>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00786>                    TIME SHIFT OF PEAK FLOW          (min)=  -379.00
00787>                    MAXIMUM  STORAGE   USED       (ha.m.)=.6086E-01
00788>
00789>      *** WARNING: Outflow volume is less than inflow volume.
00790> ---------------------------------------------------------------------------
00791> 002:0016-----------------------------------------------------------------
00792> ----------------------
00793> | ADD HYD (CTR1     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00794> ----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
00795>                        ID1 01:CTR1          .65      .006    3.15  15.33    .000
00796>                       +ID2 03:SWM1         8.38      .000     .00    .00    .000
00797>                       +ID3 09:SWM2C       17.57      .000     .00    .00    .000
00798>                        ==========================================================
00799>                        SUM 01:CTR1         26.60      .006    3.15    .37    .000
00800>
00801>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00802>
00803> ---------------------------------------------------------------------------
00804> 002:0017-----------------------------------------------------------------
00805> ----------------------
00806> | CALIB NASHYD      |   Area     (ha)=    8.99   Curve Number   (CN)=92.00
00807> | 01:C-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00808> ----------------------   U.H. Tp(hrs)=    .270
00809>
00810>     Unit Hyd Qpeak  (cms)=    1.272
00811>
00812>     PEAK FLOW       (cms)=     .146 (i)
00813>     TIME TO PEAK    (hrs)=    3.083
00814>     RUNOFF VOLUME    (mm)=   23.376
00815>     TOTAL RAINFALL   (mm)=   42.240
00816>     RUNOFF COEFFICIENT   =     .553
00817>
00818>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00819>
00820> ---------------------------------------------------------------------------
00821> 002:0018-----------------------------------------------------------------
00822> ----------------------
00823> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00824> |  IN>01:(C-203 )   |
00825> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
00826> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00827>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00828>                             .000  .0000E+00    |    3.000  .3271E+00
00829>                             .000  .3063E+00    |    9.000  .3485E+00
00830>
00831>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00832>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00833>     INFLOW >01: (C-203 )       8.99      .146     3.083     23.376
00834>     OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
00835>    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
00836>
00837>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00838>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00839>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00840>
00841>
00842>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00843>                    TIME SHIFT OF PEAK FLOW          (min)=  -185.00
00844>                    MAXIMUM  STORAGE   USED       (ha.m.)=.2102E+00
00845>
00846>      *** WARNING: Outflow volume is less than inflow volume.
00847> ---------------------------------------------------------------------------
00848> 002:0019-----------------------------------------------------------------
00849> ----------------------
00850> | DESIGN NASHYD     |   Area     (ha)=    5.15   Curve Number   (CN)=79.00
00851> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00852> ----------------------   U.H. Tp(hrs)=    .390
00853>
00854>     Unit Hyd Qpeak  (cms)=     .504
00855>
00856>     PEAK FLOW       (cms)=     .049 (i)
00857>     TIME TO PEAK    (hrs)=    3.183
00858>     RUNOFF VOLUME    (mm)=   15.331
00859>     TOTAL RAINFALL   (mm)=   42.240
00860>     RUNOFF COEFFICIENT   =     .363
00861>
00862>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00863>
00864> ---------------------------------------------------------------------------
00865> 002:0020-----------------------------------------------------------------
00866> ----------------------
00867> | ADD HYD (CTR2     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00868> ----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
00869>                        ID1 02:SWM3          8.99      .000     .00    .00    .000
00870>                       +ID2 03:EXC-3         5.15      .049    3.18  15.33    .000
00871>                        ==========================================================
00872>                        SUM 01:CTR2         14.14      .049    3.18   5.58    .000
00873>
00874>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00875>
00876> ---------------------------------------------------------------------------
00877> 002:0021-----------------------------------------------------------------
00878> ----------------------
00879> | CALIB NASHYD      |   Area     (ha)=    5.81   Curve Number   (CN)=93.00
00880> | 01:C-204  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00881> ----------------------   U.H. Tp(hrs)=    .240
00882>
00883>     Unit Hyd Qpeak  (cms)=     .925
00884>
00885>     PEAK FLOW       (cms)=     .101 (i)
00886>     TIME TO PEAK    (hrs)=    3.050
00887>     RUNOFF VOLUME    (mm)=   24.607
00888>     TOTAL RAINFALL   (mm)=   42.240
00889>     RUNOFF COEFFICIENT   =     .583
00890>
00891>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00892>
00893> ---------------------------------------------------------------------------
00894> 002:0022-----------------------------------------------------------------
00895> ----------------------
00896> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00897> |  IN>01:(C-204 )   |
00898> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
00899> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00900>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00901>                             .000  .0000E+00    |    1.000  .2444E+00
00902>                             .000  .2289E+00    |    3.000  .2604E+00
00903>
00904>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00905>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00906>     INFLOW >01: (C-204 )       5.81      .101     3.050     24.607
00907>     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
00908>    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
00909>
00910>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00911>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00912>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00913>
00914>
00915>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00916>                    TIME SHIFT OF PEAK FLOW          (min)=  -183.00
00917>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1430E+00
00918>
00919>      *** WARNING: Outflow volume is less than inflow volume.
00920> ---------------------------------------------------------------------------
00921> 002:0023-----------------------------------------------------------------
00922> ---------------------------------------------------------------------------
00923> 002:0002-----------------------------------------------------------------
00924>   ** END OF RUN :   2
00925>
00926> ***************************************************************************
00927>
00928>
00929>
00930>
00931>
00932> --------------------
00933> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
00934> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
00935>     TZERO =   .00 hrs on       0
00936>     METOUT=   2 (output = METRIC)
00937>     NRUN  = 003
00938>     NSTORM=   1
00939>            #  1=LYA5.1hr
00940> ---------------------------------------------------------------------------
00941> 003:0002-----------------------------------------------------------------
00942> *#************************************************************************
00943> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00944> *#  Date        : 2017/11/24
00945> *#  Modeller    : [C. Fischer]
00946> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00947> *#  License #   : 4730904
00948> *#************************************************************************
00949> *#
00950> *#                      Block C - CONSTRUCTION CONDITIONS
00951> *#
00952> *#************************************************************************
00953> ---------------------------------------------------------------------------
00954> 003:0002-----------------------------------------------------------------
00955> --------------------
00956> | READ STORM       |    Filename: Belleville IDF (1-hr 30% AES - 5 Year)
00957> | Ptotal=  28.00 mm|    Comments: Belleville IDF (1-hr 30% AES - 5 Year)
00958> --------------------
00959>               TIME     RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00960>               hrs    mm/hr  |   hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr
00961>               .08   30.240  |    .33   36.960 |    .58   33.600 |    .83   10.080
00962>               .17   47.040  |    .42   43.680 |    .67   16.800 |    .92    3.360
00963>               .25   70.560  |    .50   30.240 |    .75   13.440 |   1.00     .000
00964>
00965> ---------------------------------------------------------------------------
00966> 003:0003-----------------------------------------------------------------
00967> *#************************************************************************
00968> *#
00969> *#                              AMC III Conditions
00970> *#
00971> *#************************************************************************
00972> ----------------------
00973> | CALIB NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=90.00
00974> | 01:C-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
00975> ----------------------   U.H. Tp(hrs)=    .250
00976>
00977>     Unit Hyd Qpeak  (cms)=     .698
00978>
00979>     PEAK FLOW       (cms)=     .190 (i)
00980>     TIME TO PEAK    (hrs)=     .750
00981>     RUNOFF VOLUME    (mm)=   10.328
00982>     TOTAL RAINFALL   (mm)=   28.000
00983>     RUNOFF COEFFICIENT   =     .369
00984>
00985>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00986>
00987> ---------------------------------------------------------------------------
00988> 003:0004-----------------------------------------------------------------
00989> ----------------------
00990> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00991> |  IN>01:(C-200 )   |
00992> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
00993> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00994>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00995>                             .000  .0000E+00    |    2.000  .1546E+00
00996>                             .000  .1448E+00    |    5.000  .1647E+00
00997>
00998>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00999>     ---------------------       (ha)     (cms)     (hrs)       (mm)
01000>     INFLOW >01: (C-200 )       4.57      .190      .750     10.328
01001>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
01002>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
01003>
01004>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01005>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01006>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01007>
01008>
01009>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01010>                    TIME SHIFT OF PEAK FLOW          (min)=   -45.00
01011>                    MAXIMUM  STORAGE   USED       (ha.m.)=.4720E-01
01012>
01013>      *** WARNING: Outflow volume is less than inflow volume.
01014> ---------------------------------------------------------------------------
01015> 003:0005-----------------------------------------------------------------
01016> ----------------------
```

```
| DESIGN NASHYD      |   Area    (ha)=    .65   Curve Number   (CN)=79.00
| 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .016 (i)
     TIME TO PEAK    (hrs)=     .833
     RUNOFF VOLUME    (mm)=    7.469
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .267

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

003:0006-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    8.38   Curve Number   (CN)=88.00
| 02:C-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .320

     Unit Hyd Qpeak  (cms)=    1.000

     PEAK FLOW       (cms)=     .273 (i)
     TIME TO PEAK    (hrs)=     .833
     RUNOFF VOLUME    (mm)=   9.178
     TOTAL RAINFALL   (mm)=  28.000
     RUNOFF COEFFICIENT   =     .328

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

003:0007-------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>02:(C-201 )    |
| OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |    2.000  .2309E+00
                             .000  .2162E+00    |    5.000  .2460E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (C-201 )       8.38      .273      .833      9.178
     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -50.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.7691E-01

      *** WARNING: Outflow volume is less than inflow volume.

003:0008-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=79.00
| 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .560

     Unit Hyd Qpeak  (cms)=     .981

     PEAK FLOW       (cms)=     .258 (i)
     TIME TO PEAK    (hrs)=    1.050
     RUNOFF VOLUME    (mm)=   7.469
     TOTAL RAINFALL   (mm)=  28.000
     RUNOFF COEFFICIENT   =     .267

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

003:0009-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    3.19   Curve Number   (CN)=88.00
| 05:C-202  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .530

     PEAK FLOW       (cms)=     .123 (i)
     TIME TO PEAK    (hrs)=     .717
     RUNOFF VOLUME    (mm)=    9.178
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .328

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

003:0010-------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>05:(C-202 )    |
| OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |     .000  .5990E-01
                             .000  .5600E-01    |    1.000  .6400E-01

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (C-202 )       3.19      .123      .717      9.178
     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -43.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2928E-01

      *** WARNING: Outflow volume is less than inflow volume.

003:0011-------------------------------------------------------------------------
----------------------
| ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 04:EXC-2       14.38     .258    1.05   7.47    .000
                       +ID2 06:SWM2A        3.19     .000     .00    .00    .000
                        ==========================================================
                        SUM 07:CTR1A        17.57     .258    1.05   6.11    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

003:0012-------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>07:(CTR1A )    |
| OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |     .000  .1618E+00
                             .000  .1260E-01    |     .862  .2671E+00
                             .000  .4270E-01    |    2.728  .4058E+00
                             .000  .8980E-01    |    4.016  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >07: (CTR1A )       17.57      .258    1.050      6.113
     OUTFLOW<08: (SWM2B )       17.57      .000     .000       .000
    OVERFLOW<10: (OSWM2B)         .00      .000     .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -63.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1074E+00

      *** WARNING: Outflow volume is less than inflow volume.

003:0013-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
| 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .000

     PEAK FLOW       (cms)=     .000 (i)
     TIME TO PEAK    (hrs)=    1.000
     RUNOFF VOLUME    (mm)=     .011
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .000

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

003:0014-------------------------------------------------------------------------
----------------------
| ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 08:SWM2B       17.57     .000     .00    .00    .000
                       +ID2 09:BLANK         .00     .000    1.00    .01    .000
                        ==========================================================
                        SUM 04:SB&BLK      17.57     .000    1.00    .00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

003:0015-------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(SB&BLK)    |
| OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |     .500  .1004E+00
                             .000  .9410E-01    |    1.300  .1070E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (SB&BLK)       17.57      .000    1.000       .000
     OUTFLOW<09: (SWM2C )       17.57      .000     .000       .000
    OVERFLOW<10: (OSWM2C)         .00      .000     .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -60.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1060E-09

003:0016-------------------------------------------------------------------------
----------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 01:CTR1          .65     .016     .83   7.47    .000
                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
                        ==========================================================
                        SUM 01:CTR1        26.60     .016     .83    .18    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

003:0017-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    8.99   Curve Number   (CN)=92.00
| 01:C-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=    1.272

     PEAK FLOW       (cms)=     .409 (i)
     TIME TO PEAK    (hrs)=     .767
     RUNOFF VOLUME    (mm)=   11.733
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .419

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

003:0018-------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(C-203 )    |
| OUT<02:(SWM3  )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |    3.000  .3271E+00
```

```
                          .000  .3063E+00   |    9.000  .3485E+00
      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
      ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-203 )        8.99      .409      .767     11.733
     OUTFLOW<02: (SWM3  )        8.99      .000      .000       .000
    OVERFLOW<10: (OVSWM3)         .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -46.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1055E+00

       *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0019------------------------------------------------------------------------
 ---------------------
| DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=79.00
| 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .119 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    7.469
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .267

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

------------------------------------------------------------------------------
003:0020------------------------------------------------------------------------
 ----------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 02:SWM3          8.99     .000     .00    .00     .000
                       +ID2 03:EXC-3         5.15     .119     .90   7.47     .000
                        ============================================================
                        SUM 01:CTR2          14.14     .119     .90   2.72     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0021------------------------------------------------------------------------
 ---------------------
| CALIB NASHYD       |   Area    (ha)=    5.81   Curve Number   (CN)=93.00
| 01:C-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .240

     Unit Hyd Qpeak  (cms)=     .925

     PEAK FLOW       (cms)=     .299 (i)
     TIME TO PEAK    (hrs)=     .717
     RUNOFF VOLUME    (mm)=   12.560
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .449

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

------------------------------------------------------------------------------
003:0022------------------------------------------------------------------------
 ---------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>01:(C-204 )    |
| OUT<02:(SWM4  )    |   =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)  |    (cms)     (ha.m.)
                            .000  .0000E+00   |   1.000  .2444E+00
                            .000  .2289E+00   |   3.000  .2604E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-204 )        5.81      .299      .717     12.560
     OUTFLOW<02: (SWM4  )        5.81      .000      .000       .000
    OVERFLOW<05: (OVSWM4)         .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -43.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.7297E-01

       *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0023------------------------------------------------------------------------
------------------------------------------------------------------------------
003:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
003:0002------------------------------------------------------------------------
  ** END OF RUN :   3

 ****************************************************************************
```

```
 ---------------------
| START              |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
 ---------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 004
    NSTORM=   1
           #  1=LYA5.12h
------------------------------------------------------------------------------
004:0002------------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/11/24
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
*#  License #   : 4730904
*#*************************************************************************
*#
*#                    Block C - CONSTRUCTION CONDITIONS
*#
*#*************************************************************************
------------------------------------------------------------------------------
004:0002------------------------------------------------------------------------
 ---------------------
| READ STORM         |    Filename: Belleville IDF (12-hr 30% AES - 5 Year)
| Ptotal=  55.97 mm  |    Comments: Belleville IDF (12-hr 30% AES - 5 Year)
 ---------------------
              TIME    RAIN  |   TIME    RAIN  |   TIME    RAIN  |   TIME    RAIN
               hrs   mm/hr  |    hrs   mm/hr  |    hrs   mm/hr  |    hrs   mm/hr
              1.00   5.247  |   4.00   8.745  |   7.00   1.749  |  10.00    .000
              2.00  15.158  |   5.00   8.162  |   8.00    .583  |  11.00    .000
              3.00  11.660  |   6.00   4.664  |   9.00    .000  |  12.00    .000

------------------------------------------------------------------------------
004:0003------------------------------------------------------------------------
*#*************************************************************************
*#
*#                              AMC III Conditions
*#
*#*************************************************************************
 ---------------------
| CALIB NASHYD       |   Area    (ha)=    4.57   Curve Number   (CN)=90.00
| 01:C-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .250

     Unit Hyd Qpeak  (cms)=     .698

     PEAK FLOW       (cms)=     .103 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   32.804
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .586

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

------------------------------------------------------------------------------
004:0004------------------------------------------------------------------------
 ---------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>01:(C-200 )    |
| OUT<02:(SWM0  )    |   =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)  |    (cms)     (ha.m.)
                            .000  .0000E+00   |   2.000  .1546E+00
                            .000  .1448E+00   |   5.000  .1647E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-200 )        4.57      .103     3.067     32.804
     OUTFLOW<02: (SWM0  )        4.57      .020     7.033      1.134
    OVERFLOW<10: (OVSWM0)         .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=    18.908
                    TIME SHIFT OF PEAK FLOW         (min)=   238.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1449E+00

       *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
004:0005------------------------------------------------------------------------
 ---------------------
| DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=79.00
| 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .010 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   24.320
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .435

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

------------------------------------------------------------------------------
004:0006------------------------------------------------------------------------
 ---------------------
| CALIB NASHYD       |   Area    (ha)=    8.38   Curve Number   (CN)=88.00
| 02:C-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .320

     Unit Hyd Qpeak  (cms)=    1.000

     PEAK FLOW       (cms)=     .171 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   30.346
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .542

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

------------------------------------------------------------------------------
004:0007------------------------------------------------------------------------
 ---------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>02:(C-201 )    |
| OUT<03:(SWM1  )    |   =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)  |    (cms)     (ha.m.)
                            .000  .0000E+00   |   2.000  .2309E+00
                            .000  .2162E+00   |   5.000  .2460E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (C-201 )        8.38      .171     3.100     30.346
     OUTFLOW<03: (SWM1  )        8.38      .093     5.917      4.644
    OVERFLOW<10: (OVSWM1)         .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   54.510
                    TIME SHIFT OF PEAK FLOW         (min)=   169.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2169E+00

       *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
004:0008------------------------------------------------------------------------
 ---------------------
| DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=79.00
| 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .560
```

```
01525>
01526>      Unit Hyd Qpeak  (cms)=     .981
01527>
01528>      PEAK FLOW       (cms)=     .210 (i)
01529>      TIME TO PEAK    (hrs)=    3.367
01530>      RUNOFF VOLUME    (mm)=   24.320
01531>      TOTAL RAINFALL   (mm)=   55.968
01532>      RUNOFF COEFFICIENT   =     .435
01533>
01534>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01535>
01536> ---------------------------------------------------------------------------
01537> 004:0009-----------------------------------------------------------------
01538> ----------------------
01539> | CALIB NASHYD       |   Area     (ha)=    3.19   Curve Number   (CN)=88.00
01540> | 05:C-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01541> ----------------------   U.H. Tp(hrs)=    .230
01542>
01543>      Unit Hyd Qpeak  (cms)=     .530
01544>
01545>      PEAK FLOW       (cms)=     .067 (i)
01546>      TIME TO PEAK    (hrs)=    3.050
01547>      RUNOFF VOLUME    (mm)=   30.346
01548>      TOTAL RAINFALL   (mm)=   55.968
01549>      RUNOFF COEFFICIENT   =     .542
01550>
01551>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01552>
01553> ---------------------------------------------------------------------------
01554> 004:0010-----------------------------------------------------------------
01555> ----------------------
01556> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01557> |  IN>05:(C-202 )    |
01558> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
01559> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01560>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
01561>                              .000  .0000E+00    |     .000  .5990E-01
01562>                              .000  .5600E-01    |    1.000  .6400E-01
01563>
01564>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01565>      ----------------------      (ha)     (cms)     (hrs)       (mm)
01566>      INFLOW >05: (C-202 )       3.19      .067     3.050     30.346
01567>      OUTFLOW<06: (SWM2A )       3.19      .057     5.017     11.654
01568>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
01569>
01570>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01571>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01572>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01573>
01574>
01575>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   86.019
01576>                     TIME SHIFT OF PEAK FLOW          (min)=   118.00
01577>                     MAXIMUM  STORAGE   USED       (ha.m.)=.6013E-01
01578>
01579>       *** WARNING: Outflow volume is less than inflow volume.
01580> ---------------------------------------------------------------------------
01581> 004:0011-----------------------------------------------------------------
01582> ----------------------
01583> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01584> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
01585>                         ID1 04:EXC-2       14.38     .210    3.37  24.32    .000
01586>                        +ID2 06:SWM2A        3.19     .057    5.02  11.65    .000
01587>                         ========================================================
01588>                         SUM 07:CTR1A       17.57     .261    5.03  22.01    .000
01589>
01590>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01591>
01592> ---------------------------------------------------------------------------
01593> 004:0012-----------------------------------------------------------------
01594> ----------------------
01595> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01596> |  IN>07:(CTR1A )    |
01597> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
01598> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01599>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
01600>                              .000  .0000E+00    |     .000  .1618E+00
01601>                              .000  .1260E-01    |     .862  .2671E+00
01602>                              .000  .4270E-01    |    2.728  .4058E+00
01603>                              .000  .8980E-01    |    4.016  .4888E+00
01604>
01605>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01606>      ----------------------      (ha)     (cms)     (hrs)       (mm)
01607>      INFLOW >07: (CTR1A )      17.57      .261     5.033     22.005
01608>      OUTFLOW<08: (SWM2B )      17.57      .244     5.300     12.796
01609>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
01610>
01611>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01612>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01613>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01614>
01615>
01616>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   93.434
01617>                     TIME SHIFT OF PEAK FLOW          (min)=    16.00
01618>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1916E+00
01619>
01620>       *** WARNING: Outflow volume is less than inflow volume.
01621> ---------------------------------------------------------------------------
01622> 004:0013-----------------------------------------------------------------
01623> ----------------------
01624> | DESIGN NASHYD      |   Area     (ha)=     .00   Curve Number   (CN)= 1.00
01625> | 09:BLANK  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01626> ----------------------   U.H. Tp(hrs)=    .500
01627>
01628>      Unit Hyd Qpeak  (cms)=     .000
01629>
01630>      PEAK FLOW       (cms)=     .000 (i)
01631>      TIME TO PEAK    (hrs)=    5.117
01632>      RUNOFF VOLUME    (mm)=     .118
01633>      TOTAL RAINFALL   (mm)=   55.968
01634>      RUNOFF COEFFICIENT   =     .002
01635>
01636>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01637>
01638> ---------------------------------------------------------------------------
01639> 004:0014-----------------------------------------------------------------
01640> ----------------------
01641> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01642> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
01643>                         ID1 08:SWM2B       17.57     .244    5.30  12.80    .000
01644>                        +ID2 09:BLANK         .00     .000    5.12    .12    .000
01645>                         ========================================================
01646>                         SUM 04:SB&BLK      17.57     .244    5.30  12.80    .000
01647>
01648>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01649>
01650> ---------------------------------------------------------------------------
01651> 004:0015-----------------------------------------------------------------
01652> ----------------------
01653> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01654> |  IN>04:(SB&BLK)    |
01655> | OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
01656> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01657>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
01658>                              .000  .0000E+00    |     .500  .1004E+00
01659>                              .000  .9410E-01    |    1.300  .1070E+00
01660>
01661>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01662>      ----------------------      (ha)     (cms)     (hrs)       (mm)
01663>      INFLOW >04: (SB&BLK)      17.57      .244     5.300     12.796
01664>      OUTFLOW<09: (SWM2C )      17.57      .222     5.767      7.441
01665>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
01666>
01667>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01668>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01669>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01670>
01671>
01672>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   90.977
01673>                     TIME SHIFT OF PEAK FLOW          (min)=    28.00
01674>                     MAXIMUM  STORAGE   USED       (ha.m.)=.9690E-01
01675>
01676>       *** WARNING: Outflow volume is less than inflow volume.
01677> ---------------------------------------------------------------------------
01678> 004:0016-----------------------------------------------------------------
01679> ----------------------
01680> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01681> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
01682>                         ID1 01:CTR1          .65      .010    3.13  24.32    .000
01683>                        +ID2 03:SWM1         8.38      .093    5.92   4.64    .000
01684>                        +ID3 09:SWM2C       17.57      .222    5.77   7.44    .000
01685>                         ========================================================
01686>                         SUM 01:CTR1        26.60      .314    5.88   7.02    .000
01687>
01688>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01689>
01690> ---------------------------------------------------------------------------
01691> 004:0017-----------------------------------------------------------------
01692> ----------------------
01693> | CALIB NASHYD       |   Area     (ha)=    8.99   Curve Number   (CN)=92.00
01694> | 01:C-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01695> ----------------------   U.H. Tp(hrs)=    .270
01696>
01697>      Unit Hyd Qpeak  (cms)=    1.272
01698>
01699>      PEAK FLOW       (cms)=     .221 (i)
01700>      TIME TO PEAK    (hrs)=    3.067
01701>      RUNOFF VOLUME    (mm)=   35.559
01702>      TOTAL RAINFALL   (mm)=   55.968
01703>      RUNOFF COEFFICIENT   =     .635
01704>
01705>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01706>
01707> ---------------------------------------------------------------------------
01708> 004:0018-----------------------------------------------------------------
01709> ----------------------
01710> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01711> |  IN>01:(C-203 )    |
01712> | OUT<02:(SWM3  )    |    =========  OUTLFOW STORAGE TABLE  =========
01713> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01714>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
01715>                              .000  .0000E+00    |    3.000  .3271E+00
01716>                              .000  .3063E+00    |    9.000  .3485E+00
01717>
01718>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01719>      ----------------------      (ha)     (cms)     (hrs)       (mm)
01720>      INFLOW >01: (C-203 )       8.99      .221     3.067     35.559
01721>      OUTFLOW<02: (SWM3  )       8.99      .042     6.900      1.578
01722>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
01723>
01724>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01725>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01726>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01727>
01728>
01729>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   18.954
01730>                     TIME SHIFT OF PEAK FLOW          (min)=   230.00
01731>                     MAXIMUM  STORAGE   USED       (ha.m.)=.3066E+00
01732>
01733>       *** WARNING: Outflow volume is less than inflow volume.
01734> ---------------------------------------------------------------------------
01735> 004:0019-----------------------------------------------------------------
01736> ----------------------
01737> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=79.00
01738> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01739> ----------------------   U.H. Tp(hrs)=    .390
01740>
01741>      Unit Hyd Qpeak  (cms)=     .504
01742>
01743>      PEAK FLOW       (cms)=     .078 (i)
01744>      TIME TO PEAK    (hrs)=    3.167
01745>      RUNOFF VOLUME    (mm)=   24.320
01746>      TOTAL RAINFALL   (mm)=   55.968
01747>      RUNOFF COEFFICIENT   =     .435
01748>
01749>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01750>
01751> ---------------------------------------------------------------------------
01752> 004:0020-----------------------------------------------------------------
01753> ----------------------
01754> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01755> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
01756>                         ID1 02:SWM3          8.99      .042    6.90   1.58    .000
01757>                        +ID2 03:EXC-3         5.15      .078    3.17  24.32    .000
01758>                         ========================================================
01759>                         SUM 01:CTR2         14.14      .078    3.17   9.88    .000
01760>
01761>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01762>
01763> ---------------------------------------------------------------------------
01764> 004:0021-----------------------------------------------------------------
01765> ----------------------
01766> | CALIB NASHYD       |   Area     (ha)=    5.81   Curve Number   (CN)=93.00
01767> | 01:C-204  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01768> ----------------------   U.H. Tp(hrs)=    .240
01769>
01770>      Unit Hyd Qpeak  (cms)=     .925
01771>
01772>      PEAK FLOW       (cms)=     .150 (i)
01773>      TIME TO PEAK    (hrs)=    3.050
01774>      RUNOFF VOLUME    (mm)=   37.065
01775>      TOTAL RAINFALL   (mm)=   55.968
01776>      RUNOFF COEFFICIENT   =     .662
01777>
01778>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

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01779>
01780> ------------------------------------------------------------------------------
01781> 004:0022------------------------------------------------------------------------
01782> ---------------------
01783> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01784> |  IN>01:(C-204 )   |
01785> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
01786> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01787>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01788>                             .000  .0000E+00    |   1.000  .2444E+00
01789>                             .000  .2289E+00    |   3.000  .2604E+00
01790>
01791>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01792>     ---------------------      (ha)     (cms)     (hrs)       (mm)
01793>     INFLOW >01: (C-204 )       5.81      .150     3.050     37.065
01794>     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
01795>    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
01796>
01797>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01798>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01799>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01800>
01801>
01802>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01803>                    TIME SHIFT OF PEAK FLOW          (min)=  -183.00
01804>                    MAXIMUM  STORAGE   USED       (ha.m.)=.2153E+00
01805>
01806>       *** WARNING: Outflow volume is less than inflow volume.
01807> ------------------------------------------------------------------------------
01808> 004:0023------------------------------------------------------------------------
01809> ------------------------------------------------------------------------------
01810> 004:0002------------------------------------------------------------------------
01811> ------------------------------------------------------------------------------
01812> 004:0002------------------------------------------------------------------------
01813> ------------------------------------------------------------------------------
01814> 004:0002------------------------------------------------------------------------
01815>   ** END OF RUN :   4
01816>
01817> ******************************************************************************
01818>
01819>
01820>
01821>
01822>
01823> --------------------
01824> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
01825> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
01826>     TZERO =   .00 hrs on       0
01827>     METOUT=   2 (output = METRIC)
01828>     NRUN  = 005
01829>     NSTORM=   1
01830>            #  1=LYA100.1hr
01831> ------------------------------------------------------------------------------
01832> 005:0002------------------------------------------------------------------------
01833> *#**************************************************************************
01834> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
01835> *#  Date        : 2017/11/24
01836> *#  Modeller    : [C. Fischer]
01837> *#  Company     : Stantec Consulting Ltd. (Waterloo)
01838> *#  License #   : 4730904
01839> *#**************************************************************************
01840> *#
01841> *#                        Block C - CONSTRUCTION CONDITIONS
01842> *#
01843> *#**************************************************************************
01844> ------------------------------------------------------------------------------
01845> 005:0002------------------------------------------------------------------------
01846> --------------------
01847> | READ STORM       |    Filename: Belleville IDF (1-hr 30% AES - 100 Year)
01848> | Ptotal=  44.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 100 Year)
01849> --------------------
01850>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
01851>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
01852>               .08  47.628 |    .33  58.212 |    .58  52.920 |    .83  15.876
01853>               .17  74.088 |    .42  68.796 |    .67  26.460 |    .92   5.292
01854>               .25 111.132 |    .50  47.628 |    .75  21.168 |   1.00    .000
01855>
01856> ------------------------------------------------------------------------------
01857> 005:0003------------------------------------------------------------------------
01858> *#**************************************************************************
01859> *#
01860> *#                              AMC III Conditions
01861> *#
01862> *#**************************************************************************
01863> ----------------------
01864> | CALIB NASHYD       |   Area     (ha)=    4.57   Curve Number   (CN)=90.00
01865> | 01:C-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01866> ----------------------   U.H. Tp(hrs)=    .250
01867>
01868>     Unit Hyd Qpeak  (cms)=     .698
01869>
01870>     PEAK FLOW       (cms)=     .410 (i)
01871>     TIME TO PEAK    (hrs)=     .717
01872>     RUNOFF VOLUME    (mm)=   22.709
01873>     TOTAL RAINFALL   (mm)=   44.100
01874>     RUNOFF COEFFICIENT   =     .515
01875>
01876>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01877>
01878> ------------------------------------------------------------------------------
01879> 005:0004------------------------------------------------------------------------
01880> ---------------------
01881> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01882> |  IN>01:(C-200 )   |
01883> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
01884> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01885>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01886>                             .000  .0000E+00    |   2.000  .1546E+00
01887>                             .000  .1448E+00    |   5.000  .1647E+00
01888>
01889>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01890>     ---------------------      (ha)     (cms)     (hrs)       (mm)
01891>     INFLOW >01: (C-200 )       4.57      .410      .717     22.709
01892>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
01893>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
01894>
01895>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01896>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01897>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01898>
01899>
01900>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01901>                    TIME SHIFT OF PEAK FLOW          (min)=  -43.00
01902>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1038E+00
01903>
01904>       *** WARNING: Outflow volume is less than inflow volume.
01905> ------------------------------------------------------------------------------
01906> 005:0005------------------------------------------------------------------------
01907> ----------------------
01908> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=79.00
01909> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01910> ----------------------   U.H. Tp(hrs)=    .340
01911>
01912>     Unit Hyd Qpeak  (cms)=     .073
01913>
01914>     PEAK FLOW       (cms)=     .036 (i)
01915>     TIME TO PEAK    (hrs)=     .817
01916>     RUNOFF VOLUME    (mm)=   16.480
01917>     TOTAL RAINFALL   (mm)=   44.100
01918>     RUNOFF COEFFICIENT   =     .374
01919>
01920>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01921>
01922> ------------------------------------------------------------------------------
01923> 005:0006------------------------------------------------------------------------
01924> ----------------------
01925> | CALIB NASHYD       |   Area     (ha)=    8.38   Curve Number   (CN)=88.00
01926> | 02:C-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01927> ----------------------   U.H. Tp(hrs)=    .320
01928>
01929>     Unit Hyd Qpeak  (cms)=    1.000
01930>
01931>     PEAK FLOW       (cms)=     .606 (i)
01932>     TIME TO PEAK    (hrs)=     .800
01933>     RUNOFF VOLUME    (mm)=   20.733
01934>     TOTAL RAINFALL   (mm)=   44.100
01935>     RUNOFF COEFFICIENT   =     .470
01936>
01937>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01938>
01939> ------------------------------------------------------------------------------
01940> 005:0007------------------------------------------------------------------------
01941> ---------------------
01942> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01943> |  IN>02:(C-201 )   |
01944> | OUT<03:(SWM1  )   |    =========  OUTLFOW STORAGE TABLE  =========
01945> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01946>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01947>                             .000  .0000E+00    |   2.000  .2309E+00
01948>                             .000  .2162E+00    |   5.000  .2460E+00
01949>
01950>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01951>     ---------------------      (ha)     (cms)     (hrs)       (mm)
01952>     INFLOW >02: (C-201 )       8.38      .606      .800     20.733
01953>     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
01954>    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
01955>
01956>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01957>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01958>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01959>
01960>
01961>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01962>                    TIME SHIFT OF PEAK FLOW          (min)=   -48.00
01963>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1737E+00
01964>
01965>       *** WARNING: Outflow volume is less than inflow volume.
01966> ------------------------------------------------------------------------------
01967> 005:0008------------------------------------------------------------------------
01968> ----------------------
01969> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=79.00
01970> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01971> ----------------------   U.H. Tp(hrs)=    .560
01972>
01973>     Unit Hyd Qpeak  (cms)=     .981
01974>
01975>     PEAK FLOW       (cms)=     .567 (i)
01976>     TIME TO PEAK    (hrs)=    1.033
01977>     RUNOFF VOLUME    (mm)=   16.480
01978>     TOTAL RAINFALL   (mm)=   44.100
01979>     RUNOFF COEFFICIENT   =     .374
01980>
01981>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01982>
01983> ------------------------------------------------------------------------------
01984> 005:0009------------------------------------------------------------------------
01985> ----------------------
01986> | CALIB NASHYD       |   Area     (ha)=    3.19   Curve Number   (CN)=88.00
01987> | 05:C-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
01988> ----------------------   U.H. Tp(hrs)=    .230
01989>
01990>     Unit Hyd Qpeak  (cms)=     .530
01991>
01992>     PEAK FLOW       (cms)=     .271 (i)
01993>     TIME TO PEAK    (hrs)=     .700
01994>     RUNOFF VOLUME    (mm)=   20.733
01995>     TOTAL RAINFALL   (mm)=   44.100
01996>     RUNOFF COEFFICIENT   =     .470
01997>
01998>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01999>
02000> ------------------------------------------------------------------------------
02001> 005:0010------------------------------------------------------------------------
02002> ---------------------
02003> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02004> |  IN>05:(C-202 )   |
02005> | OUT<06:(SWM2A )   |    =========  OUTLFOW STORAGE TABLE  =========
02006> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02007>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02008>                             .000  .0000E+00    |    .000  .5990E-01
02009>                             .000  .5600E-01    |   1.000  .6400E-01
02010>
02011>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02012>     ---------------------      (ha)     (cms)     (hrs)       (mm)
02013>     INFLOW >05: (C-202 )       3.19      .271      .700     20.733
02014>     OUTFLOW<06: (SWM2A )       3.19      .081     1.183      1.999
02015>    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
02016>
02017>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02018>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
02019>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
02020>
02021>
02022>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=    29.919
02023>                    TIME SHIFT OF PEAK FLOW          (min)=    29.00
02024>                    MAXIMUM  STORAGE   USED       (ha.m.)=.6024E-01
02025>
02026>       *** WARNING: Outflow volume is less than inflow volume.
02027> ------------------------------------------------------------------------------
02028> 005:0011------------------------------------------------------------------------
02029> ----------------------
02030> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02031> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
02032>                        ID1 04:EXC-2        14.38     .567    1.03  16.48    .000
```

```
                    +ID2 06:SWM2A          3.19     .081    1.18   2.00    .000
                     ============================================================
                     SUM 07:CTR1A          17.57     .626    1.17  13.84    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
005:0012------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>07:(CTR1A )   |
| OUT<08:(SWM2B )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00     |     .000  .1618E+00
                           .000  .1260E-01     |     .862  .2671E+00
                           .000  .4270E-01     |    2.728  .4058E+00
                           .000  .8980E-01     |    4.016  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >07: (CTR1A )      17.57      .626     1.167     13.843
     OUTFLOW<08: (SWM2B )      17.57      .214     1.817      4.665
    OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   34.184
                    TIME SHIFT OF PEAK FLOW         (min)=    39.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1879E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
005:0013------------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
| 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .000

     PEAK FLOW       (cms)=     .000 (i)
     TIME TO PEAK    (hrs)=    1.000
     RUNOFF VOLUME    (mm)=     .028
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .001

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

------------------------------------------------------------------------------
005:0014------------------------------------------------------------------------
------------------------
| ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 08:SWM2B       17.57     .214    1.82   4.67    .000
                       +ID2 09:BLANK         .00     .000    1.00    .03    .000
                        ============================================================
                        SUM 04:SB&BLK      17.57     .214    1.82   4.67    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
005:0015------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>04:(SB&BLK)   |
| OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00     |     .500  .1004E+00
                           .000  .9410E-01     |    1.300  .1070E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (SB&BLK)      17.57      .214     1.817      4.665
     OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=  -109.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.8197E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
005:0016------------------------------------------------------------------------
------------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 01:CTR1          .65     .036     .82  16.48    .000
                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
                        ============================================================
                        SUM 01:CTR1        26.60     .036     .82    .40    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
005:0017------------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=92.00
| 01:C-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=    1.272

     PEAK FLOW       (cms)=     .854 (i)
     TIME TO PEAK    (hrs)=     .733
     RUNOFF VOLUME    (mm)=   24.986
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .567

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

------------------------------------------------------------------------------
005:0018------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-203 )   |
| OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00     |    3.000  .3271E+00
                           .000  .3063E+00     |    9.000  .3485E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-203 )       8.99      .854      .733     24.986
     OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -44.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2246E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
005:0019------------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    5.15   Curve Number   (CN)=79.00
| 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .261 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=   16.480
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .374

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

------------------------------------------------------------------------------
005:0020------------------------------------------------------------------------
------------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 02:SWM3        8.99     .000     .00    .00    .000
                       +ID2 03:EXC-3       5.15     .261     .88  16.48    .000
                        ============================================================
                        SUM 01:CTR2        14.14     .261     .88   6.00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
005:0021------------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=93.00
| 01:C-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .240

     Unit Hyd Qpeak  (cms)=     .925

     PEAK FLOW       (cms)=     .613 (i)
     TIME TO PEAK    (hrs)=     .683
     RUNOFF VOLUME    (mm)=   26.260
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .595

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

------------------------------------------------------------------------------
005:0022------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-204 )   |
| OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00     |    1.000  .2444E+00
                           .000  .2289E+00     |    3.000  .2604E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-204 )       5.81      .613      .683     26.260
     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -41.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1526E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
005:0023------------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002------------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002------------------------------------------------------------------------
  ** END OF RUN :   5

********************************************************************************



---------------------
| START             |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
---------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
           #  1=LYA100.12h
------------------------------------------------------------------------------
006:0002------------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/11/24
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
```

```
02287> *#  License #   : 4730904
02288> *#*****************************************************************************
02289> *#
02290> *#                      Block C - CONSTRUCTION CONDITIONS
02291> *#
02292> *#*****************************************************************************
02293> -------------------------------------------------------------------------------
02294> 006:0002---------------------------------------------------------------------
02295> --------------------
02296> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 100 Year
02297> | Ptotal=  93.70 mm|    Comments: Belleville IDF (12-hr 30% AES - 100 Year
02298> --------------------
02299>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
02300>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
02301>              1.00   8.784 |   4.00  14.640 |   7.00   2.928 |  10.00    .000
02302>              2.00  25.376 |   5.00  13.664 |   8.00    .976 |  11.00    .000
02303>              3.00  19.520 |   6.00   7.808 |   9.00    .000 |  12.00    .000
02304>
02305> -------------------------------------------------------------------------------
02306> 006:0003---------------------------------------------------------------------
02307> *#*****************************************************************************
02308> *#
02309> *#                            AMC III Conditions
02310> *#
02311> *#*****************************************************************************
02312> ----------------------
02313> | CALIB NASHYD       |   Area     (ha)=    4.57   Curve Number    (CN)=90.00
02314> | 01:C-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
02315> ----------------------   U.H. Tp(hrs)=    .250
02316>
02317>      Unit Hyd Qpeak  (cms)=     .698
02318>
02319>      PEAK FLOW       (cms)=     .215 (i)
02320>      TIME TO PEAK    (hrs)=    2.150
02321>      RUNOFF VOLUME    (mm)=   67.286
02322>      TOTAL RAINFALL   (mm)=   93.696
02323>      RUNOFF COEFFICIENT   =     .718
02324>
02325>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02326>
02327> -------------------------------------------------------------------------------
02328> 006:0004---------------------------------------------------------------------
02329> ----------------------
02330> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02331> |  IN>01:(C-200 )    |
02332> | OUT<02:(SWM0  )    |    =========  OUTLFOW STORAGE TABLE  =========
02333> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02334>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02335>                              .000  .0000E+00     |   2.000  .1546E+00
02336>                              .000  .1448E+00     |   5.000  .1647E+00
02337>
02338>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02339>      ---------------------      (ha)     (cms)     (hrs)       (mm)
02340>      INFLOW >01: (C-200 )       4.57      .215     2.150     67.286
02341>      OUTFLOW<02: (SWM0  )       4.57      .173     3.517     35.602
02342>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
02343>
02344>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02345>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02346>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02347>
02348>
02349>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   80.435
02350>                     TIME SHIFT OF PEAK FLOW          (min)=    82.00
02351>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1456E+00
02352>
02353>       *** WARNING: Outflow volume is less than inflow volume.
02354> -------------------------------------------------------------------------------
02355> 006:0005---------------------------------------------------------------------
02356> ----------------------
02357> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number    (CN)=79.00
02358> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02359> ----------------------   U.H. Tp(hrs)=    .340
02360>
02361>      Unit Hyd Qpeak  (cms)=     .073
02362>
02363>      PEAK FLOW       (cms)=     .022 (i)
02364>      TIME TO PEAK    (hrs)=    3.100
02365>      RUNOFF VOLUME    (mm)=   53.221
02366>      TOTAL RAINFALL   (mm)=   93.696
02367>      RUNOFF COEFFICIENT   =     .568
02368>
02369>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02370>
02371> -------------------------------------------------------------------------------
02372> 006:0006---------------------------------------------------------------------
02373> ----------------------
02374> | CALIB NASHYD       |   Area     (ha)=    8.38   Curve Number    (CN)=88.00
02375> | 02:C-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
02376> ----------------------   U.H. Tp(hrs)=    .320
02377>
02378>      Unit Hyd Qpeak  (cms)=    1.000
02379>
02380>      PEAK FLOW       (cms)=     .359 (i)
02381>      TIME TO PEAK    (hrs)=    3.067
02382>      RUNOFF VOLUME    (mm)=   63.787
02383>      TOTAL RAINFALL   (mm)=   93.696
02384>      RUNOFF COEFFICIENT   =     .681
02385>
02386>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02387>
02388> -------------------------------------------------------------------------------
02389> 006:0007---------------------------------------------------------------------
02390> ----------------------
02391> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02392> |  IN>02:(C-201 )    |
02393> | OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
02394> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02395>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02396>                              .000  .0000E+00     |   2.000  .2309E+00
02397>                              .000  .2162E+00     |   5.000  .2460E+00
02398>
02399>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02400>      ---------------------      (ha)     (cms)     (hrs)       (mm)
02401>      INFLOW >02: (C-201 )       8.38      .359     3.067     63.787
02402>      OUTFLOW<03: (SWM1  )       8.38      .327     3.400     37.988
02403>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
02404>
02405>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02406>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02407>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02408>
02409>
02410>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   91.014
02411>                     TIME SHIFT OF PEAK FLOW          (min)=    20.00
02412>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2186E+00
02413>
02414>       *** WARNING: Outflow volume is less than inflow volume.
02415> -------------------------------------------------------------------------------
02416> 006:0008---------------------------------------------------------------------
02417> ----------------------
02418> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number    (CN)=79.00
02419> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02420> ----------------------   U.H. Tp(hrs)=    .560
02421>
02422>      Unit Hyd Qpeak  (cms)=     .981
02423>
02424>      PEAK FLOW       (cms)=     .473 (i)
02425>      TIME TO PEAK    (hrs)=    3.267
02426>      RUNOFF VOLUME    (mm)=   53.221
02427>      TOTAL RAINFALL   (mm)=   93.696
02428>      RUNOFF COEFFICIENT   =     .568
02429>
02430>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02431>
02432> -------------------------------------------------------------------------------
02433> 006:0009---------------------------------------------------------------------
02434> ----------------------
02435> | CALIB NASHYD       |   Area     (ha)=    3.19   Curve Number    (CN)=88.00
02436> | 05:C-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
02437> ----------------------   U.H. Tp(hrs)=    .230
02438>
02439>      Unit Hyd Qpeak  (cms)=     .530
02440>
02441>      PEAK FLOW       (cms)=     .140 (i)
02442>      TIME TO PEAK    (hrs)=    2.133
02443>      RUNOFF VOLUME    (mm)=   63.787
02444>      TOTAL RAINFALL   (mm)=   93.696
02445>      RUNOFF COEFFICIENT   =     .681
02446>
02447>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02448>
02449> -------------------------------------------------------------------------------
02450> 006:0010---------------------------------------------------------------------
02451> ----------------------
02452> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02453> |  IN>05:(C-202 )    |
02454> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
02455> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02456>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02457>                              .000  .0000E+00     |    .000  .5990E-01
02458>                              .000  .5600E-01     |   1.000  .6400E-01
02459>
02460>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02461>      ---------------------      (ha)     (cms)     (hrs)       (mm)
02462>      INFLOW >05: (C-202 )       3.19      .140     2.133     63.787
02463>      OUTFLOW<06: (SWM2A )       3.19      .138     3.050     45.010
02464>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
02465>
02466>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02467>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02468>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02469>
02470>
02471>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   98.815
02472>                     TIME SHIFT OF PEAK FLOW          (min)=    55.00
02473>                     MAXIMUM  STORAGE   USED       (ha.m.)=.6047E-01
02474>
02475>       *** WARNING: Outflow volume is less than inflow volume.
02476> -------------------------------------------------------------------------------
02477> 006:0011---------------------------------------------------------------------
02478> ----------------------
02479> | ADD HYD (CTR1A     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02480> ----------------------                     (ha)     (cms)   (hrs)   (mm)    (cms)
02481>                         ID1 04:EXC-2        14.38     .473   3.27  53.22    .000
02482>                        +ID2 06:SWM2A         3.19     .138   3.05  45.01    .000
02483>                         ========================================================
02484>                         SUM 07:CTR1A         17.57     .606   3.13  51.73    .000
02485>
02486>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02487>
02488> -------------------------------------------------------------------------------
02489> 006:0012---------------------------------------------------------------------
02490> ----------------------
02491> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02492> |  IN>07:(CTR1A )    |
02493> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
02494> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02495>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02496>                              .000  .0000E+00     |    .000  .1618E+00
02497>                              .000  .1260E-01     |    .862  .2671E+00
02498>                              .000  .4270E-01     |   2.728  .4058E+00
02499>                              .000  .8980E-01     |   4.016  .4888E+00
02500>
02501>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02502>      ---------------------      (ha)     (cms)     (hrs)       (mm)
02503>      INFLOW >07: (CTR1A )      17.57      .606     3.133     51.730
02504>      OUTFLOW<08: (SWM2B )      17.57      .550     4.100     42.521
02505>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
02506>
02507>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02508>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02509>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02510>
02511>
02512>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   90.773
02513>                     TIME SHIFT OF PEAK FLOW          (min)=    58.00
02514>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2290E+00
02515>
02516>       *** WARNING: Outflow volume is less than inflow volume.
02517> -------------------------------------------------------------------------------
02518> 006:0013---------------------------------------------------------------------
02519> ----------------------
02520> | DESIGN NASHYD      |   Area     (ha)=     .00   Curve Number    (CN)= 1.00
02521> | 09:BLANK  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02522> ----------------------   U.H. Tp(hrs)=    .500
02523>
02524>      Unit Hyd Qpeak  (cms)=     .000
02525>
02526>      PEAK FLOW       (cms)=     .000 (i)
02527>      TIME TO PEAK    (hrs)=    5.117
02528>      RUNOFF VOLUME    (mm)=     .337
02529>      TOTAL RAINFALL   (mm)=   93.696
02530>      RUNOFF COEFFICIENT   =     .004
02531>
02532>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02533>
02534> -------------------------------------------------------------------------------
02535> 006:0014---------------------------------------------------------------------
02536> ----------------------
02537> | ADD HYD (SB&BLK    ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02538> ----------------------                     (ha)     (cms)   (hrs)   (mm)    (cms)
02539>                         ID1 08:SWM2B        17.57     .550   4.10  42.52    .000
02540>                        +ID2 09:BLANK         .00     .000   5.12    .34    .000
```

```
02541>                    ============================================================
02542>                    SUM 04:SB&BLK        17.57     .550    4.10  42.52    .000
02543>
02544>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02545>
02546> ------------------------------------------------------------------------------
02547> 006:0015-----------------------------------------------------------------------
02548> ---------------------
02549> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02550> |  IN>04:(SB&BLK)   |
02551> | OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
02552> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02553>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02554>                             .000  .0000E+00    |     .500  .1004E+00
02555>                             .000  .9410E-01    |    1.300  .1070E+00
02556>
02557>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02558>     ---------------------       (ha)     (cms)     (hrs)       (mm)
02559>     INFLOW >04: (SB&BLK)      17.57      .550     4.100     42.521
02560>     OUTFLOW<09: (SWM2C )      17.57      .550     4.117     37.165
02561>    OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
02562>
02563>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02564>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02565>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02566>
02567>
02568>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   99.995
02569>                    TIME SHIFT OF PEAK FLOW          (min)=     1.00
02570>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1008E+00
02571>
02572>       *** WARNING: Outflow volume is less than inflow volume.
02573> ------------------------------------------------------------------------------
02574> 006:0016-----------------------------------------------------------------------
02575> ------------------------
02576> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02577> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
02578>                         ID1 01:CTR1          .65      .022    3.10  53.22    .000
02579>                        +ID2 03:SWM1         8.38      .327    3.40  37.99    .000
02580>                        +ID3 09:SWM2C       17.57      .550    4.12  37.17    .000
02581>                         ============================================================
02582>                         SUM 01:CTR1         26.60      .864    4.07  37.82    .000
02583>
02584>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02585>
02586> ------------------------------------------------------------------------------
02587> 006:0017-----------------------------------------------------------------------
02588> ---------------------
02589> | CALIB NASHYD      |   Area     (ha)=    8.99   Curve Number   (CN)=92.00
02590> | 01:C-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
02591> ---------------------   U.H. Tp(hrs)=    .270
02592>
02593>     Unit Hyd Qpeak  (cms)=    1.272
02594>
02595>     PEAK FLOW       (cms)=     .457 (i)
02596>     TIME TO PEAK    (hrs)=    2.150
02597>     RUNOFF VOLUME    (mm)=   71.013
02598>     TOTAL RAINFALL   (mm)=   93.696
02599>     RUNOFF COEFFICIENT   =     .758
02600>
02601>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02602>
02603> ------------------------------------------------------------------------------
02604> 006:0018-----------------------------------------------------------------------
02605> ---------------------
02606> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02607> |  IN>01:(C-203 )   |
02608> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
02609> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02610>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02611>                             .000  .0000E+00    |    3.000  .3271E+00
02612>                             .000  .3063E+00    |    9.000  .3485E+00
02613>
02614>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02615>     ---------------------       (ha)     (cms)     (hrs)       (mm)
02616>     INFLOW >01: (C-203 )       8.99      .457     2.150     71.013
02617>     OUTFLOW<02: (SWM3  )       8.99      .355     3.550     36.942
02618>    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
02619>
02620>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02621>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02622>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02623>
02624>
02625>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   77.670
02626>                    TIME SHIFT OF PEAK FLOW          (min)=    84.00
02627>                    MAXIMUM  STORAGE   USED       (ha.m.)=.3088E+00
02628>
02629>       *** WARNING: Outflow volume is less than inflow volume.
02630> ------------------------------------------------------------------------------
02631> 006:0019-----------------------------------------------------------------------
02632> ---------------------
02633> | DESIGN NASHYD     |   Area     (ha)=    5.15   Curve Number   (CN)=79.00
02634> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=  1.500   # of Linear Res.(N)= 3.00
02635> ---------------------   U.H. Tp(hrs)=    .390
02636>
02637>     Unit Hyd Qpeak  (cms)=     .504
02638>
02639>     PEAK FLOW       (cms)=     .176 (i)
02640>     TIME TO PEAK    (hrs)=    3.117
02641>     RUNOFF VOLUME    (mm)=   53.221
02642>     TOTAL RAINFALL   (mm)=   93.696
02643>     RUNOFF COEFFICIENT   =     .568
02644>
02645>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02646>
02647> ------------------------------------------------------------------------------
02648> 006:0020-----------------------------------------------------------------------
02649> ------------------------
02650> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02651> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
02652>                         ID1 02:SWM3          8.99      .355    3.55  36.94    .000
02653>                        +ID2 03:EXC-3         5.15      .176    3.12  53.22    .000
02654>                         ============================================================
02655>                         SUM 01:CTR2         14.14      .517    3.55  42.87    .000
02656>
02657>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02658>
02659> ------------------------------------------------------------------------------
02660> 006:0021-----------------------------------------------------------------------
02661> ---------------------
02662> | CALIB NASHYD      |   Area     (ha)=    5.81   Curve Number   (CN)=93.00
02663> | 01:C-204  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
02664> ---------------------   U.H. Tp(hrs)=    .240
02665>
02666>     Unit Hyd Qpeak  (cms)=     .925
02667>
02668>     PEAK FLOW       (cms)=     .314 (i)
02669>     TIME TO PEAK    (hrs)=    2.100
02670>     RUNOFF VOLUME    (mm)=   72.968
02671>     TOTAL RAINFALL   (mm)=   93.696
02672>     RUNOFF COEFFICIENT   =     .779
02673>
02674>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02675>
02676> ------------------------------------------------------------------------------
02677> 006:0022-----------------------------------------------------------------------
02678> ---------------------
02679> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02680> |  IN>01:(C-204 )   |
02681> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
02682> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02683>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02684>                             .000  .0000E+00    |    1.000  .2444E+00
02685>                             .000  .2289E+00    |    3.000  .2604E+00
02686>
02687>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02688>     ---------------------       (ha)     (cms)     (hrs)       (mm)
02689>     INFLOW >01: (C-204 )       5.81      .314     2.100     72.968
02690>     OUTFLOW<02: (SWM4  )       5.81      .222     4.033     33.571
02691>    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
02692>
02693>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02694>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02695>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02696>
02697>
02698>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   70.864
02699>                    TIME SHIFT OF PEAK FLOW          (min)=   116.00
02700>                    MAXIMUM  STORAGE   USED       (ha.m.)=.2323E+00
02701>
02702>       *** WARNING: Outflow volume is less than inflow volume.
02703> ------------------------------------------------------------------------------
02704> 006:0023-----------------------------------------------------------------------
02705> ------------------------------------------------------------------------------
02706> 006:0002-----------------------------------------------------------------------
02707> ------------------------------------------------------------------------------
02708> 006:0002-----------------------------------------------------------------------
02709> ------------------------------------------------------------------------------
02710> 006:0002-----------------------------------------------------------------------
02711> ------------------------------------------------------------------------------
02712> 006:0002-----------------------------------------------------------------------
02713> ------------------------------------------------------------------------------
02714> 006:0002-----------------------------------------------------------------------
02715>   ** END OF RUN :   6
02716>
02717> ******************************************************************************
02718>
02719>
02720>
02721>
02722>
02723> --------------------
02724> | START            |  Project  dir.: C:\TREVOR-1\$13356-1\AMCIII\
02725> --------------------  Rainfall dir.: C:\TREVOR-1\$13356-1\AMCIII\
02726>     TZERO =   .00 hrs on        0
02727>     METOUT=   2 (output = METRIC)
02728>     NRUN  = 007
02729>     NSTORM=   1
02730>               #  1=25mm.4hr
02731> ------------------------------------------------------------------------------
02732> 007:0002-----------------------------------------------------------------------
02733> *#*****************************************************************************
02734> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
02735> *#  Date        : 2017/11/24
02736> *#  Modeller    : [C. Fischer]
02737> *#  Company     : Stantec Consulting Ltd. (Waterloo)
02738> *#  License #   : 4730904
02739> *#*****************************************************************************
02740> *#
02741> *#                     Block C - CONSTRUCTION CONDITIONS
02742> *#
02743> *#*****************************************************************************
02744> ------------------------------------------------------------------------------
02745> 007:0002-----------------------------------------------------------------------
02746> --------------------
02747> | READ STORM       |    Filename: 25 mm, 4hr Chicago Storm
02748> | Ptotal=  25.00 mm|    Comments: 25 mm, 4hr Chicago Storm
02749> --------------------
02750>               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
02751>               hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
02752>               .08   1.465 |  1.08   4.024 |  2.08   5.764 |  3.08   2.074
02753>               .17   1.540 |  1.17   4.814 |  2.17   4.969 |  3.17   1.977
02754>               .25   1.625 |  1.25   6.025 |  2.25   4.374 |  3.25   1.889
02755>               .33   1.720 |  1.33   8.114 |  2.33   3.913 |  3.33   1.810
02756>               .42   1.829 |  1.42  12.526 |  2.42   3.545 |  3.42   1.737
02757>               .50   1.955 |  1.50  27.198 |  2.50   3.245 |  3.50   1.671
02758>               .58   2.101 |  1.58  74.855 |  2.58   2.994 |  3.58   1.610
02759>               .67   2.274 |  1.67  31.410 |  2.67   2.782 |  3.67   1.553
02760>               .75   2.482 |  1.75  16.819 |  2.75   2.601 |  3.75   1.501
02761>               .83   2.736 |  1.83  11.357 |  2.83   2.443 |  3.83   1.453
02762>               .92   3.055 |  1.92   8.563 |  2.92   2.305 |  3.92   1.408
02763>              1.00   3.468 |  2.00   6.882 |  3.00   2.183 |  4.00   1.366
02764>
02765> ------------------------------------------------------------------------------
02766> 007:0003-----------------------------------------------------------------------
02767> *#*****************************************************************************
02768> *#
02769> *#                              AMC III Conditions
02770> *#
02771> *#*****************************************************************************
02772> ---------------------
02773> | CALIB NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=90.00
02774> | 01:C-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
02775> ---------------------   U.H. Tp(hrs)=    .250
02776>
02777>     Unit Hyd Qpeak  (cms)=     .698
02778>
02779>     PEAK FLOW       (cms)=     .107 (i)
02780>     TIME TO PEAK    (hrs)=    1.917
02781>     RUNOFF VOLUME    (mm)=    8.295
02782>     TOTAL RAINFALL   (mm)=   25.000
02783>     RUNOFF COEFFICIENT   =     .332
02784>
02785>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02786>
02787> ------------------------------------------------------------------------------
02788> 007:0004-----------------------------------------------------------------------
02789> ---------------------
02790> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02791> |  IN>01:(C-200 )   |
02792> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
02793> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02794>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
```

```
                              .000  .0000E+00   |    2.000  .1546E+00
                              .000  .1448E+00   |    5.000  .1647E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-200 )       4.57      .107     1.917      8.295
     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=  -115.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.3791E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
007:0005--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=79.00
| 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .009 (i)
     TIME TO PEAK    (hrs)=    2.000
     RUNOFF VOLUME    (mm)=    6.067
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .243

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

--------------------------------------------------------------------------------
007:0006--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    8.38   Curve Number   (CN)=88.00
| 02:C-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .320

     Unit Hyd Qpeak  (cms)=    1.000

     PEAK FLOW       (cms)=     .146 (i)
     TIME TO PEAK    (hrs)=    2.017
     RUNOFF VOLUME    (mm)=    7.321
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .293

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

--------------------------------------------------------------------------------
007:0007--------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>02:(C-201 )    |
| OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |    2.000  .2309E+00
                             .000  .2162E+00    |    5.000  .2460E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (C-201 )       8.38      .146     2.017      7.321
     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=  -121.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6135E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
007:0008--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=79.00
| 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .560

     Unit Hyd Qpeak  (cms)=     .981

     PEAK FLOW       (cms)=     .147 (i)
     TIME TO PEAK    (hrs)=    2.300
     RUNOFF VOLUME    (mm)=    6.068
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .243

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

--------------------------------------------------------------------------------
007:0009--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    3.19   Curve Number   (CN)=88.00
| 05:C-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .530

     PEAK FLOW       (cms)=     .068 (i)
     TIME TO PEAK    (hrs)=    1.883
     RUNOFF VOLUME    (mm)=    7.321
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .293

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

--------------------------------------------------------------------------------
007:0010--------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>05:(C-202 )    |
| OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |     .000  .5990E-01
                             .000  .5600E-01    |    1.000  .6400E-01

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (C-202 )       3.19      .068     1.883      7.321
     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=  -113.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2335E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
007:0011--------------------------------------------------------------------------
----------------------
| ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 04:EXC-2       14.38     .147    2.30   6.07    .000
                       +ID2 06:SWM2A        3.19     .000     .00    .00    .000
                        ==========================================================
                        SUM 07:CTR1A       17.57     .147    2.30   4.97    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0012--------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>07:(CTR1A )    |
| OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |     .000  .1618E+00
                             .000  .1260E-01    |     .862  .2671E+00
                             .000  .4270E-01    |    2.728  .4058E+00
                             .000  .8980E-01    |    4.016  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >07: (CTR1A )       17.57      .147     2.300      4.966
     OUTFLOW<08: (SWM2B )       17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=  -138.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.8725E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
007:0013--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=     .00   Curve Number   (CN)= 1.00
| 09:BLANK  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .000

     PEAK FLOW       (cms)=     .000 (i)
     TIME TO PEAK    (hrs)=    2.250
     RUNOFF VOLUME    (mm)=     .020
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .001

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

--------------------------------------------------------------------------------
007:0014--------------------------------------------------------------------------
----------------------
| ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 08:SWM2B       17.57     .000     .00    .00    .000
                       +ID2 09:BLANK         .00     .000    2.25    .02    .000
                        ==========================================================
                        SUM 04:SB&BLK      17.57     .000    2.25    .00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0015--------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(SB&BLK)    |
| OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |     .500  .1004E+00
                             .000  .9410E-01    |    1.300  .1070E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (SB&BLK)       17.57      .000     2.250      .000
     OUTFLOW<09: (SWM2C )       17.57      .000      .000      .000
    OVERFLOW<10: (OSWM2C)        .00      .000      .000      .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=  -135.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1968E-09

--------------------------------------------------------------------------------
007:0016--------------------------------------------------------------------------
----------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 01:CTR1          .65     .009    2.00   6.07    .000
                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
                        ==========================================================
                        SUM 01:CTR1        26.60     .009    2.00    .15    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0017--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    8.99   Curve Number   (CN)=92.00
```

```
| 01:C-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=    1.272

     PEAK FLOW       (cms)=     .235 (i)
     TIME TO PEAK    (hrs)=    1.933
     RUNOFF VOLUME    (mm)=    9.504
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .380

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

007:0018-------------------------------------------------------------------------
 ---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-203 )   |
| OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)  |    (cms)    (ha.m.)
                            .000  .0000E+00   |    3.000  .3271E+00
                            .000  .3063E+00   |    9.000  .3485E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-203 )       8.99      .235     1.933      9.504
     OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000

                   TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
                   CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                   PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                   TIME SHIFT OF PEAK FLOW         (min)=  -116.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.8544E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
007:0019-------------------------------------------------------------------------
 ---------------------
| DESIGN NASHYD     |   Area    (ha)=    5.15   Curve Number   (CN)=79.00
| 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .067 (i)
     TIME TO PEAK    (hrs)=    2.067
     RUNOFF VOLUME    (mm)=    6.068
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .243

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

------------------------------------------------------------------------------
007:0020-------------------------------------------------------------------------
 ----------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:SWM3          8.99     .000     .00    .00    .000
                      +ID2 03:EXC-3         5.15     .067    2.07   6.07    .000
                       ==========================================================
                       SUM 01:CTR2          14.14     .067    2.07   2.21    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0021-------------------------------------------------------------------------
 ---------------------
| CALIB NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=93.00
| 01:C-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .240

     Unit Hyd Qpeak  (cms)=     .925

     PEAK FLOW       (cms)=     .178 (i)
     TIME TO PEAK    (hrs)=    1.883
     RUNOFF VOLUME    (mm)=   10.226
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .409

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

------------------------------------------------------------------------------
007:0022-------------------------------------------------------------------------
 ---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-204 )   |
| OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)  |    (cms)    (ha.m.)
                            .000  .0000E+00   |    1.000  .2444E+00
                            .000  .2289E+00   |    3.000  .2604E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-204 )       5.81      .178     1.883     10.226
     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000

                   TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
                   CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                   PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                   TIME SHIFT OF PEAK FLOW         (min)=  -113.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.5941E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
007:0023-------------------------------------------------------------------------
------------------------------------------------------------------------------
007:0002-------------------------------------------------------------------------
------------------------------------------------------------------------------
007:0002-------------------------------------------------------------------------
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007:0002-------------------------------------------------------------------------
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007:0002-------------------------------------------------------------------------
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007:0002-------------------------------------------------------------------------
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007:0002-------------------------------------------------------------------------
------------------------------------------------------------------------------
007:0002-------------------------------------------------------------------------

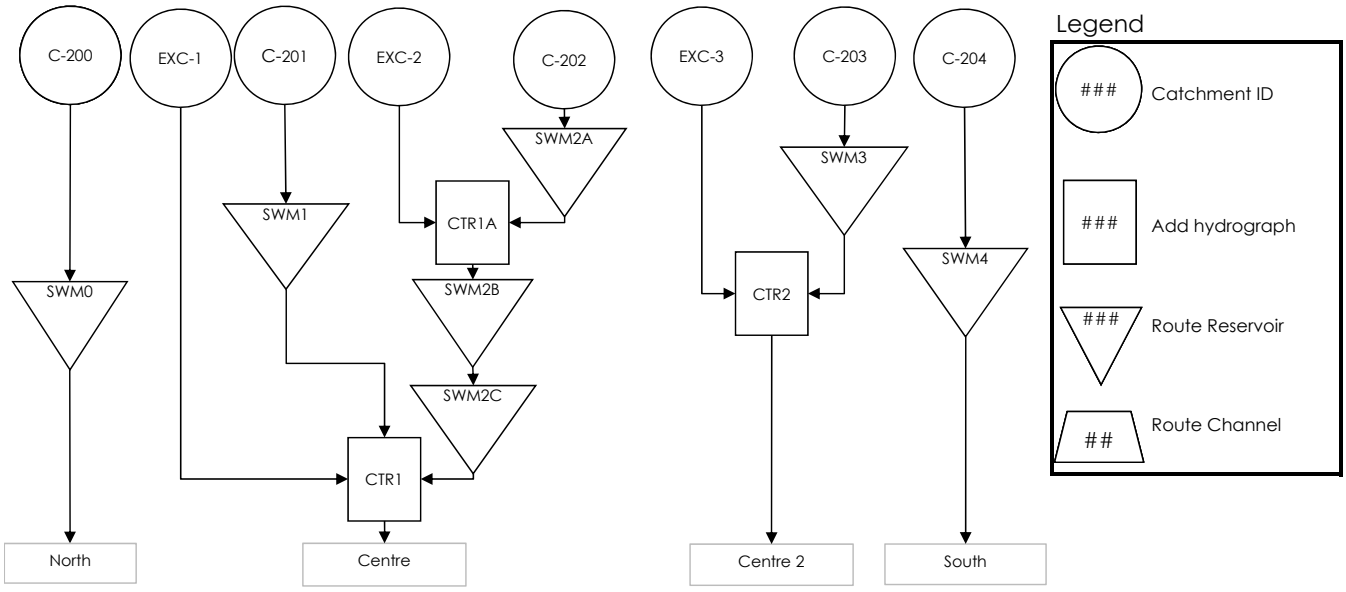
      FINISH
-------------------------------------------------------------------------------
*******************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0015 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0015 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0015 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0015 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
   Simulation ended on 2017-12-21     at 14:51:23
*******************************************************************************

```

APPENDIX D – PROPOSED CONDITIONS

SWMHYMO Schematic – Proposed Conditions
NRCS (SCS) Curve Number Determination – Proposed Conditions
Proposed Conditions SWMHYMO Output – AMC II
Proposed Conditions SWMHYMO Output – AMC III

Subject: **Proposed Schematic**
Project: **Loyalist Solar Project**
Project No.: **1335-60220**
Client: **Loyalist Solar LP**
Date: **January 12, 2018**



V:\01614\active\133560220\design\analysis\SWM\Block C\[20171212_133560220_BlockC_PondDesignV4.xlsx]Interim Schematic

Subject: **NRCS (SCS) Curve Number Determination - Proposed Conditions**
Project: **Loyalist Solar Project**
Site: **Block C**
Project No.: **1335-60220**
Client: **Loyalist Solar LP**
Date: **January 16, 2018**

TABLE OF CURVE NUMBERS (CN's)									Source
Land Use		Hydrologic Soil Type							
		A	AB	B	BC	C	CD	D	
Meadow	"Good"	30	44	58	65	71	75	78	USDA
Woodlot	"Fair"	36	48	60	67	73	76	79	USDA
Lawns	"Good"	39	50	61	68	74	77	80	USDA
Pasture/Range	"Fair"	49	55	60	70	79	82	84	USDA
Crop - SR + CR	"Good"	64	70	75	79	82	84	85	USDA
Gravel		76	81	85	87	89	90	91	USDA
Scarified Soil		69	74	78	81	83	85	87	USDA
Wetland/Lake		100	100	100	100	100	100	100	USDA
Impervious		98	98	98	98	98	98	98	USDA

USDA - United States Department of Agriculture (2004), National Engineering Handbook, Part 630 Hydrology, Chapter 9 Hydrologic Soil Cover Compexes

Scarified Soil CNs based on contour plowing & crop residue in poor hydrologic condition

HYDROLOGIC SOIL TYPE (%) - Proposed Conditions								
	Hydrologic Soil Type							
Catchment	A	AB	B	BC	C	CD	D	TOTAL
C-200		85					15	100
C-201		100						100
C-202		100						100
C-203			85				15	100
C-204			50				50	100
EX C-1			90				10	100
EX C-2			90				10	100
EX C-3			90				10	100

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Bare Soil	Wetland	Impervious	Total
C-200			94						6	100
C-201			97						3	100
C-202			95						5	100
C-203			96						4	100
C-204			96						4	100
EX C-1		15	85							100
EX C-2		15	85							100
EX C-3		15	85							100

CURVE NUMBER (CN) - Proposed Conditions											
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Bare Soil	Wetland/ Lakes	Impervious	Weighted CN (AMC II)	Weighted CN (AMC III)
C-200			51						6	57	75
C-201			49						3	51	70
C-202			48						5	52	71
C-203			61						4	66	82
C-204			68						4	71	86
EX C-1		9	53							63	80
EX C-2		9	53							63	80
EX C-3		9	53							63	80

Notes: AMC II assumed - AMC III Conversion Per Soil Conservation Service Curve Number (SCS-CN) Methodology (Mishra, Surendra Hydrological Soil Groups based on guidance presented in National Engineering Handbook

V:\01614\active\1335602220\design\analysis\SWM\Block C\20180111 - Revisions\[SWMHYMO_parameters_133560220_BlockC_v3.xlsx]CN Number - Prop

```
00001> ================================================================================
00002>
00003>    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
00004>    S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
00006>        S  W W  M   M  M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
00007>    SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9    =========
00008>                                                          9   9  9   9   # 4730904
00009>          StormWater Management HYdrologic Model           999    999    =========
00010>
00011> ********************************************************************************
00012> ****************************** SWMHYMO Ver/4.05  *******************************
00013> *********  A single event and continuous hydrologic simulation model  *********
00014> *********     based on the principles of HYMO and its successors      *********
00015> *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
00016> ********************************************************************************
00017> ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
00018> *********                  Ottawa,  Ontario: (613) 836-3884            *********
00019> *********                  Gatineau, Quebec: (819) 243-6858            *********
00020> *********                  E-Mail: swmhymo@jfsa.com                    *********
00021> ********************************************************************************
00022>
00023> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024> +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
00025> +++++++++                  Kitchener            SERIAL#:4730904      +++++++++
00026> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028> ********************************************************************************
00029> **********            ++++++ PROGRAM ARRAY DIMENSIONS ++++++              **********
00030> **********            Maximum value for ID numbers  :     10             **********
00031> **********            Max. number of rainfall points: 105408             **********
00032> **********            Max. number of flow points    : 105408             **********
00033> ********************************************************************************
00034>
00035>
00036> **********************   D E T A I L E D   O U T P U T   **********************
00037> ********************************************************************************
00038> *         DATE: 2018-01-12     TIME: 11:31:43     RUN COUNTER: 001844          *
00039> ********************************************************************************
00040> * Input   filename: C:\TREVOR-1\$13356-1\AMCII\CPR-1.dat                        *
00041> * Output  filename: C:\TREVOR-1\$13356-1\AMCII\CPR-1.out                        *
00042> * Summary filename: C:\TREVOR-1\$13356-1\AMCII\CPR-1.sum                        *
00043> * User comments:                                                               *
00044> * 1:_____________________________________________________________________________*
00045> * 2:_____________________________________________________________________________*
00046> * 3:_____________________________________________________________________________*
00047> ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001--------------------------------------------------------------------------
00051> *#*****************************************************************************
00052> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00053> *#  Date        : 2017/11/24
00054> *#  Modeller    : [C. Fischer]
00055> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00056> *#  License #   : 4730904
00057> *#*****************************************************************************
00058> *#
00059> *#                       Block C - PROPOSED CONDITIONS
00060> *#
00061> *#*****************************************************************************
00062> ---------------------
00063> | START             |  Project  dir.: C:\TREVOR-1\$13356-1\AMCII\
00064> ---------------------  Rainfall dir.: C:\TREVOR-1\$13356-1\AMCII\
00065>     TZERO =   .00 hrs on      0
00066>     METOUT=   2 (output = METRIC)
00067>     NRUN  = 001
00068>     NSTORM=   1
00069>               #  1=LYA2.1hr
00070> --------------------------------------------------------------------------------
00071> 001:0002--------------------------------------------------------------------------
00072> ---------------------
00073> | READ STORM        |    Filename: Belleville IDF (1-hr 30% AES - 2 Year)
00074> | Ptotal=  22.10 mm |    Comments: Belleville IDF (1-hr 30% AES - 2 Year)
00075> ---------------------
00076>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>               .08  23.868 |    .33  29.172 |    .58  26.520 |    .83   7.956
00079>               .17  37.128 |    .42  34.476 |    .67  13.260 |    .92   2.652
00080>               .25  55.692 |    .50  23.868 |    .75  10.608 |   1.00    .000
00081>
00082> --------------------------------------------------------------------------------
00083> 001:0003--------------------------------------------------------------------------
00084> *#*****************************************************************************
00085> *#
00086> *#                                AMC II Conditions
00087> *#
00088> *#*****************************************************************************
00089> ----------------------
00090> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=57.00
00091> | 01:C-200  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00092> ----------------------   U.H. Tp(hrs)=    .270
00093>
00094>     Unit Hyd Qpeak  (cms)=     .646
00095>
00096>     PEAK FLOW       (cms)=     .035 (i)
00097>     TIME TO PEAK    (hrs)=     .783
00098>     RUNOFF VOLUME    (mm)=    2.000
00099>     TOTAL RAINFALL   (mm)=   22.100
00100>     RUNOFF COEFFICIENT   =     .090
00101>
00102>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00103>
00104> --------------------------------------------------------------------------------
00105> 001:0004--------------------------------------------------------------------------
00106> ---------------------
00107> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00108> |  IN>01:(C-200 )   |
00109> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
00110> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00111>                           (cms)     (ha.m.)  |    (cms)    (ha.m.)
00112>                           .000  .0000E+00    |    2.000  .1372E+00
00113>                           .000  .1285E+00    |    5.000  .1462E+00
00114>
00115>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00116>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00117>     INFLOW >01: (C-200 )       4.57      .035      .783      2.000
00118>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
00119>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
00120>
00121>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00122>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00123>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00124>
00125>
00126>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00127>                    TIME SHIFT OF PEAK FLOW         (min)=   -47.00
00128>                    MAXIMUM  STORAGE   USED       (ha.m.)=.9138E-02
00129>
00130>      *** WARNING: Outflow volume is less than inflow volume.
00131> --------------------------------------------------------------------------------
00132> 001:0005--------------------------------------------------------------------------
00133> ---------------------
00134> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=63.00
00135> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00136> ---------------------   U.H. Tp(hrs)=    .340
00137>
00138>     Unit Hyd Qpeak  (cms)=     .073
00139>
00140>     PEAK FLOW       (cms)=     .005 (i)
00141>     TIME TO PEAK    (hrs)=     .867
00142>     RUNOFF VOLUME    (mm)=    2.499
00143>     TOTAL RAINFALL   (mm)=   22.100
00144>     RUNOFF COEFFICIENT   =     .113
00145>
00146>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00147>
00148> --------------------------------------------------------------------------------
00149> 001:0006--------------------------------------------------------------------------
00150> ---------------------
00151> | DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number   (CN)=51.00
00152> | 02:C-201  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00153> ---------------------   U.H. Tp(hrs)=    .350
00154>
00155>     Unit Hyd Qpeak  (cms)=     .914
00156>
00157>     PEAK FLOW       (cms)=     .045 (i)
00158>     TIME TO PEAK    (hrs)=     .867
00159>     RUNOFF VOLUME    (mm)=    1.604
00160>     TOTAL RAINFALL   (mm)=   22.100
00161>     RUNOFF COEFFICIENT   =     .073
00162>
00163>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00164>
00165> --------------------------------------------------------------------------------
00166> 001:0007--------------------------------------------------------------------------
00167> ---------------------
00168> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00169> |  IN>02:(C-201 )   |
00170> | OUT<03:(SWM1  )   |    =========  OUTLFOW STORAGE TABLE  =========
00171> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00172>                           (cms)     (ha.m.)  |    (cms)    (ha.m.)
00173>                           .000  .0000E+00    |    1.000  .1918E+00
00174>                           .000  .1796E+00    |    4.000  .2044E+00
00175>
00176>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00177>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00178>     INFLOW >02: (C-201 )       8.38      .045      .867      1.604
00179>     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
00180>    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
00181>
00182>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00183>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00184>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00185>
00186>
00187>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00188>                    TIME SHIFT OF PEAK FLOW         (min)=   -52.00
00189>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1344E-01
00190>
00191>      *** WARNING: Outflow volume is less than inflow volume.
00192> --------------------------------------------------------------------------------
00193> 001:0008--------------------------------------------------------------------------
00194> ---------------------
00195> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=63.00
00196> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00197> ---------------------   U.H. Tp(hrs)=    .560
00198>
00199>     Unit Hyd Qpeak  (cms)=     .981
00200>
00201>     PEAK FLOW       (cms)=     .087 (i)
00202>     TIME TO PEAK    (hrs)=    1.067
00203>     RUNOFF VOLUME    (mm)=    2.500
00204>     TOTAL RAINFALL   (mm)=   22.100
00205>     RUNOFF COEFFICIENT   =     .113
00206>
00207>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00208>
00209> --------------------------------------------------------------------------------
00210> 001:0009--------------------------------------------------------------------------
00211> ---------------------
00212> | DESIGN NASHYD      |   Area     (ha)=    3.19   Curve Number   (CN)=52.00
00213> | 05:C-202  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00214> ---------------------   U.H. Tp(hrs)=    .260
00215>
00216>     Unit Hyd Qpeak  (cms)=     .469
00217>
00218>     PEAK FLOW       (cms)=     .020 (i)
00219>     TIME TO PEAK    (hrs)=     .767
00220>     RUNOFF VOLUME    (mm)=    1.664
00221>     TOTAL RAINFALL   (mm)=   22.100
00222>     RUNOFF COEFFICIENT   =     .075
00223>
00224>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00225>
00226> --------------------------------------------------------------------------------
00227> 001:0010--------------------------------------------------------------------------
00228> ---------------------
00229> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00230> |  IN>05:(C-202 )   |
00231> | OUT<06:(SWM2A )   |    =========  OUTLFOW STORAGE TABLE  =========
00232> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00233>                           (cms)     (ha.m.)  |    (cms)    (ha.m.)
00234>                           .000  .0000E+00    |    1.000  .6400E-01
00235>                           .000  .5990E-01    |    2.000  .6820E-01
00236>
00237>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00238>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00239>     INFLOW >05: (C-202 )       3.19      .020      .767      1.664
00240>     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
00241>    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
00242>
00243>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00244>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00245>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00246>
00247>
00248>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00249>                    TIME SHIFT OF PEAK FLOW         (min)=   -46.00
00250>                    MAXIMUM  STORAGE   USED       (ha.m.)=.5307E-02
00251>
00252>      *** WARNING: Outflow volume is less than inflow volume.
00253> --------------------------------------------------------------------------------
00254> 001:0011--------------------------------------------------------------------------
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00255> ----------------------
00256> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00257> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00258>                        ID1 04:EXC-2       14.38     .087    1.07   2.50    .000
00259>                       +ID2 06:SWM2A        3.19     .000     .00    .00    .000
00260>                        ============================================================
00261>                        SUM 07:CTR1A       17.57     .087    1.07   2.05    .000
00262>
00263>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00264>
00265> ------------------------------------------------------------------------------
00266> 001:0012-------------------------------------------------------------------------
00267> ----------------------
00268> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00269> |  IN>07:(CTR1A )   |
00270> | OUT<08:(SWM2B )   |    =========  OUTLFOW STORAGE TABLE  =========
00271> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00272>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00273>                              .000  .0000E+00     |     .000  .1618E+00
00274>                              .000  .1260E-01     |     .862  .2671E+00
00275>                              .000  .4270E-01     |    2.728  .4058E+00
00276>                              .000  .8980E-01     |    4.016  .4888E+00
00277>
00278>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00279>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00280>      INFLOW >07: (CTR1A )      17.57      .087     1.067      2.046
00281>      OUTFLOW<08: (SWM2B )      17.57      .000      .000       .000
00282>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
00283>
00284>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00285>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00286>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00287>
00288>
00289>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00290>                     TIME SHIFT OF PEAK FLOW          (min)=   -64.00
00291>                     MAXIMUM  STORAGE   USED        (ha.m.)=.3594E-01
00292>
00293>       *** WARNING: Outflow volume is less than inflow volume.
00294> ------------------------------------------------------------------------------
00295> 001:0013-------------------------------------------------------------------------
00296> ----------------------
00297> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
00298> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00299> ----------------------   U.H. Tp(hrs)=     .500
00300>
00301>      Unit Hyd Qpeak  (cms)=      .000
00302>
00303>      PEAK FLOW       (cms)=      .000 (i)
00304>      TIME TO PEAK    (hrs)=     1.000
00305>      RUNOFF VOLUME    (mm)=      .006
00306>      TOTAL RAINFALL   (mm)=    22.100
00307>      RUNOFF COEFFICIENT   =      .000
00308>
00309>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00310>
00311> ------------------------------------------------------------------------------
00312> 001:0014-------------------------------------------------------------------------
00313> ----------------------
00314> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00315> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00316>                        ID1 08:SWM2B       17.57     .000     .00    .00    .000
00317>                       +ID2 09:BLANK         .00     .000    1.00    .01    .000
00318>                        ============================================================
00319>                        SUM 04:SB&BLK      17.57     .000    1.00    .00    .000
00320>
00321>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00322>
00323> ------------------------------------------------------------------------------
00324> 001:0015-------------------------------------------------------------------------
00325> ----------------------
00326> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00327> |  IN>04:(SB&BLK)   |
00328> | OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
00329> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00330>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00331>                              .000  .0000E+00     |     .500  .1054E+00
00332>                              .000  .9880E-01     |    1.300  .1124E+00
00333>
00334>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00335>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00336>      INFLOW >04: (SB&BLK)      17.57      .000     1.000       .000
00337>      OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
00338>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
00339>
00340>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00341>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00342>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00343>
00344>
00345>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00346>                     TIME SHIFT OF PEAK FLOW          (min)=   -60.00
00347>                     MAXIMUM  STORAGE   USED        (ha.m.)=.6353E-10
00348>
00349> ------------------------------------------------------------------------------
00350> 001:0016-------------------------------------------------------------------------
00351> ----------------------
00352> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00353> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00354>                        ID1 01:CTR1          .65     .005     .87   2.50    .000
00355>                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
00356>                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
00357>                        ============================================================
00358>                        SUM 01:CTR1        26.60     .005     .87    .06    .000
00359>
00360>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00361>
00362> ------------------------------------------------------------------------------
00363> 001:0017-------------------------------------------------------------------------
00364> ----------------------
00365> | DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=66.00
00366> | 01:C-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00367> ----------------------   U.H. Tp(hrs)=     .300
00368>
00369>      Unit Hyd Qpeak  (cms)=     1.145
00370>
00371>      PEAK FLOW       (cms)=      .090 (i)
00372>      TIME TO PEAK    (hrs)=      .817
00373>      RUNOFF VOLUME    (mm)=     2.802
00374>      TOTAL RAINFALL   (mm)=    22.100
00375>      RUNOFF COEFFICIENT   =      .127
00376>
00377>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00378>
00379> ------------------------------------------------------------------------------
00380> 001:0018-------------------------------------------------------------------------
00381> ----------------------
00382> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00383> |  IN>01:(C-203 )   |
00384> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
00385> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00386>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00387>                              .000  .0000E+00     |    3.000  .2660E+00
00388>                              .000  .2491E+00     |    7.000  .2834E+00
00389>
00390>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00391>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00392>      INFLOW >01: (C-203 )       8.99      .090      .817      2.802
00393>      OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
00394>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
00395>
00396>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00397>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00398>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00399>
00400>
00401>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00402>                     TIME SHIFT OF PEAK FLOW          (min)=   -49.00
00403>                     MAXIMUM  STORAGE   USED        (ha.m.)=.2519E-01
00404>
00405>       *** WARNING: Outflow volume is less than inflow volume.
00406> ------------------------------------------------------------------------------
00407> 001:0019-------------------------------------------------------------------------
00408> ----------------------
00409> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=63.00
00410> | 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00411> ----------------------   U.H. Tp(hrs)=     .390
00412>
00413>      Unit Hyd Qpeak  (cms)=      .504
00414>
00415>      PEAK FLOW       (cms)=      .040 (i)
00416>      TIME TO PEAK    (hrs)=      .917
00417>      RUNOFF VOLUME    (mm)=     2.500
00418>      TOTAL RAINFALL   (mm)=    22.100
00419>      RUNOFF COEFFICIENT   =      .113
00420>
00421>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00422>
00423> ------------------------------------------------------------------------------
00424> 001:0020-------------------------------------------------------------------------
00425> ----------------------
00426> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00427> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00428>                        ID1 02:SWM3        8.99      .000     .00    .00    .000
00429>                       +ID2 03:EXC-3       5.15      .040     .92   2.50    .000
00430>                        ============================================================
00431>                        SUM 01:CTR2       14.14      .040     .92    .91    .000
00432>
00433>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00434>
00435> ------------------------------------------------------------------------------
00436> 001:0021-------------------------------------------------------------------------
00437> ----------------------
00438> | DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=71.00
00439> | 01:C-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00440> ----------------------   U.H. Tp(hrs)=     .260
00441>
00442>      Unit Hyd Qpeak  (cms)=      .854
00443>
00444>      PEAK FLOW       (cms)=      .076 (i)
00445>      TIME TO PEAK    (hrs)=      .767
00446>      RUNOFF VOLUME    (mm)=     3.413
00447>      TOTAL RAINFALL   (mm)=    22.100
00448>      RUNOFF COEFFICIENT   =      .154
00449>
00450>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00451>
00452> ------------------------------------------------------------------------------
00453> 001:0022-------------------------------------------------------------------------
00454> ----------------------
00455> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00456> |  IN>01:(C-204 )   |
00457> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
00458> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00459>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00460>                              .000  .0000E+00     |    1.000  .1925E+00
00461>                              .000  .1803E+00     |    2.000  .2051E+00
00462>
00463>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00464>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00465>      INFLOW >01: (C-204 )       5.81      .076      .767      3.413
00466>      OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
00467>     OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
00468>
00469>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00470>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00471>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00472>
00473>
00474>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00475>                     TIME SHIFT OF PEAK FLOW          (min)=   -46.00
00476>                     MAXIMUM  STORAGE   USED        (ha.m.)=.1983E-01
00477>
00478>       *** WARNING: Outflow volume is less than inflow volume.
00479> ------------------------------------------------------------------------------
00480> 001:0023-------------------------------------------------------------------------
00481>   ** END OF RUN :   1
00482>  ************************************************************************
00483>
00484>
00485>
00486>
00487>
00488>
00489> --------------------
00490> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
00491> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
00492>     TZERO =   .00 hrs on        0
00493>     METOUT=   2 (output = METRIC)
00494>     NRUN  = 002
00495>     NSTORM=   1
00496>            #  1=LYA2.12h
00497> ------------------------------------------------------------------------------
00498> 002:0002-------------------------------------------------------------------------
00499> *#*************************************************************************
00500> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00501> *#  Date        : 2017/11/24
00502> *#  Modeller    : [C. Fischer]
00503> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00504> *#  License #   : 4730904
00505> *#*************************************************************************
00506> *#
00507> *#                     Block C - PROPOSED CONDITIONS
00508> *#
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00509> *#*************************************************************************
00510> ---------------------------------------------------------------------------
00511> 002:0002-----------------------------------------------------------------
00512> --------------------
00513> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 2 Year)
00514> | Ptotal=  42.24 mm|    Comments: Belleville IDF (12-hr 30% AES - 2 Year)
00515> --------------------
00516>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00517>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00518>              1.00   3.960 |   4.00   6.600 |   7.00   1.320 |  10.00    .000
00519>              2.00  11.440 |   5.00   6.160 |   8.00    .440 |  11.00    .000
00520>              3.00   8.800 |   6.00   3.520 |   9.00    .000 |  12.00    .000
00521>
00522> ---------------------------------------------------------------------------
00523> 002:0003-----------------------------------------------------------------
00524> *#*************************************************************************
00525> *#
00526> *#                              AMC II Conditions
00527> *#
00528> *#*************************************************************************
00529> ----------------------
00530> | DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=57.00
00531> | 01:C-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00532> ----------------------   U.H. Tp(hrs)=    .270
00533>
00534>      Unit Hyd Qpeak  (cms)=     .646
00535>
00536>      PEAK FLOW       (cms)=     .021 (i)
00537>      TIME TO PEAK    (hrs)=    5.033
00538>      RUNOFF VOLUME    (mm)=    7.143
00539>      TOTAL RAINFALL   (mm)=   42.240
00540>      RUNOFF COEFFICIENT   =     .169
00541>
00542>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00543>
00544> ---------------------------------------------------------------------------
00545> 002:0004-----------------------------------------------------------------
00546> ----------------------
00547> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00548> |  IN>01:(C-200 )    |
00549> | OUT<02:(SWM0  )    |    =========  OUTLFOW STORAGE TABLE  =========
00550> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00551>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00552>                              .000  .0000E+00     |    2.000  .1372E+00
00553>                              .000  .1285E+00     |    5.000  .1462E+00
00554>
00555>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00556>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00557>      INFLOW >01: (C-200 )       4.57      .021     5.033      7.143
00558>      OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
00559>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
00560>
00561>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00562>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00563>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00564>
00565>
00566>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00567>                      TIME SHIFT OF PEAK FLOW          (min)=  -302.00
00568>                      MAXIMUM  STORAGE   USED       (ha.m.)=.3264E-01
00569>
00570>       *** WARNING: Outflow volume is less than inflow volume.
00571> ---------------------------------------------------------------------------
00572> 002:0005-----------------------------------------------------------------
00573> ----------------------
00574> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=63.00
00575> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00576> ----------------------   U.H. Tp(hrs)=    .340
00577>
00578>      Unit Hyd Qpeak  (cms)=     .073
00579>
00580>      PEAK FLOW       (cms)=     .004 (i)
00581>      TIME TO PEAK    (hrs)=    5.050
00582>      RUNOFF VOLUME    (mm)=    8.739
00583>      TOTAL RAINFALL   (mm)=   42.240
00584>      RUNOFF COEFFICIENT   =     .207
00585>
00586>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00587>
00588> ---------------------------------------------------------------------------
00589> 002:0006-----------------------------------------------------------------
00590> ----------------------
00591> | DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=51.00
00592> | 02:C-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00593> ----------------------   U.H. Tp(hrs)=    .350
00594>
00595>      Unit Hyd Qpeak  (cms)=     .914
00596>
00597>      PEAK FLOW       (cms)=     .032 (i)
00598>      TIME TO PEAK    (hrs)=    5.067
00599>      RUNOFF VOLUME    (mm)=    5.828
00600>      TOTAL RAINFALL   (mm)=   42.240
00601>      RUNOFF COEFFICIENT   =     .138
00602>
00603>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00604>
00605> ---------------------------------------------------------------------------
00606> 002:0007-----------------------------------------------------------------
00607> ----------------------
00608> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00609> |  IN>02:(C-201 )    |
00610> | OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
00611> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00612>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00613>                              .000  .0000E+00     |    1.000  .1918E+00
00614>                              .000  .1796E+00     |    4.000  .2044E+00
00615>
00616>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00617>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00618>      INFLOW >02: (C-201 )       8.38      .032     5.067      5.828
00619>      OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
00620>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
00621>
00622>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00623>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00624>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00625>
00626>
00627>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00628>                      TIME SHIFT OF PEAK FLOW          (min)=  -304.00
00629>                      MAXIMUM  STORAGE   USED       (ha.m.)=.4884E-01
00630>
00631>       *** WARNING: Outflow volume is less than inflow volume.
00632> ---------------------------------------------------------------------------
00633> 002:0008-----------------------------------------------------------------
00634> ----------------------
00635> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=63.00
00636> | 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00637> ----------------------   U.H. Tp(hrs)=    .560
00638>
00639>      Unit Hyd Qpeak  (cms)=     .981
00640>
00641>      PEAK FLOW       (cms)=     .078 (i)
00642>      TIME TO PEAK    (hrs)=    5.117
00643>      RUNOFF VOLUME    (mm)=    8.739
00644>      TOTAL RAINFALL   (mm)=   42.240
00645>      RUNOFF COEFFICIENT   =     .207
00646>
00647>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00648>
00649> ---------------------------------------------------------------------------
00650> 002:0009-----------------------------------------------------------------
00651> ----------------------
00652> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=52.00
00653> | 05:C-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00654> ----------------------   U.H. Tp(hrs)=    .260
00655>
00656>      Unit Hyd Qpeak  (cms)=     .469
00657>
00658>      PEAK FLOW       (cms)=     .013 (i)
00659>      TIME TO PEAK    (hrs)=    5.033
00660>      RUNOFF VOLUME    (mm)=    6.031
00661>      TOTAL RAINFALL   (mm)=   42.240
00662>      RUNOFF COEFFICIENT   =     .143
00663>
00664>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00665>
00666> ---------------------------------------------------------------------------
00667> 002:0010-----------------------------------------------------------------
00668> ----------------------
00669> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00670> |  IN>05:(C-202 )    |
00671> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
00672> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00673>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00674>                              .000  .0000E+00     |    1.000  .6400E-01
00675>                              .000  .5990E-01     |    2.000  .6820E-01
00676>
00677>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00678>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00679>      INFLOW >05: (C-202 )       3.19      .013     5.033      6.031
00680>      OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
00681>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
00682>
00683>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00684>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00685>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00686>
00687>
00688>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00689>                      TIME SHIFT OF PEAK FLOW          (min)=  -302.00
00690>                      MAXIMUM  STORAGE   USED       (ha.m.)=.1924E-01
00691>
00692>       *** WARNING: Outflow volume is less than inflow volume.
00693> ---------------------------------------------------------------------------
00694> 002:0011-----------------------------------------------------------------
00695> ----------------------
00696> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00697> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00698>                         ID1 04:EXC-2      14.38     .078    5.12   8.74    .000
00699>                        +ID2 06:SWM2A       3.19     .000     .00    .00    .000
00700>                         ================================================
00701>                         SUM 07:CTR1A      17.57     .078    5.12   7.15    .000
00702>
00703>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00704>
00705> ---------------------------------------------------------------------------
00706> 002:0012-----------------------------------------------------------------
00707> ----------------------
00708> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00709> |  IN>07:(CTR1A )    |
00710> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
00711> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00712>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00713>                              .000  .0000E+00     |     .000  .1618E+00
00714>                              .000  .1260E-01     |     .862  .2671E+00
00715>                              .000  .4270E-01     |    2.728  .4058E+00
00716>                              .000  .8980E-01     |    4.016  .4888E+00
00717>
00718>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00719>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00720>      INFLOW >07: (CTR1A )      17.57      .078     5.117      7.153
00721>      OUTFLOW<08: (SWM2B )      17.57      .000      .000       .000
00722>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
00723>
00724>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00725>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00726>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00727>
00728>
00729>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00730>                      TIME SHIFT OF PEAK FLOW          (min)=  -307.00
00731>                      MAXIMUM  STORAGE   USED       (ha.m.)=.1257E+00
00732>
00733>       *** WARNING: Outflow volume is less than inflow volume.
00734> ---------------------------------------------------------------------------
00735> 002:0013-----------------------------------------------------------------
00736> ----------------------
00737> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
00738> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00739> ----------------------   U.H. Tp(hrs)=    .500
00740>
00741>      Unit Hyd Qpeak  (cms)=     .000
00742>
00743>      PEAK FLOW       (cms)=     .000 (i)
00744>      TIME TO PEAK    (hrs)=    5.133
00745>      RUNOFF VOLUME    (mm)=     .066
00746>      TOTAL RAINFALL   (mm)=   42.240
00747>      RUNOFF COEFFICIENT   =     .002
00748>
00749>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00750>
00751> ---------------------------------------------------------------------------
00752> 002:0014-----------------------------------------------------------------
00753> ----------------------
00754> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00755> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00756>                         ID1 08:SWM2B      17.57     .000     .00    .00    .000
00757>                        +ID2 09:BLANK        .00     .000    5.13    .07    .000
00758>                         ================================================
00759>                         SUM 04:SB&BLK     17.57     .000    5.13    .00    .000
00760>
00761>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00762>
```

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00763> ------------------------------------------------------------------------------
00764> 002:0015------------------------------------------------------------------------
00765> ---------------------
00766> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00767> |  IN>04:(SB&BLK)   |
00768> | OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
00769> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00770>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00771>                             .000  .0000E+00    |     .500  .1054E+00
00772>                             .000  .9880E-01    |    1.300  .1124E+00
00773>
00774>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00775>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00776>     INFLOW >04: (SB&BLK)      17.57      .000     5.133       .000
00777>     OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
00778>    OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
00779>
00780>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00781>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00782>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00783>
00784>
00785>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00786>                    TIME SHIFT OF PEAK FLOW          (min)=  -308.00
00787>                    MAXIMUM  STORAGE   USED       (ha.m.)=.6590E-09
00788>
00789> ------------------------------------------------------------------------------
00790> 002:0016------------------------------------------------------------------------
00791> ----------------------
00792> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00793> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00794>                        ID1 01:CTR1          .65     .004    5.05   8.74    .000
00795>                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
00796>                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
00797>                        ============================================================
00798>                        SUM 01:CTR1         26.60     .004    5.05    .21    .000
00799>
00800>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00801>
00802> ------------------------------------------------------------------------------
00803> 002:0017------------------------------------------------------------------------
00804> ----------------------
00805> | DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=66.00
00806> | 01:C-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00807> ----------------------   U.H. Tp(hrs)=    .300
00808>
00809>     Unit Hyd Qpeak  (cms)=    1.145
00810>
00811>     PEAK FLOW       (cms)=     .056 (i)
00812>     TIME TO PEAK    (hrs)=    5.050
00813>     RUNOFF VOLUME    (mm)=    9.673
00814>     TOTAL RAINFALL   (mm)=   42.240
00815>     RUNOFF COEFFICIENT   =     .229
00816>
00817>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00818>
00819> ------------------------------------------------------------------------------
00820> 002:0018------------------------------------------------------------------------
00821> ----------------------
00822> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00823> |  IN>01:(C-203 )   |
00824> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
00825> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00826>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00827>                             .000  .0000E+00    |    3.000  .2660E+00
00828>                             .000  .2491E+00    |    7.000  .2834E+00
00829>
00830>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00831>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00832>     INFLOW >01: (C-203 )       8.99      .056     5.050      9.673
00833>     OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
00834>    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
00835>
00836>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00837>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00838>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00839>
00840>
00841>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00842>                    TIME SHIFT OF PEAK FLOW          (min)=  -303.00
00843>                    MAXIMUM  STORAGE   USED       (ha.m.)=.8696E-01
00844>
00845>      *** WARNING: Outflow volume is less than inflow volume.
00846> ------------------------------------------------------------------------------
00847> 002:0019------------------------------------------------------------------------
00848> ----------------------
00849> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=63.00
00850> | 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00851> ----------------------   U.H. Tp(hrs)=    .390
00852>
00853>     Unit Hyd Qpeak  (cms)=     .504
00854>
00855>     PEAK FLOW       (cms)=     .029 (i)
00856>     TIME TO PEAK    (hrs)=    5.067
00857>     RUNOFF VOLUME    (mm)=    8.739
00858>     TOTAL RAINFALL   (mm)=   42.240
00859>     RUNOFF COEFFICIENT   =     .207
00860>
00861>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00862>
00863> ------------------------------------------------------------------------------
00864> 002:0020------------------------------------------------------------------------
00865> ------------------------
00866> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00867> ------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00868>                        ID1 02:SWM3          8.99     .000     .00    .00    .000
00869>                       +ID2 03:EXC-3         5.15     .029    5.07   8.74    .000
00870>                        ============================================================
00871>                        SUM 01:CTR2         14.14     .029    5.07   3.18    .000
00872>
00873>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00874>
00875> ------------------------------------------------------------------------------
00876> 002:0021------------------------------------------------------------------------
00877> ----------------------
00878> | DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=71.00
00879> | 01:C-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00880> ----------------------   U.H. Tp(hrs)=    .260
00881>
00882>     Unit Hyd Qpeak  (cms)=     .854
00883>
00884>     PEAK FLOW       (cms)=     .042 (i)
00885>     TIME TO PEAK    (hrs)=    5.033
00886>     RUNOFF VOLUME    (mm)=   11.487
00887>     TOTAL RAINFALL   (mm)=   42.240
00888>     RUNOFF COEFFICIENT   =     .272
00889>
00890>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00891>
00892> ------------------------------------------------------------------------------
00893> 002:0022------------------------------------------------------------------------
00894> ---------------------
00895> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00896> |  IN>01:(C-204 )   |
00897> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
00898> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00899>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00900>                             .000  .0000E+00    |    1.000  .1925E+00
00901>                             .000  .1803E+00    |    2.000  .2051E+00
00902>
00903>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00904>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00905>     INFLOW >01: (C-204 )       5.81      .042     5.033     11.487
00906>     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
00907>    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
00908>
00909>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00910>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00911>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00912>
00913>
00914>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00915>                    TIME SHIFT OF PEAK FLOW          (min)=  -302.00
00916>                    MAXIMUM  STORAGE   USED       (ha.m.)=.6674E-01
00917>
00918>      *** WARNING: Outflow volume is less than inflow volume.
00919> ------------------------------------------------------------------------------
00920> 002:0023------------------------------------------------------------------------
00921> ------------------------------------------------------------------------------
00922> 002:0002------------------------------------------------------------------------
00923>   ** END OF RUN :   2
00924>
00925> ****************************************************************************
00926>
00927>
00928>
00929>
00930>
00931> ---------------------
00932> | START             |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
00933> ---------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
00934>     TZERO =   .00 hrs on        0
00935>     METOUT=   2 (output = METRIC)
00936>     NRUN  = 003
00937>     NSTORM=   1
00938>            #  1=LYA5.1hr
00939> ------------------------------------------------------------------------------
00940> 003:0002------------------------------------------------------------------------
00941> *#************************************************************************
00942> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00943> *#  Date        : 2017/11/24
00944> *#  Modeller    : [C. Fischer]
00945> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00946> *#  License #   : 4730904
00947> *#************************************************************************
00948> *#
00949> *#                     Block C - PROPOSED CONDITIONS
00950> *#
00951> *#************************************************************************
00952> ------------------------------------------------------------------------------
00953> 003:0002------------------------------------------------------------------------
00954> ---------------------
00955> | READ STORM        |    Filename: Belleville IDF (1-hr 30% AES - 5 Year)
00956> | Ptotal=  28.00 mm|    Comments: Belleville IDF (1-hr 30% AES - 5 Year)
00957> ---------------------
00958>                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
00959>                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
00960>                 .08  30.240 |   .33  36.960 |   .58  33.600 |   .83  10.080
00961>                 .17  47.040 |   .42  43.680 |   .67  16.800 |   .92   3.360
00962>                 .25  70.560 |   .50  30.240 |   .75  13.440 |  1.00    .000
00963>
00964> ------------------------------------------------------------------------------
00965> 003:0003------------------------------------------------------------------------
00966> *#************************************************************************
00967> *#
00968> *#                            AMC II Conditions
00969> *#
00970> *#************************************************************************
00971> ----------------------
00972> | DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=57.00
00973> | 01:C-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00974> ----------------------   U.H. Tp(hrs)=    .270
00975>
00976>     Unit Hyd Qpeak  (cms)=     .646
00977>
00978>     PEAK FLOW       (cms)=     .055 (i)
00979>     TIME TO PEAK    (hrs)=     .767
00980>     RUNOFF VOLUME    (mm)=    3.220
00981>     TOTAL RAINFALL   (mm)=   28.000
00982>     RUNOFF COEFFICIENT   =     .115
00983>
00984>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00985>
00986> ------------------------------------------------------------------------------
00987> 003:0004------------------------------------------------------------------------
00988> ---------------------
00989> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00990> |  IN>01:(C-200 )   |
00991> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
00992> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00993>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00994>                             .000  .0000E+00    |    2.000  .1372E+00
00995>                             .000  .1285E+00    |    5.000  .1462E+00
00996>
00997>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00998>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00999>     INFLOW >01: (C-200 )       4.57      .055      .767      3.220
01000>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
01001>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
01002>
01003>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01004>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01005>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01006>
01007>
01008>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01009>                    TIME SHIFT OF PEAK FLOW          (min)=   -46.00
01010>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1471E-01
01011>
01012>      *** WARNING: Outflow volume is less than inflow volume.
01013> ------------------------------------------------------------------------------
01014> 003:0005------------------------------------------------------------------------
01015> ---------------------
01016> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=63.00
```

```
| 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .009 (i)
     TIME TO PEAK    (hrs)=     .850
     RUNOFF VOLUME    (mm)=    3.997
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .143

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

003:0006----------------------------------------------------------------------
----------
| DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number   (CN)=51.00
| 02:C-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .350

     Unit Hyd Qpeak  (cms)=     .914

     PEAK FLOW       (cms)=     .072 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=    2.596
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .093

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

003:0007----------------------------------------------------------------------
----------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>02:(C-201 )    |
| OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
                            .000  .0000E+00     |   1.000  .1918E+00
                            .000  .1796E+00     |   4.000  .2044E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (C-201 )       8.38      .072      .867      2.596
     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -52.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2175E-01

      *** WARNING: Outflow volume is less than inflow volume.

003:0008----------------------------------------------------------------------
----------
| DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=63.00
| 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .560

     Unit Hyd Qpeak  (cms)=     .981

     PEAK FLOW       (cms)=     .138 (i)
     TIME TO PEAK    (hrs)=    1.067
     RUNOFF VOLUME    (mm)=    3.997
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .143

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

003:0009----------------------------------------------------------------------
----------
| DESIGN NASHYD      |   Area     (ha)=    3.19   Curve Number   (CN)=52.00
| 05:C-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .469

     PEAK FLOW       (cms)=     .033 (i)
     TIME TO PEAK    (hrs)=     .767
     RUNOFF VOLUME    (mm)=    2.691
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .096

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

003:0010----------------------------------------------------------------------
----------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>05:(C-202 )    |
| OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
                            .000  .0000E+00     |   1.000  .6400E-01
                            .000  .5990E-01     |   2.000  .6820E-01

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (C-202 )       3.19      .033      .767      2.691
     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -46.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.8584E-02

      *** WARNING: Outflow volume is less than inflow volume.

003:0011----------------------------------------------------------------------
----------
| ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 04:EXC-2       14.38     .138    1.07   4.00    .000
                      +ID2 06:SWM2A        3.19     .000     .00    .00    .000
                       ==========================================================
                       SUM 07:CTR1A       17.57     .138    1.07   3.27    .000


   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

003:0012----------------------------------------------------------------------
----------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>07:(CTR1A )    |
| OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
                            .000  .0000E+00     |    .000  .1618E+00
                            .000  .1260E-01     |    .862  .2671E+00
                            .000  .4270E-01     |   2.728  .4058E+00
                            .000  .8980E-01     |   4.016  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >07: (CTR1A )       17.57      .138     1.067      3.272
     OUTFLOW<08: (SWM2B )       17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2B)         .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -64.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.5748E-01

      *** WARNING: Outflow volume is less than inflow volume.

003:0013----------------------------------------------------------------------
----------
| DESIGN NASHYD      |   Area     (ha)=     .00   Curve Number   (CN)= 1.00
| 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .000

     PEAK FLOW       (cms)=     .000 (i)
     TIME TO PEAK    (hrs)=    1.000
     RUNOFF VOLUME    (mm)=     .011
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .000

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

----------------------------------------------------------------------------
003:0014----------------------------------------------------------------------
----------
| ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 08:SWM2B       17.57     .000     .00    .00    .000
                      +ID2 09:BLANK         .00     .000    1.00    .01    .000
                       ==========================================================
                       SUM 04:SB&BLK      17.57     .000    1.00    .00    .000


   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

003:0015----------------------------------------------------------------------
----------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(SB&BLK)    |
| OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
                            .000  .0000E+00     |    .500  .1054E+00
                            .000  .9880E-01     |   1.300  .1124E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (SB&BLK)       17.57      .000     1.000      .000
     OUTFLOW<09: (SWM2C )       17.57      .000      .000      .000
    OVERFLOW<10: (OSWM2C)         .00      .000      .000      .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -60.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1060E-09

003:0016----------------------------------------------------------------------
----------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:CTR1          .65     .009     .85   4.00    .000
                      +ID2 03:SWM1         8.38     .000     .00    .00    .000
                      +ID3 09:SWM2C       17.57     .000     .00    .00    .000
                       ==========================================================
                       SUM 01:CTR1        26.60     .009     .85    .10    .000


   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

003:0017----------------------------------------------------------------------
----------
| DESIGN NASHYD      |   Area     (ha)=    8.99   Curve Number   (CN)=66.00
| 01:C-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .300

     Unit Hyd Qpeak  (cms)=    1.145

     PEAK FLOW       (cms)=     .144 (i)
     TIME TO PEAK    (hrs)=     .800
     RUNOFF VOLUME    (mm)=    4.463
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .159

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

003:0018----------------------------------------------------------------------
----------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(C-203 )    |
| OUT<02:(SWM3  )    |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
                            .000  .0000E+00     |   3.000  .2660E+00
                            .000  .2491E+00     |   7.000  .2834E+00
```

```
01271>
01272>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01273>      --------------------       (ha)     (cms)     (hrs)       (mm)
01274>      INFLOW >01: (C-203 )       8.99      .144      .800      4.463
01275>      OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
01276>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
01277>
01278>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01279>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01280>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01281>
01282>
01283>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01284>                     TIME SHIFT OF PEAK FLOW          (min)=   -48.00
01285>                     MAXIMUM  STORAGE   USED       (ha.m.)=.4012E-01
01286>
01287>       *** WARNING: Outflow volume is less than inflow volume.
01288> ----------------------------------------------------------------------------
01289> 003:0019----------------------------------------------------------------------
01290> ----------------------
01291> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=63.00
01292> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01293> ----------------------   U.H. Tp(hrs)=    .390
01294>
01295>      Unit Hyd Qpeak  (cms)=     .504
01296>
01297>      PEAK FLOW       (cms)=     .064 (i)
01298>      TIME TO PEAK    (hrs)=     .900
01299>      RUNOFF VOLUME    (mm)=    3.997
01300>      TOTAL RAINFALL   (mm)=   28.000
01301>      RUNOFF COEFFICIENT   =     .143
01302>
01303>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01304>
01305> ----------------------------------------------------------------------------
01306> 003:0020----------------------------------------------------------------------
01307> ------------------------
01308> | ADD HYD (CTR2      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
01309> ------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
01310>                        ID1 02:SWM3           8.99     .000     .00    .00     .000
01311>                       +ID2 03:EXC-3          5.15     .064     .90   4.00     .000
01312>                        ========================================================
01313>                        SUM 01:CTR2           14.14     .064     .90   1.46     .000
01314>
01315>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01316>
01317> ----------------------------------------------------------------------------
01318> 003:0021----------------------------------------------------------------------
01319> ----------------------
01320> | DESIGN NASHYD      |   Area     (ha)=    5.81   Curve Number   (CN)=71.00
01321> | 01:C-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01322> ----------------------   U.H. Tp(hrs)=    .260
01323>
01324>      Unit Hyd Qpeak  (cms)=     .854
01325>
01326>      PEAK FLOW       (cms)=     .120 (i)
01327>      TIME TO PEAK    (hrs)=     .750
01328>      RUNOFF VOLUME    (mm)=    5.392
01329>      TOTAL RAINFALL   (mm)=   28.000
01330>      RUNOFF COEFFICIENT   =     .193
01331>
01332>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01333>
01334> ----------------------------------------------------------------------------
01335> 003:0022----------------------------------------------------------------------
01336> ----------------------
01337> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01338> |  IN>01:(C-204 )    |
01339> | OUT<02:(SWM4  )    |    =========  OUTLFOW STORAGE TABLE  =========
01340> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01341>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
01342>                              .000  .0000E+00     |   1.000  .1925E+00
01343>                              .000  .1803E+00     |   2.000  .2051E+00
01344>
01345>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01346>      --------------------       (ha)     (cms)     (hrs)       (mm)
01347>      INFLOW >01: (C-204 )       5.81      .120      .750      5.392
01348>      OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
01349>     OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
01350>
01351>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01352>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01353>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01354>
01355>
01356>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01357>                     TIME SHIFT OF PEAK FLOW          (min)=   -45.00
01358>                     MAXIMUM  STORAGE   USED       (ha.m.)=.3133E-01
01359>
01360>       *** WARNING: Outflow volume is less than inflow volume.
01361> ----------------------------------------------------------------------------
01362> 003:0023----------------------------------------------------------------------
01363> ----------------------------------------------------------------------------
01364> 003:0002----------------------------------------------------------------------
01365> ----------------------------------------------------------------------------
01366> 003:0002----------------------------------------------------------------------
01367>   ** END OF RUN :   3
01368>
01369> ****************************************************************************
01370>
01371>
01372>
01373>
01374>
01375> --------------------
01376> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
01377> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
01378>     TZERO =   .00 hrs on        0
01379>     METOUT=   2 (output = METRIC)
01380>     NRUN  = 004
01381>     NSTORM=   1
01382>            #  1=LYA5.12h
01383> ----------------------------------------------------------------------------
01384> 004:0002----------------------------------------------------------------------
01385> *#****************************************************************************
01386> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
01387> *#  Date        : 2017/11/24
01388> *#  Modeller    : [C. Fischer]
01389> *#  Company     : Stantec Consulting Ltd. (Waterloo)
01390> *#  License #   : 4730904
01391> *#****************************************************************************
01392> *#
01393> *#                      Block C - PROPOSED CONDITIONS
01394> *#
01395> *#****************************************************************************
01396> ----------------------------------------------------------------------------
01397> 004:0002----------------------------------------------------------------------
01398> --------------------
01399> | READ STORM        |    Filename: Belleville IDF (12-hr 30% AES - 5 Year)
01400> | Ptotal=  55.97 mm|    Comments: Belleville IDF (12-hr 30% AES - 5 Year)
01401> --------------------
01402>               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
01403>                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
01404>               1.00   5.247 |  4.00   8.745 |  7.00   1.749 | 10.00    .000
01405>               2.00  15.158 |  5.00   8.162 |  8.00    .583 | 11.00    .000
01406>               3.00  11.660 |  6.00   4.664 |  9.00    .000 | 12.00    .000
01407>
01408> ----------------------------------------------------------------------------
01409> 004:0003----------------------------------------------------------------------
01410> *#****************************************************************************
01411> *#
01412> *#                            AMC II Conditions
01413> *#
01414> *#****************************************************************************
01415> --------------------
01416> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=57.00
01417> | 01:C-200  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01418> ----------------------   U.H. Tp(hrs)=    .270
01419>
01420>      Unit Hyd Qpeak  (cms)=     .646
01421>
01422>      PEAK FLOW       (cms)=     .035 (i)
01423>      TIME TO PEAK    (hrs)=    5.033
01424>      RUNOFF VOLUME    (mm)=   12.056
01425>      TOTAL RAINFALL   (mm)=   55.968
01426>      RUNOFF COEFFICIENT   =     .215
01427>
01428>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01429>
01430> ----------------------------------------------------------------------------
01431> 004:0004----------------------------------------------------------------------
01432> ----------------------
01433> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01434> |  IN>01:(C-200 )    |
01435> | OUT<02:(SWM0  )    |    =========  OUTLFOW STORAGE TABLE  =========
01436> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01437>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
01438>                              .000  .0000E+00     |   2.000  .1372E+00
01439>                              .000  .1285E+00     |   5.000  .1462E+00
01440>
01441>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01442>      --------------------       (ha)     (cms)     (hrs)       (mm)
01443>      INFLOW >01: (C-200 )       4.57      .035     5.033     12.056
01444>      OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
01445>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
01446>
01447>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01448>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01449>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01450>
01451>
01452>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01453>                     TIME SHIFT OF PEAK FLOW          (min)=  -302.00
01454>                     MAXIMUM  STORAGE   USED       (ha.m.)=.5510E-01
01455>
01456>       *** WARNING: Outflow volume is less than inflow volume.
01457> ----------------------------------------------------------------------------
01458> 004:0005----------------------------------------------------------------------
01459> ----------------------
01460> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=63.00
01461> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01462> ----------------------   U.H. Tp(hrs)=    .340
01463>
01464>      Unit Hyd Qpeak  (cms)=     .073
01465>
01466>      PEAK FLOW       (cms)=     .006 (i)
01467>      TIME TO PEAK    (hrs)=    5.050
01468>      RUNOFF VOLUME    (mm)=   14.569
01469>      TOTAL RAINFALL   (mm)=   55.968
01470>      RUNOFF COEFFICIENT   =     .260
01471>
01472>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01473>
01474> ----------------------------------------------------------------------------
01475> 004:0006----------------------------------------------------------------------
01476> ----------------------
01477> | DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number   (CN)=51.00
01478> | 02:C-201  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01479> ----------------------   U.H. Tp(hrs)=    .350
01480>
01481>      Unit Hyd Qpeak  (cms)=     .914
01482>
01483>      PEAK FLOW       (cms)=     .053 (i)
01484>      TIME TO PEAK    (hrs)=    5.067
01485>      RUNOFF VOLUME    (mm)=    9.939
01486>      TOTAL RAINFALL   (mm)=   55.968
01487>      RUNOFF COEFFICIENT   =     .178
01488>
01489>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01490>
01491> ----------------------------------------------------------------------------
01492> 004:0007----------------------------------------------------------------------
01493> ----------------------
01494> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01495> |  IN>02:(C-201 )    |
01496> | OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
01497> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01498>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
01499>                              .000  .0000E+00     |   1.000  .1918E+00
01500>                              .000  .1796E+00     |   4.000  .2044E+00
01501>
01502>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01503>      --------------------       (ha)     (cms)     (hrs)       (mm)
01504>      INFLOW >02: (C-201 )       8.38      .053     5.067      9.939
01505>      OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
01506>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
01507>
01508>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01509>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01510>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01511>
01512>
01513>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01514>                     TIME SHIFT OF PEAK FLOW          (min)=  -304.00
01515>                     MAXIMUM  STORAGE   USED       (ha.m.)=.8329E-01
01516>
01517>       *** WARNING: Outflow volume is less than inflow volume.
01518> ----------------------------------------------------------------------------
01519> 004:0008----------------------------------------------------------------------
01520> ----------------------
01521> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=63.00
01522> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01523> ----------------------   U.H. Tp(hrs)=    .560
01524>
```

```
01525>      Unit Hyd Qpeak  (cms)=     .981
01526>
01527>      PEAK FLOW       (cms)=     .128 (i)
01528>      TIME TO PEAK    (hrs)=    5.100
01529>      RUNOFF VOLUME    (mm)=   14.569
01530>      TOTAL RAINFALL   (mm)=   55.968
01531>      RUNOFF COEFFICIENT   =     .260
01532>
01533>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01534>
01535> ------------------------------------------------------------------------------
01536> 004:0009----------------------------------------------------------------------
01537> ---------------------
01538> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=52.00
01539> | 05:C-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01540> ---------------------   U.H. Tp(hrs)=    .260
01541>
01542>      Unit Hyd Qpeak  (cms)=     .469
01543>
01544>      PEAK FLOW       (cms)=     .021 (i)
01545>      TIME TO PEAK    (hrs)=    5.033
01546>      RUNOFF VOLUME    (mm)=   10.268
01547>      TOTAL RAINFALL   (mm)=   55.968
01548>      RUNOFF COEFFICIENT   =     .183
01549>
01550>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01551>
01552> ------------------------------------------------------------------------------
01553> 004:0010----------------------------------------------------------------------
01554> ---------------------
01555> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01556> |  IN>05:(C-202 )    |
01557> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
01558> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01559>                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
01560>                            .000  .0000E+00   |   1.000  .6400E-01
01561>                            .000  .5990E-01   |   2.000  .6820E-01
01562>
01563>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01564>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01565>      INFLOW >05: (C-202 )       3.19      .021     5.033     10.268
01566>      OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
01567>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
01568>
01569>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
01570>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01571>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01572>
01573>
01574>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01575>                     TIME SHIFT OF PEAK FLOW          (min)=  -302.00
01576>                     MAXIMUM  STORAGE   USED       (ha.m.)=.3276E-01
01577>
01578>       *** WARNING: Outflow volume is less than inflow volume.
01579> ------------------------------------------------------------------------------
01580> 004:0011----------------------------------------------------------------------
01581> ------------------------
01582> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01583> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
01584>                       ID1 04:EXC-2        14.38     .128    5.10  14.57    .000
01585>                      +ID2 06:SWM2A         3.19     .000     .00    .00    .000
01586>                       ========================================================
01587>                       SUM 07:CTR1A        17.57     .128    5.10  11.92    .000
01588>
01589>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01590>
01591> ------------------------------------------------------------------------------
01592> 004:0012----------------------------------------------------------------------
01593> ---------------------
01594> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01595> |  IN>07:(CTR1A )    |
01596> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
01597> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01598>                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
01599>                            .000  .0000E+00   |     .000  .1618E+00
01600>                            .000  .1260E-01   |     .862  .2671E+00
01601>                            .000  .4270E-01   |    2.728  .4058E+00
01602>                            .000  .8980E-01   |    4.016  .4888E+00
01603>
01604>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01605>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01606>      INFLOW >07: (CTR1A )      17.57      .128     5.100     11.923
01607>      OUTFLOW<08: (SWM2B )      17.57      .073     6.500      2.746
01608>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
01609>
01610>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
01611>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01612>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01613>
01614>
01615>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=    56.795
01616>                     TIME SHIFT OF PEAK FLOW          (min)=    84.00
01617>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1707E+00
01618>
01619>       *** WARNING: Outflow volume is less than inflow volume.
01620> ------------------------------------------------------------------------------
01621> 004:0013----------------------------------------------------------------------
01622> ---------------------
01623> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
01624> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01625> ---------------------   U.H. Tp(hrs)=    .500
01626>
01627>      Unit Hyd Qpeak  (cms)=     .000
01628>
01629>      PEAK FLOW       (cms)=     .000 (i)
01630>      TIME TO PEAK    (hrs)=    5.117
01631>      RUNOFF VOLUME    (mm)=     .118
01632>      TOTAL RAINFALL   (mm)=   55.968
01633>      RUNOFF COEFFICIENT   =     .002
01634>
01635>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01636>
01637> ------------------------------------------------------------------------------
01638> 004:0014----------------------------------------------------------------------
01639> ------------------------
01640> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01641> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
01642>                       ID1 08:SWM2B        17.57     .073    6.50   2.75    .000
01643>                      +ID2 09:BLANK          .00     .000    5.12    .12    .000
01644>                       ========================================================
01645>                       SUM 04:SB&BLK       17.57     .073    6.50   2.75    .000
01646>
01647>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01648>
01649> ------------------------------------------------------------------------------
01650> 004:0015----------------------------------------------------------------------
01651> ---------------------
01652> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01653> |  IN>04:(SB&BLK)    |
01654> | OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
01655> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01656>                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
01657>                             .000  .0000E+00   |     .500  .1054E+00
01658>                             .000  .9880E-01   |    1.300  .1124E+00
01659>
01660>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01661>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01662>      INFLOW >04: (SB&BLK)      17.57      .073     6.500      2.746
01663>      OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
01664>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
01665>
01666>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
01667>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01668>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01669>
01670>
01671>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01672>                     TIME SHIFT OF PEAK FLOW          (min)=  -390.00
01673>                     MAXIMUM  STORAGE   USED       (ha.m.)=.4824E-01
01674>
01675>       *** WARNING: Outflow volume is less than inflow volume.
01676> ------------------------------------------------------------------------------
01677> 004:0016----------------------------------------------------------------------
01678> ------------------------
01679> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01680> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
01681>                       ID1 01:CTR1          26.60     .006    5.05   .36    .000
01682>                      +ID2 03:SWM1           8.38     .000     .00    .00    .000
01683>                      +ID3 09:SWM2C         17.57     .000     .00    .00    .000
01684>                       ========================================================
01685>                       SUM 01:CTR1          26.60     .006    5.05   .36    .000
01686>
01687>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01688>
01689> ------------------------------------------------------------------------------
01690> 004:0017----------------------------------------------------------------------
01691> ---------------------
01692> | DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=66.00
01693> | 01:C-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01694> ---------------------   U.H. Tp(hrs)=    .300
01695>
01696>      Unit Hyd Qpeak  (cms)=    1.145
01697>
01698>      PEAK FLOW       (cms)=     .090 (i)
01699>      TIME TO PEAK    (hrs)=    5.033
01700>      RUNOFF VOLUME    (mm)=   16.009
01701>      TOTAL RAINFALL   (mm)=   55.968
01702>      RUNOFF COEFFICIENT   =     .286
01703>
01704>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01705>
01706> ------------------------------------------------------------------------------
01707> 004:0018----------------------------------------------------------------------
01708> ---------------------
01709> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01710> |  IN>01:(C-203 )    |
01711> | OUT<02:(SWM3  )    |    =========  OUTLFOW STORAGE TABLE  =========
01712> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01713>                            (cms)     (ha.m.)   |    (cms)     (ha.m.)
01714>                             .000  .0000E+00   |    3.000  .2660E+00
01715>                             .000  .2491E+00   |    7.000  .2834E+00
01716>
01717>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01718>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01719>      INFLOW >01: (C-203 )       8.99      .090     5.033     16.009
01720>      OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
01721>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
01722>
01723>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
01724>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01725>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01726>
01727>
01728>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01729>                     TIME SHIFT OF PEAK FLOW          (min)=  -302.00
01730>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1439E+00
01731>
01732>       *** WARNING: Outflow volume is less than inflow volume.
01733> ------------------------------------------------------------------------------
01734> 004:0019----------------------------------------------------------------------
01735> ---------------------
01736> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=63.00
01737> | 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01738> ---------------------   U.H. Tp(hrs)=    .390
01739>
01740>      Unit Hyd Qpeak  (cms)=     .504
01741>
01742>      PEAK FLOW       (cms)=     .047 (i)
01743>      TIME TO PEAK    (hrs)=    5.067
01744>      RUNOFF VOLUME    (mm)=   14.569
01745>      TOTAL RAINFALL   (mm)=   55.968
01746>      RUNOFF COEFFICIENT   =     .260
01747>
01748>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01749>
01750> ------------------------------------------------------------------------------
01751> 004:0020----------------------------------------------------------------------
01752> ------------------------
01753> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01754> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
01755>                       ID1 02:SWM3           8.99     .000     .00    .00    .000
01756>                      +ID2 03:EXC-3          5.15     .047    5.07  14.57    .000
01757>                       ========================================================
01758>                       SUM 01:CTR2          14.14     .047    5.07   5.31    .000
01759>
01760>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01761>
01762> ------------------------------------------------------------------------------
01763> 004:0021----------------------------------------------------------------------
01764> ---------------------
01765> | DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=71.00
01766> | 01:C-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01767> ---------------------   U.H. Tp(hrs)=    .260
01768>
01769>      Unit Hyd Qpeak  (cms)=     .854
01770>
01771>      PEAK FLOW       (cms)=     .069 (i)
01772>      TIME TO PEAK    (hrs)=    3.083
01773>      RUNOFF VOLUME    (mm)=   18.752
01774>      TOTAL RAINFALL   (mm)=   55.968
01775>      RUNOFF COEFFICIENT   =     .335
01776>
01777>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01778>
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01779> ---------------------------------------------------------------------------
01780> 004:0022-----------------------------------------------------------------
01781> ---------------------
01782> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01783> |  IN>01:(C-204 )   |
01784> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
01785> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01786>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01787>                             .000  .0000E+00    |   1.000  .1925E+00
01788>                             .000  .1803E+00    |   2.000  .2051E+00
01789>
01790>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01791>     ---------------------       (ha)     (cms)     (hrs)       (mm)
01792>     INFLOW >01: (C-204 )       5.81      .069     3.083     18.752
01793>     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
01794>    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
01795>
01796>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01797>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01798>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01799>
01800>
01801>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01802>                    TIME SHIFT OF PEAK FLOW          (min)=  -185.00
01803>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1089E+00
01804>
01805>       *** WARNING: Outflow volume is less than inflow volume.
01806> ---------------------------------------------------------------------------
01807> 004:0023-----------------------------------------------------------------
01808> ---------------------------------------------------------------------------
01809> 004:0002-----------------------------------------------------------------
01810> ---------------------------------------------------------------------------
01811> 004:0002-----------------------------------------------------------------
01812> ---------------------------------------------------------------------------
01813> 004:0002-----------------------------------------------------------------
01814>   ** END OF RUN :   4
01815>
01816> ***************************************************************************
01817>
01818>
01819>
01820>
01821>
01822> --------------------
01823> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
01824> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
01825>     TZERO =   .00 hrs on        0
01826>     METOUT=   2 (output = METRIC)
01827>     NRUN  = 005
01828>     NSTORM=   1
01829>            #  1=LYA100.1hr
01830> ---------------------------------------------------------------------------
01831> 005:0002-----------------------------------------------------------------
01832> *#************************************************************************
01833> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
01834> *#  Date        : 2017/11/24
01835> *#  Modeller    : [C. Fischer]
01836> *#  Company     : Stantec Consulting Ltd. (Waterloo)
01837> *#  License #   : 4730904
01838> *#************************************************************************
01839> *#
01840> *#                        Block C - PROPOSED CONDITIONS
01841> *#
01842> *#************************************************************************
01843> ---------------------------------------------------------------------------
01844> 005:0002-----------------------------------------------------------------
01845> --------------------
01846> | READ STORM       |    Filename: Belleville IDF (1-hr 30% AES - 100 Year)
01847> | Ptotal=  44.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 100 Year)
01848> --------------------
01849>                TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
01850>                 hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
01851>                .08  47.628 |    .33  58.212 |    .58  52.920 |    .83  15.876
01852>                .17  74.088 |    .42  68.796 |    .67  26.460 |    .92   5.292
01853>                .25 111.132 |    .50  47.628 |    .75  21.168 |   1.00    .000
01854>
01855> ---------------------------------------------------------------------------
01856> 005:0003-----------------------------------------------------------------
01857> *#************************************************************************
01858> *#
01859> *#                              AMC II Conditions
01860> *#
01861> *#************************************************************************
01862> ----------------------
01863> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=57.00
01864> | 01:C-200  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01865> ----------------------   U.H. Tp(hrs)=    .270
01866>
01867>     Unit Hyd Qpeak  (cms)=     .646
01868>
01869>     PEAK FLOW       (cms)=     .133 (i)
01870>     TIME TO PEAK    (hrs)=     .767
01871>     RUNOFF VOLUME    (mm)=    7.748
01872>     TOTAL RAINFALL   (mm)=   44.100
01873>     RUNOFF COEFFICIENT   =     .176
01874>
01875>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01876>
01877> ---------------------------------------------------------------------------
01878> 005:0004-----------------------------------------------------------------
01879> ---------------------
01880> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01881> |  IN>01:(C-200 )   |
01882> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
01883> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01884>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01885>                             .000  .0000E+00    |   2.000  .1372E+00
01886>                             .000  .1285E+00    |   5.000  .1462E+00
01887>
01888>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01889>     ---------------------       (ha)     (cms)     (hrs)       (mm)
01890>     INFLOW >01: (C-200 )       4.57      .133      .767      7.748
01891>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
01892>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
01893>
01894>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01895>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01896>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01897>
01898>
01899>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01900>                    TIME SHIFT OF PEAK FLOW          (min)=   -46.00
01901>                    MAXIMUM  STORAGE   USED       (ha.m.)=.3541E-01
01902>
01903>       *** WARNING: Outflow volume is less than inflow volume.
01904> ---------------------------------------------------------------------------
01905> 005:0005-----------------------------------------------------------------
01906> ----------------------
01907> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=63.00
01908> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01909> ----------------------   U.H. Tp(hrs)=    .340
01910>
01911>     Unit Hyd Qpeak  (cms)=     .073
01912>
01913>     PEAK FLOW       (cms)=     .020 (i)
01914>     TIME TO PEAK    (hrs)=     .850
01915>     RUNOFF VOLUME    (mm)=    9.463
01916>     TOTAL RAINFALL   (mm)=   44.100
01917>     RUNOFF COEFFICIENT   =     .215
01918>
01919>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01920>
01921> ---------------------------------------------------------------------------
01922> 005:0006-----------------------------------------------------------------
01923> ----------------------
01924> | DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number   (CN)=51.00
01925> | 02:C-201  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01926> ----------------------   U.H. Tp(hrs)=    .350
01927>
01928>     Unit Hyd Qpeak  (cms)=     .914
01929>
01930>     PEAK FLOW       (cms)=     .174 (i)
01931>     TIME TO PEAK    (hrs)=     .867
01932>     RUNOFF VOLUME    (mm)=    6.331
01933>     TOTAL RAINFALL   (mm)=   44.100
01934>     RUNOFF COEFFICIENT   =     .144
01935>
01936>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01937>
01938> ---------------------------------------------------------------------------
01939> 005:0007-----------------------------------------------------------------
01940> ---------------------
01941> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01942> |  IN>02:(C-201 )   |
01943> | OUT<03:(SWM1  )   |    =========  OUTLFOW STORAGE TABLE  =========
01944> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01945>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01946>                             .000  .0000E+00    |   1.000  .1918E+00
01947>                             .000  .1796E+00    |   4.000  .2044E+00
01948>
01949>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01950>     ---------------------       (ha)     (cms)     (hrs)       (mm)
01951>     INFLOW >02: (C-201 )       8.38      .174      .867      6.331
01952>     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
01953>    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
01954>
01955>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01956>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01957>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01958>
01959>
01960>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01961>                    TIME SHIFT OF PEAK FLOW          (min)=   -52.00
01962>                    MAXIMUM  STORAGE   USED       (ha.m.)=.5306E-01
01963>
01964>       *** WARNING: Outflow volume is less than inflow volume.
01965> ---------------------------------------------------------------------------
01966> 005:0008-----------------------------------------------------------------
01967> ----------------------
01968> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=63.00
01969> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01970> ----------------------   U.H. Tp(hrs)=    .560
01971>
01972>     Unit Hyd Qpeak  (cms)=     .981
01973>
01974>     PEAK FLOW       (cms)=     .326 (i)
01975>     TIME TO PEAK    (hrs)=    1.050
01976>     RUNOFF VOLUME    (mm)=    9.463
01977>     TOTAL RAINFALL   (mm)=   44.100
01978>     RUNOFF COEFFICIENT   =     .215
01979>
01980>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01981>
01982> ---------------------------------------------------------------------------
01983> 005:0009-----------------------------------------------------------------
01984> ----------------------
01985> | DESIGN NASHYD      |   Area     (ha)=    3.19   Curve Number   (CN)=52.00
01986> | 05:C-202  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01987> ----------------------   U.H. Tp(hrs)=    .260
01988>
01989>     Unit Hyd Qpeak  (cms)=     .469
01990>
01991>     PEAK FLOW       (cms)=     .080 (i)
01992>     TIME TO PEAK    (hrs)=     .750
01993>     RUNOFF VOLUME    (mm)=    6.550
01994>     TOTAL RAINFALL   (mm)=   44.100
01995>     RUNOFF COEFFICIENT   =     .149
01996>
01997>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01998>
01999> ---------------------------------------------------------------------------
02000> 005:0010-----------------------------------------------------------------
02001> ---------------------
02002> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02003> |  IN>05:(C-202 )   |
02004> | OUT<06:(SWM2A )   |    =========  OUTLFOW STORAGE TABLE  =========
02005> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02006>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02007>                             .000  .0000E+00    |   1.000  .6400E-01
02008>                             .000  .5990E-01    |   2.000  .6820E-01
02009>
02010>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02011>     ---------------------       (ha)     (cms)     (hrs)       (mm)
02012>     INFLOW >05: (C-202 )       3.19      .080      .750      6.550
02013>     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
02014>    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
02015>
02016>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02017>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02018>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02019>
02020>
02021>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
02022>                    TIME SHIFT OF PEAK FLOW          (min)=   -45.00
02023>                    MAXIMUM  STORAGE   USED       (ha.m.)=.2089E-01
02024>
02025>       *** WARNING: Outflow volume is less than inflow volume.
02026> ---------------------------------------------------------------------------
02027> 005:0011-----------------------------------------------------------------
02028> ------------------------
02029> | ADD HYD (CTR1A     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02030> ------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
02031>                        ID1 04:EXC-2        14.38     .326    1.05   9.46    .000
02032>                       +ID2 06:SWM2A         3.19     .000     .00    .00    .000
```

```
                    ============================================================
                    SUM 07:CTR1A         17.57     .326    1.05    7.74    .000
                    ============================================================

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0012--------------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>07:(CTR1A )   |
| OUT<08:(SWM2B )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |     .000  .1618E+00
                           .000  .1260E-01    |     .862  .2671E+00
                           .000  .4270E-01    |    2.728  .4058E+00
                           .000  .8980E-01    |    4.016  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >07: (CTR1A )      17.57      .326     1.050      7.745
     OUTFLOW<08: (SWM2B )      17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -63.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1361E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0013--------------------------------------------------------------------------
--------------------
| DESIGN NASHYD     |   Area     (ha)=     .00   Curve Number    (CN)= 1.00
| 09:BLANK  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .000

     PEAK FLOW       (cms)=     .000 (i)
     TIME TO PEAK    (hrs)=    1.000
     RUNOFF VOLUME    (mm)=     .028
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .001

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

--------------------------------------------------------------------------------
005:0014--------------------------------------------------------------------------
------------------------
| ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 08:SWM2B       17.57     .000     .00    .00    .000
                       +ID2 09:BLANK         .00     .000    1.00    .03    .000
                        ============================================================
                        SUM 04:SB&BLK      17.57     .000    1.00    .00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0015--------------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>04:(SB&BLK)   |
| OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |     .500  .1054E+00
                           .000  .9880E-01    |    1.300  .1124E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (SB&BLK)      17.57      .000     1.000       .000
     OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -60.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2769E-09

--------------------------------------------------------------------------------
005:0016--------------------------------------------------------------------------
------------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 01:CTR1          .65     .020     .85   9.46    .000
                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
                        ============================================================
                        SUM 01:CTR1         26.60     .020     .85    .23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0017--------------------------------------------------------------------------
--------------------
| DESIGN NASHYD     |   Area     (ha)=    8.99   Curve Number    (CN)=66.00
| 01:C-203  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .300

     Unit Hyd Qpeak  (cms)=    1.145

     PEAK FLOW       (cms)=     .334 (i)
     TIME TO PEAK    (hrs)=     .783
     RUNOFF VOLUME    (mm)=   10.463
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .237

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

--------------------------------------------------------------------------------
005:0018--------------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-203 )   |
| OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                                              .000  .0000E+00    |    3.000  .2660E+00
                                              .000  .2491E+00    |    7.000  .2834E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-203 )       8.99      .334      .783     10.463
     OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -47.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9406E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0019--------------------------------------------------------------------------
--------------------
| DESIGN NASHYD     |   Area     (ha)=    5.15   Curve Number    (CN)=63.00
| 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .150 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    9.463
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .215

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

--------------------------------------------------------------------------------
005:0020--------------------------------------------------------------------------
------------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 02:SWM3        8.99      .000     .00    .00    .000
                       +ID2 03:EXC-3       5.15      .150     .90   9.46    .000
                        ============================================================
                        SUM 01:CTR2        14.14      .150     .90   3.45    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0021--------------------------------------------------------------------------
--------------------
| DESIGN NASHYD     |   Area     (ha)=    5.81   Curve Number    (CN)=71.00
| 01:C-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .854

     PEAK FLOW       (cms)=     .274 (i)
     TIME TO PEAK    (hrs)=     .733
     RUNOFF VOLUME    (mm)=   12.400
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .281

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

--------------------------------------------------------------------------------
005:0022--------------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-204 )   |
| OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1925E+00
                           .000  .1803E+00    |    2.000  .2051E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-204 )       5.81      .274      .733     12.400
     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -44.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.7205E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0023--------------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
  ** END OF RUN :   5
********************************************************************************




--------------------
| START             |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
--------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
           #  1=LYA100.12h
--------------------------------------------------------------------------------
006:0002--------------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/11/24
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
*#  License #   : 4730904
*#*****************************************************************************
```

```
02287> *#
02288> *#                     Block C - PROPOSED CONDITIONS
02289> *#
02290> *#*************************************************************************
02291> -------------------------------------------------------------------------
02292> 006:0002-------------------------------------------------------------------
02293> --------------------
02294> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 100 Year
02295> | Ptotal=  93.70 mm|    Comments: Belleville IDF (12-hr 30% AES - 100 Year
02296> --------------------
02297>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
02298>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
02299>              1.00   8.784 |   4.00  14.640 |   7.00   2.928 |  10.00    .000
02300>              2.00  25.376 |   5.00  13.664 |   8.00    .976 |  11.00    .000
02301>              3.00  19.520 |   6.00   7.808 |   9.00    .000 |  12.00    .000
02302>
02303> -------------------------------------------------------------------------
02304> 006:0003-------------------------------------------------------------------
02305> *#*************************************************************************
02306> *#
02307> *#                          AMC II Conditions
02308> *#
02309> *#*************************************************************************
02310> ----------------------
02311> | DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=57.00
02312> | 01:C-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02313> ----------------------  U.H. Tp(hrs)=    .270
02314>
02315>      Unit Hyd Qpeak  (cms)=     .646
02316>
02317>      PEAK FLOW       (cms)=     .086 (i)
02318>      TIME TO PEAK    (hrs)=    3.100
02319>      RUNOFF VOLUME    (mm)=   29.950
02320>      TOTAL RAINFALL   (mm)=   93.696
02321>      RUNOFF COEFFICIENT   =     .320
02322>
02323>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02324>
02325> -------------------------------------------------------------------------
02326> 006:0004-------------------------------------------------------------------
02327> ----------------------
02328> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02329> |  IN>01:(C-200 )    |
02330> | OUT<02:(SWM0  )    |    =========  OUTLFOW STORAGE TABLE  =========
02331> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02332>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02333>                             .000  .0000E+00    |    2.000  .1372E+00
02334>                             .000  .1285E+00    |    5.000  .1462E+00
02335>
02336>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02337>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02338>      INFLOW >01: (C-200 )       4.57      .086     3.100     29.950
02339>      OUTFLOW<02: (SWM0  )       4.57      .024     6.667      1.832
02340>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
02341>
02342>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02343>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02344>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02345>
02346>
02347>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   27.862
02348>                     TIME SHIFT OF PEAK FLOW          (min)=   214.00
02349>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1286E+00
02350>
02351>       *** WARNING: Outflow volume is less than inflow volume.
02352> -------------------------------------------------------------------------
02353> 006:0005-------------------------------------------------------------------
02354> ----------------------
02355> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=63.00
02356> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02357> ----------------------  U.H. Tp(hrs)=    .340
02358>
02359>      Unit Hyd Qpeak  (cms)=     .073
02360>
02361>      PEAK FLOW       (cms)=     .014 (i)
02362>      TIME TO PEAK    (hrs)=    3.133
02363>      RUNOFF VOLUME    (mm)=   35.216
02364>      TOTAL RAINFALL   (mm)=   93.696
02365>      RUNOFF COEFFICIENT   =     .376
02366>
02367>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02368>
02369> -------------------------------------------------------------------------
02370> 006:0006-------------------------------------------------------------------
02371> ----------------------
02372> | DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=51.00
02373> | 02:C-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02374> ----------------------  U.H. Tp(hrs)=    .350
02375>
02376>      Unit Hyd Qpeak  (cms)=     .914
02377>
02378>      PEAK FLOW       (cms)=     .131 (i)
02379>      TIME TO PEAK    (hrs)=    5.050
02380>      RUNOFF VOLUME    (mm)=   25.280
02381>      TOTAL RAINFALL   (mm)=   93.696
02382>      RUNOFF COEFFICIENT   =     .270
02383>
02384>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02385>
02386> -------------------------------------------------------------------------
02387> 006:0007-------------------------------------------------------------------
02388> ----------------------
02389> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02390> |  IN>02:(C-201 )    |
02391> | OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
02392> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02393>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02394>                             .000  .0000E+00    |    1.000  .1918E+00
02395>                             .000  .1796E+00    |    4.000  .2044E+00
02396>
02397>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02398>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02399>      INFLOW >02: (C-201 )       8.38      .131     5.050     25.280
02400>      OUTFLOW<03: (SWM1  )       8.38      .083     6.100      3.946
02401>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
02402>
02403>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02404>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02405>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02406>
02407>
02408>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   63.368
02409>                     TIME SHIFT OF PEAK FLOW          (min)=    63.00
02410>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1806E+00
02411>
02412>       *** WARNING: Outflow volume is less than inflow volume.
02413> -------------------------------------------------------------------------
02414> 006:0008-------------------------------------------------------------------
02415> ----------------------
02416> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=63.00
02417> | 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02418> ----------------------  U.H. Tp(hrs)=    .560
02419>
02420>      Unit Hyd Qpeak  (cms)=     .981
02421>
02422>      PEAK FLOW       (cms)=     .299 (i)
02423>      TIME TO PEAK    (hrs)=    3.400
02424>      RUNOFF VOLUME    (mm)=   35.216
02425>      TOTAL RAINFALL   (mm)=   93.696
02426>      RUNOFF COEFFICIENT   =     .376
02427>
02428>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02429>
02430> -------------------------------------------------------------------------
02431> 006:0009-------------------------------------------------------------------
02432> ----------------------
02433> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=52.00
02434> | 05:C-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02435> ----------------------  U.H. Tp(hrs)=    .260
02436>
02437>      Unit Hyd Qpeak  (cms)=     .469
02438>
02439>      PEAK FLOW       (cms)=     .052 (i)
02440>      TIME TO PEAK    (hrs)=    3.100
02441>      RUNOFF VOLUME    (mm)=   26.022
02442>      TOTAL RAINFALL   (mm)=   93.696
02443>      RUNOFF COEFFICIENT   =     .278
02444>
02445>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02446>
02447> -------------------------------------------------------------------------
02448> 006:0010-------------------------------------------------------------------
02449> ----------------------
02450> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02451> |  IN>05:(C-202 )    |
02452> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
02453> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02454>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02455>                             .000  .0000E+00    |    1.000  .6400E-01
02456>                             .000  .5990E-01    |    2.000  .6820E-01
02457>
02458>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02459>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02460>      INFLOW >05: (C-202 )       3.19      .052     3.100     26.022
02461>      OUTFLOW<06: (SWM2A )       3.19      .050     5.133      7.329
02462>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
02463>
02464>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02465>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02466>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02467>
02468>
02469>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   97.062
02470>                     TIME SHIFT OF PEAK FLOW          (min)=   122.00
02471>                     MAXIMUM  STORAGE   USED       (ha.m.)=.6011E-01
02472>
02473>       *** WARNING: Outflow volume is less than inflow volume.
02474> -------------------------------------------------------------------------
02475> 006:0011-------------------------------------------------------------------
02476> ------------------------
02477> | ADD HYD (CTR1A     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02478> ------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
02479>                         ID1 04:EXC-2       14.38     .299    3.40  35.22    .000
02480>                        +ID2 06:SWM2A        3.19     .050    5.13   7.33    .000
02481>                         ========================================================
02482>                         SUM 07:CTR1A       17.57     .348    5.13  30.14    .000
02483>
02484>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02485>
02486> -------------------------------------------------------------------------
02487> 006:0012-------------------------------------------------------------------
02488> ----------------------
02489> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02490> |  IN>07:(CTR1A )    |
02491> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
02492> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02493>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02494>                             .000  .0000E+00    |     .000  .1618E+00
02495>                             .000  .1260E-01    |     .862  .2671E+00
02496>                             .000  .4270E-01    |    2.728  .4058E+00
02497>                             .000  .8980E-01    |    4.016  .4888E+00
02498>
02499>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02500>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02501>      INFLOW >07: (CTR1A )       17.57      .348     5.133     30.138
02502>      OUTFLOW<08: (SWM2B )       17.57      .319     5.417     20.929
02503>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
02504>
02505>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02506>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02507>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02508>
02509>
02510>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   91.458
02511>                     TIME SHIFT OF PEAK FLOW          (min)=    17.00
02512>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2007E+00
02513>
02514>       *** WARNING: Outflow volume is less than inflow volume.
02515> -------------------------------------------------------------------------
02516> 006:0013-------------------------------------------------------------------
02517> ----------------------
02518> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
02519> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02520> ----------------------  U.H. Tp(hrs)=    .500
02521>
02522>      Unit Hyd Qpeak  (cms)=     .000
02523>
02524>      PEAK FLOW       (cms)=     .000 (i)
02525>      TIME TO PEAK    (hrs)=    5.117
02526>      RUNOFF VOLUME    (mm)=     .337
02527>      TOTAL RAINFALL   (mm)=   93.696
02528>      RUNOFF COEFFICIENT   =     .004
02529>
02530>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02531>
02532> -------------------------------------------------------------------------
02533> 006:0014-------------------------------------------------------------------
02534> ------------------------
02535> | ADD HYD (SB&BLK    ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02536> ------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
02537>                         ID1 08:SWM2B       17.57     .319    5.42  20.93    .000
02538>                        +ID2 09:BLANK         .00     .000    5.12    .34    .000
02539>                         ========================================================
02540>                         SUM 04:SB&BLK      17.57     .319    5.42  20.93    .000
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02541>
02542>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02543>
02544> ------------------------------------------------------------------------
02545> 006:0015------------------------------------------------------------------
02546> ---------------------
02547> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02548> |  IN>04:(SB&BLK)   |
02549> | OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
02550> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02551>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02552>                             .000  .0000E+00    |     .500  .1054E+00
02553>                             .000  .9880E-01    |    1.300  .1124E+00
02554>
02555>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02556>      ---------------            (ha)     (cms)     (hrs)       (mm)
02557>      INFLOW >04: (SB&BLK)      17.57      .319     5.417     20.929
02558>      OUTFLOW<09: (SWM2C )      17.57      .318     5.450     15.306
02559>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
02560>
02561>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02562>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02563>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02564>
02565>
02566>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   99.910
02567>                     TIME SHIFT OF PEAK FLOW          (min)=    2.00
02568>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1030E+00
02569>
02570>       *** WARNING: Outflow volume is less than inflow volume.
02571> ------------------------------------------------------------------------
02572> 006:0016------------------------------------------------------------------
02573> ------------------------
02574> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02575> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
02576>                         ID1 01:CTR1          .65      .014    3.13  35.22    .000
02577>                        +ID2 03:SWM1         8.38      .083    6.10   3.95    .000
02578>                        +ID3 09:SWM2C       17.57      .318    5.45  15.31    .000
02579>                         ============================================================
02580>                         SUM 01:CTR1         26.60      .369    6.07  12.26    .000
02581>
02582>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02583>
02584> ------------------------------------------------------------------------
02585> 006:0017------------------------------------------------------------------
02586> ----------------------
02587> | DESIGN NASHYD      |   Area     (ha)=    8.99   Curve Number   (CN)=66.00
02588> | 01:C-203  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02589> ----------------------   U.H. Tp(hrs)=    .300
02590>
02591>      Unit Hyd Qpeak  (cms)=    1.145
02592>
02593>      PEAK FLOW       (cms)=     .217 (i)
02594>      TIME TO PEAK    (hrs)=    3.100
02595>      RUNOFF VOLUME    (mm)=   38.110
02596>      TOTAL RAINFALL   (mm)=   93.696
02597>      RUNOFF COEFFICIENT   =     .407
02598>
02599>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02600>
02601> ------------------------------------------------------------------------
02602> 006:0018------------------------------------------------------------------
02603> ----------------------
02604> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02605> |  IN>01:(C-203 )   |
02606> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
02607> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02608>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02609>                             .000  .0000E+00    |    3.000  .2660E+00
02610>                             .000  .2491E+00    |    7.000  .2834E+00
02611>
02612>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02613>      ---------------            (ha)     (cms)     (hrs)       (mm)
02614>      INFLOW >01: (C-203 )       8.99      .217     3.100     38.110
02615>      OUTFLOW<02: (SWM3  )       8.99      .197     5.150     10.401
02616>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
02617>
02618>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02619>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02620>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02621>
02622>
02623>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   90.621
02624>                     TIME SHIFT OF PEAK FLOW          (min)=  123.00
02625>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2502E+00
02626>
02627>       *** WARNING: Outflow volume is less than inflow volume.
02628> ------------------------------------------------------------------------
02629> 006:0019------------------------------------------------------------------
02630> ----------------------
02631> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=63.00
02632> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02633> ----------------------   U.H. Tp(hrs)=    .390
02634>
02635>      Unit Hyd Qpeak  (cms)=     .504
02636>
02637>      PEAK FLOW       (cms)=     .112 (i)
02638>      TIME TO PEAK    (hrs)=    3.183
02639>      RUNOFF VOLUME    (mm)=   35.216
02640>      TOTAL RAINFALL   (mm)=   93.696
02641>      RUNOFF COEFFICIENT   =     .376
02642>
02643>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02644>
02645> ------------------------------------------------------------------------
02646> 006:0020------------------------------------------------------------------
02647> ------------------------
02648> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02649> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
02650>                         ID1 02:SWM3          8.99      .197    5.15  10.40    .000
02651>                        +ID2 03:EXC-3         5.15      .112    3.18  35.22    .000
02652>                         ============================================================
02653>                         SUM 01:CTR2         14.14      .303    5.15  19.44    .000
02654>
02655>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02656>
02657> ------------------------------------------------------------------------
02658> 006:0021------------------------------------------------------------------
02659> ----------------------
02660> | DESIGN NASHYD      |   Area     (ha)=    5.81   Curve Number   (CN)=71.00
02661> | 01:C-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02662> ----------------------   U.H. Tp(hrs)=    .260
02663>
02664>      Unit Hyd Qpeak  (cms)=     .854
02665>
02666>      PEAK FLOW       (cms)=     .163 (i)
02667>      TIME TO PEAK    (hrs)=    3.083
02668>      RUNOFF VOLUME    (mm)=   43.381
02669>      TOTAL RAINFALL   (mm)=   93.696
02670>      RUNOFF COEFFICIENT   =     .463
02671>
02672>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02673>
02674> ------------------------------------------------------------------------
02675> 006:0022------------------------------------------------------------------
02676> ---------------------
02677> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02678> |  IN>01:(C-204 )   |
02679> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
02680> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02681>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02682>                             .000  .0000E+00    |    1.000  .1925E+00
02683>                             .000  .1803E+00    |    2.000  .2051E+00
02684>
02685>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02686>      ---------------            (ha)     (cms)     (hrs)       (mm)
02687>      INFLOW >01: (C-204 )       5.81      .163     3.083     43.381
02688>      OUTFLOW<02: (SWM4  )       5.81      .145     5.100     12.535
02689>     OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
02690>
02691>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02692>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02693>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02694>
02695>
02696>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   88.755
02697>                     TIME SHIFT OF PEAK FLOW          (min)=  121.00
02698>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1821E+00
02699>
02700>       *** WARNING: Outflow volume is less than inflow volume.
02701> ------------------------------------------------------------------------
02702> 006:0023------------------------------------------------------------------
02703> ------------------------------------------------------------------------
02704> 006:0002------------------------------------------------------------------
02705> ------------------------------------------------------------------------
02706> 006:0002------------------------------------------------------------------
02707> ------------------------------------------------------------------------
02708> 006:0002------------------------------------------------------------------
02709> ------------------------------------------------------------------------
02710> 006:0002------------------------------------------------------------------
02711> ------------------------------------------------------------------------
02712> 006:0002------------------------------------------------------------------
02713>   ** END OF RUN :   6
02714>
02715> ************************************************************************
02716>
02717>
02718>
02719>
02720>
02721> --------------------
02722> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCII\
02723> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCII\
02724>     TZERO =   .00 hrs on       0
02725>     METOUT=   2 (output = METRIC)
02726>     NRUN  = 007
02727>     NSTORM=   1
02728>               #  1=25mm.4hr
02729> ------------------------------------------------------------------------
02730> 007:0002------------------------------------------------------------------
02731> *#*********************************************************************
02732> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
02733> *#  Date       : 2017/11/24
02734> *#  Modeller   : [C. Fischer]
02735> *#  Company    : Stantec Consulting Ltd. (Waterloo)
02736> *#  License #  : 4730904
02737> *#*********************************************************************
02738> *#
02739> *#                     Block C - PROPOSED CONDITIONS
02740> *#
02741> *#*********************************************************************
02742> ------------------------------------------------------------------------
02743> 007:0002------------------------------------------------------------------
02744> --------------------
02745> | READ STORM        |    Filename: 25 mm, 4hr Chicago Storm
02746> | Ptotal=  25.00 mm|    Comments: 25 mm, 4hr Chicago Storm
02747> --------------------
02748>               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
02749>               hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
02750>               .08   1.465 |  1.08   4.024 |  2.08   5.764 |  3.08   2.074
02751>               .17   1.540 |  1.17   4.814 |  2.17   4.969 |  3.17   1.977
02752>               .25   1.625 |  1.25   6.025 |  2.25   4.374 |  3.25   1.889
02753>               .33   1.720 |  1.33   8.114 |  2.33   3.913 |  3.33   1.810
02754>               .42   1.829 |  1.42  12.526 |  2.42   3.545 |  3.42   1.737
02755>               .50   1.955 |  1.50  27.198 |  2.50   3.245 |  3.50   1.671
02756>               .58   2.101 |  1.58  74.855 |  2.58   2.994 |  3.58   1.610
02757>               .67   2.274 |  1.67  31.410 |  2.67   2.782 |  3.67   1.553
02758>               .75   2.482 |  1.75  16.819 |  2.75   2.601 |  3.75   1.501
02759>               .83   2.736 |  1.83  11.357 |  2.83   2.443 |  3.83   1.453
02760>               .92   3.055 |  1.92   8.563 |  2.92   2.305 |  3.92   1.408
02761>              1.00   3.468 |  2.00   6.882 |  3.00   2.183 |  4.00   1.366
02762>
02763> ------------------------------------------------------------------------
02764> 007:0003------------------------------------------------------------------
02765> *#*********************************************************************
02766> *#
02767> *#                              AMC II Conditions
02768> *#
02769> *#*********************************************************************
02770> ----------------------
02771> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=57.00
02772> | 01:C-200  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02773> ----------------------   U.H. Tp(hrs)=    .270
02774>
02775>      Unit Hyd Qpeak  (cms)=     .646
02776>
02777>      PEAK FLOW       (cms)=     .031 (i)
02778>      TIME TO PEAK    (hrs)=    1.917
02779>      RUNOFF VOLUME    (mm)=    2.567
02780>      TOTAL RAINFALL   (mm)=   25.000
02781>      RUNOFF COEFFICIENT   =     .103
02782>
02783>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02784>
02785> ------------------------------------------------------------------------
02786> 007:0004------------------------------------------------------------------
02787> ---------------------
02788> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02789> |  IN>01:(C-200 )   |
02790> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
02791> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02792>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02793>                             .000  .0000E+00    |    2.000  .1372E+00
02794>                             .000  .1285E+00    |    5.000  .1462E+00
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02795>
02796>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02797>      --------------------       (ha)     (cms)     (hrs)       (mm)
02798>      INFLOW >01: (C-200 )       4.57      .031     1.917      2.567
02799>      OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
02800>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
02801>
02802>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02803>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02804>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02805>
02806>
02807>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
02808>                      TIME SHIFT OF PEAK FLOW          (min)=  -115.00
02809>                      MAXIMUM  STORAGE   USED       (ha.m.)=.1173E-01
02810>
02811>       *** WARNING: Outflow volume is less than inflow volume.
02812> ------------------------------------------------------------------------------
02813> 007:0005----------------------------------------------------------------------
02814> ----------------------
02815> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=63.00
02816> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02817> ----------------------   U.H. Tp(hrs)=    .340
02818>
02819>      Unit Hyd Qpeak  (cms)=     .073
02820>
02821>      PEAK FLOW       (cms)=     .005 (i)
02822>      TIME TO PEAK    (hrs)=    2.017
02823>      RUNOFF VOLUME    (mm)=    3.197
02824>      TOTAL RAINFALL   (mm)=   25.000
02825>      RUNOFF COEFFICIENT   =     .128
02826>
02827>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02828>
02829> ------------------------------------------------------------------------------
02830> 007:0006----------------------------------------------------------------------
02831> ----------------------
02832> | DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=51.00
02833> | 02:C-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02834> ----------------------   U.H. Tp(hrs)=    .350
02835>
02836>      Unit Hyd Qpeak  (cms)=     .914
02837>
02838>      PEAK FLOW       (cms)=     .039 (i)
02839>      TIME TO PEAK    (hrs)=    2.033
02840>      RUNOFF VOLUME    (mm)=    2.064
02841>      TOTAL RAINFALL   (mm)=   25.000
02842>      RUNOFF COEFFICIENT   =     .083
02843>
02844>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02845>
02846> ------------------------------------------------------------------------------
02847> 007:0007----------------------------------------------------------------------
02848> ----------------------
02849> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02850> |  IN>02:(C-201 )    |
02851> | OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
02852> ----------------------   OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02853>                            (cms)     (ha.m.)    |    (cms)    (ha.m.)
02854>                             .000  .0000E+00     |   1.000  .1918E+00
02855>                             .000  .1796E+00     |   4.000  .2044E+00
02856>
02857>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02858>      --------------------       (ha)     (cms)     (hrs)       (mm)
02859>      INFLOW >02: (C-201 )       8.38      .039     2.033      2.064
02860>      OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
02861>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
02862>
02863>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02864>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02865>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02866>
02867>
02868>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
02869>                      TIME SHIFT OF PEAK FLOW          (min)=  -122.00
02870>                      MAXIMUM  STORAGE   USED       (ha.m.)=.1730E-01
02871>
02872>       *** WARNING: Outflow volume is less than inflow volume.
02873> ------------------------------------------------------------------------------
02874> 007:0008----------------------------------------------------------------------
02875> ----------------------
02876> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=63.00
02877> | 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02878> ----------------------   U.H. Tp(hrs)=    .560
02879>
02880>      Unit Hyd Qpeak  (cms)=     .981
02881>
02882>      PEAK FLOW       (cms)=     .076 (i)
02883>      TIME TO PEAK    (hrs)=    2.317
02884>      RUNOFF VOLUME    (mm)=    3.198
02885>      TOTAL RAINFALL   (mm)=   25.000
02886>      RUNOFF COEFFICIENT   =     .128
02887>
02888>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02889>
02890> ------------------------------------------------------------------------------
02891> 007:0009----------------------------------------------------------------------
02892> ----------------------
02893> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=52.00
02894> | 05:C-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02895> ----------------------   U.H. Tp(hrs)=    .260
02896>
02897>      Unit Hyd Qpeak  (cms)=     .469
02898>
02899>      PEAK FLOW       (cms)=     .018 (i)
02900>      TIME TO PEAK    (hrs)=    1.917
02901>      RUNOFF VOLUME    (mm)=    2.141
02902>      TOTAL RAINFALL   (mm)=   25.000
02903>      RUNOFF COEFFICIENT   =     .086
02904>
02905>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02906>
02907> ------------------------------------------------------------------------------
02908> 007:0010----------------------------------------------------------------------
02909> ----------------------
02910> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02911> |  IN>05:(C-202 )    |
02912> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
02913> ----------------------   OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02914>                            (cms)     (ha.m.)    |    (cms)    (ha.m.)
02915>                             .000  .0000E+00     |   1.000  .6400E-01
02916>                             .000  .5990E-01     |   2.000  .6820E-01
02917>
02918>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02919>      --------------------       (ha)     (cms)     (hrs)       (mm)
02920>      INFLOW >05: (C-202 )       3.19      .018     1.917      2.141
02921>      OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
02922>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
02923>
02924>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02925>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02926>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02927>
02928>
02929>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
02930>                      TIME SHIFT OF PEAK FLOW          (min)=  -115.00
02931>                      MAXIMUM  STORAGE   USED       (ha.m.)=.6829E-02
02932>
02933>       *** WARNING: Outflow volume is less than inflow volume.
02934> ------------------------------------------------------------------------------
02935> 007:0011----------------------------------------------------------------------
02936> ----------------------
02937> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02938> ----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
02939>                         ID1 04:EXC-2      14.38     .076    2.32   3.20    .000
02940>                        +ID2 06:SWM2A       3.19     .000     .00    .00    .000
02941>                         ============================================================
02942>                         SUM 07:CTR1A      17.57     .076    2.32   2.62    .000
02943>
02944>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02945>
02946> ------------------------------------------------------------------------------
02947> 007:0012----------------------------------------------------------------------
02948> ----------------------
02949> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02950> |  IN>07:(CTR1A )    |
02951> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
02952> ----------------------   OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02953>                            (cms)     (ha.m.)    |    (cms)    (ha.m.)
02954>                             .000  .0000E+00     |    .000  .1618E+00
02955>                             .000  .1260E-01     |    .862  .2671E+00
02956>                             .000  .4270E-01     |   2.728  .4058E+00
02957>                             .000  .8980E-01     |   4.016  .4888E+00
02958>
02959>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02960>      --------------------       (ha)     (cms)     (hrs)       (mm)
02961>      INFLOW >07: (CTR1A )       17.57      .076     2.317      2.618
02962>      OUTFLOW<08: (SWM2B )       17.57      .000      .000       .000
02963>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
02964>
02965>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02966>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02967>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02968>
02969>
02970>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
02971>                      TIME SHIFT OF PEAK FLOW          (min)=  -139.00
02972>                      MAXIMUM  STORAGE   USED       (ha.m.)=.4599E-01
02973>
02974>       *** WARNING: Outflow volume is less than inflow volume.
02975> ------------------------------------------------------------------------------
02976> 007:0013----------------------------------------------------------------------
02977> ----------------------
02978> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
02979> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02980> ----------------------   U.H. Tp(hrs)=    .500
02981>
02982>      Unit Hyd Qpeak  (cms)=     .000
02983>
02984>      PEAK FLOW       (cms)=     .000 (i)
02985>      TIME TO PEAK    (hrs)=    2.250
02986>      RUNOFF VOLUME    (mm)=     .020
02987>      TOTAL RAINFALL   (mm)=   25.000
02988>      RUNOFF COEFFICIENT   =     .001
02989>
02990>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02991>
02992> ------------------------------------------------------------------------------
02993> 007:0014----------------------------------------------------------------------
02994> ----------------------
02995> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02996> ----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
02997>                         ID1 08:SWM2B      17.57     .000     .00    .00    .000
02998>                        +ID2 09:BLANK        .00     .000    2.25    .02    .000
02999>                         ============================================================
03000>                         SUM 04:SB&BLK     17.57     .000    2.25    .00    .000
03001>
03002>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
03003>
03004> ------------------------------------------------------------------------------
03005> 007:0015----------------------------------------------------------------------
03006> ----------------------
03007> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
03008> |  IN>04:(SB&BLK)    |
03009> | OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
03010> ----------------------   OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
03011>                            (cms)     (ha.m.)    |    (cms)    (ha.m.)
03012>                             .000  .0000E+00     |    .500  .1054E+00
03013>                             .000  .9880E-01     |   1.300  .1124E+00
03014>
03015>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
03016>      --------------------       (ha)     (cms)     (hrs)       (mm)
03017>      INFLOW >04: (SB&BLK)       17.57      .000     2.250      .000
03018>      OUTFLOW<09: (SWM2C )       17.57      .000      .000      .000
03019>     OVERFLOW<10: (OSWM2C)        .00      .000      .000      .000
03020>
03021>                      TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
03022>                      CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
03023>                      PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
03024>
03025>
03026>                      PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
03027>                      TIME SHIFT OF PEAK FLOW          (min)=  -135.00
03028>                      MAXIMUM  STORAGE   USED       (ha.m.)=.1968E-09
03029>
03030> ------------------------------------------------------------------------------
03031> 007:0016----------------------------------------------------------------------
03032> ----------------------
03033> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
03034> ----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
03035>                         ID1 01:CTR1         .65     .005    2.02   3.20    .000
03036>                        +ID2 03:SWM1        8.38     .000     .00    .00    .000
03037>                        +ID3 09:SWM2C      17.57     .000     .00    .00    .000
03038>                         ============================================================
03039>                         SUM 01:CTR1       26.60     .005    2.02    .08    .000
03040>
03041>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
03042>
03043> ------------------------------------------------------------------------------
03044> 007:0017----------------------------------------------------------------------
03045> ----------------------
03046> | DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=66.00
03047> | 01:C-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
03048> ----------------------   U.H. Tp(hrs)=    .300
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03049>
03050>      Unit Hyd Qpeak  (cms)=    1.145
03051>
03052>      PEAK FLOW       (cms)=     .080 (i)
03053>      TIME TO PEAK    (hrs)=    1.967
03054>      RUNOFF VOLUME    (mm)=    3.578
03055>      TOTAL RAINFALL   (mm)=   25.000
03056>      RUNOFF COEFFICIENT   =     .143
03057>
03058>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03059>
03060> ------------------------------------------------------------------------------
03061> 007:0018------------------------------------------------------------------------
03062> --------------------
03063> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
03064> |  IN>01:(C-203 )   |
03065> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
03066> --------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
03067>                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
03068>                            .000  .0000E+00     |    3.000  .2660E+00
03069>                            .000  .2491E+00     |    7.000  .2834E+00
03070>
03071>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
03072>      ---------------------        (ha)     (cms)     (hrs)       (mm)
03073>      INFLOW >01: (C-203 )        8.99      .080     1.967      3.578
03074>      OUTFLOW<02: (SWM3  )        8.99      .000      .000       .000
03075>     OVERFLOW<10: (OVSWM3)         .00      .000      .000       .000
03076>
03077>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
03078>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
03079>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
03080>
03081>
03082>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
03083>                     TIME SHIFT OF PEAK FLOW          (min)=  -118.00
03084>                     MAXIMUM  STORAGE   USED       (ha.m.)=.3217E-01
03085>
03086>       *** WARNING: Outflow volume is less than inflow volume.
03087> ------------------------------------------------------------------------------
03088> 007:0019------------------------------------------------------------------------
03089> --------------------
03090> | DESIGN NASHYD     |   Area     (ha)=    5.15   Curve Number    (CN)=63.00
03091> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
03092> --------------------   U.H. Tp(hrs)=    .390
03093>
03094>      Unit Hyd Qpeak  (cms)=     .504
03095>
03096>      PEAK FLOW       (cms)=     .035 (i)
03097>      TIME TO PEAK    (hrs)=    2.083
03098>      RUNOFF VOLUME    (mm)=    3.198
03099>      TOTAL RAINFALL   (mm)=   25.000
03100>      RUNOFF COEFFICIENT   =     .128
03101>
03102>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03103>
03104> ------------------------------------------------------------------------------
03105> 007:0020------------------------------------------------------------------------
03106> ----------------------
03107> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
03108> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
03109>                        ID1 02:SWM3          8.99     .000     .00    .00    .000
03110>                       +ID2 03:EXC-3         5.15     .035    2.08   3.20    .000
03111>                        ============================================================
03112>                        SUM 01:CTR2          14.14     .035    2.08   1.16    .000
03113>
03114>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
03115>
03116> ------------------------------------------------------------------------------
03117> 007:0021------------------------------------------------------------------------
03118> --------------------
03119> | DESIGN NASHYD     |   Area     (ha)=    5.81   Curve Number    (CN)=71.00
03120> | 01:C-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
03121> --------------------   U.H. Tp(hrs)=    .260
03122>
03123>      Unit Hyd Qpeak  (cms)=     .854
03124>
03125>      PEAK FLOW       (cms)=     .070 (i)
03126>      TIME TO PEAK    (hrs)=    1.900
03127>      RUNOFF VOLUME    (mm)=    4.340
03128>      TOTAL RAINFALL   (mm)=   25.000
03129>      RUNOFF COEFFICIENT   =     .174
03130>
03131>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
03132>
03133> ------------------------------------------------------------------------------
03134> 007:0022------------------------------------------------------------------------
03135> --------------------
03136> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
03137> |  IN>01:(C-204 )   |
03138> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
03139> --------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
03140>                           (cms)     (ha.m.)    |    (cms)    (ha.m.)
03141>                            .000  .0000E+00     |    1.000  .1925E+00
03142>                            .000  .1803E+00     |    2.000  .2051E+00
03143>
03144>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
03145>      ---------------------        (ha)     (cms)     (hrs)       (mm)
03146>      INFLOW >01: (C-204 )        5.81      .070     1.900      4.340
03147>      OUTFLOW<02: (SWM4  )        5.81      .000      .000       .000
03148>     OVERFLOW<05: (OVSWM4)         .00      .000      .000       .000
03149>
03150>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
03151>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
03152>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
03153>
03154>
03155>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
03156>                     TIME SHIFT OF PEAK FLOW          (min)=  -114.00
03157>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2522E-01
03158>
03159>       *** WARNING: Outflow volume is less than inflow volume.
03160> ------------------------------------------------------------------------------
03161> 007:0023------------------------------------------------------------------------
03162> ------------------------------------------------------------------------------
03163> 007:0002------------------------------------------------------------------------
03164> ------------------------------------------------------------------------------
03165> 007:0002------------------------------------------------------------------------
03166> ------------------------------------------------------------------------------
03167> 007:0002------------------------------------------------------------------------
03168> ------------------------------------------------------------------------------
03169> 007:0002------------------------------------------------------------------------
03170> ------------------------------------------------------------------------------
03171> 007:0002------------------------------------------------------------------------
03172> ------------------------------------------------------------------------------
03173> 007:0002------------------------------------------------------------------------
03174>       FINISH
03175> ------------------------------------------------------------------------------
03176> ******************************************************************************
03177>      WARNINGS / ERRORS / NOTES
03178>      -------------------------
03179>  001:0004 ROUTE RESERVOIR
03180>       *** WARNING: Outflow volume is less than inflow volume.
03181>  001:0007 ROUTE RESERVOIR
03182>       *** WARNING: Outflow volume is less than inflow volume.
03183>  001:0010 ROUTE RESERVOIR
03184>       *** WARNING: Outflow volume is less than inflow volume.
03185>  001:0012 ROUTE RESERVOIR
03186>       *** WARNING: Outflow volume is less than inflow volume.
03187>  001:0018 ROUTE RESERVOIR
03188>       *** WARNING: Outflow volume is less than inflow volume.
03189>  001:0022 ROUTE RESERVOIR
03190>       *** WARNING: Outflow volume is less than inflow volume.
03191>  002:0004 ROUTE RESERVOIR
03192>       *** WARNING: Outflow volume is less than inflow volume.
03193>  002:0007 ROUTE RESERVOIR
03194>       *** WARNING: Outflow volume is less than inflow volume.
03195>  002:0010 ROUTE RESERVOIR
03196>       *** WARNING: Outflow volume is less than inflow volume.
03197>  002:0012 ROUTE RESERVOIR
03198>       *** WARNING: Outflow volume is less than inflow volume.
03199>  002:0018 ROUTE RESERVOIR
03200>       *** WARNING: Outflow volume is less than inflow volume.
03201>  002:0022 ROUTE RESERVOIR
03202>       *** WARNING: Outflow volume is less than inflow volume.
03203>  003:0004 ROUTE RESERVOIR
03204>       *** WARNING: Outflow volume is less than inflow volume.
03205>  003:0007 ROUTE RESERVOIR
03206>       *** WARNING: Outflow volume is less than inflow volume.
03207>  003:0010 ROUTE RESERVOIR
03208>       *** WARNING: Outflow volume is less than inflow volume.
03209>  003:0012 ROUTE RESERVOIR
03210>       *** WARNING: Outflow volume is less than inflow volume.
03211>  003:0018 ROUTE RESERVOIR
03212>       *** WARNING: Outflow volume is less than inflow volume.
03213>  003:0022 ROUTE RESERVOIR
03214>       *** WARNING: Outflow volume is less than inflow volume.
03215>  004:0004 ROUTE RESERVOIR
03216>       *** WARNING: Outflow volume is less than inflow volume.
03217>  004:0007 ROUTE RESERVOIR
03218>       *** WARNING: Outflow volume is less than inflow volume.
03219>  004:0010 ROUTE RESERVOIR
03220>       *** WARNING: Outflow volume is less than inflow volume.
03221>  004:0012 ROUTE RESERVOIR
03222>       *** WARNING: Outflow volume is less than inflow volume.
03223>  004:0015 ROUTE RESERVOIR
03224>       *** WARNING: Outflow volume is less than inflow volume.
03225>  004:0018 ROUTE RESERVOIR
03226>       *** WARNING: Outflow volume is less than inflow volume.
03227>  004:0022 ROUTE RESERVOIR
03228>       *** WARNING: Outflow volume is less than inflow volume.
03229>  005:0004 ROUTE RESERVOIR
03230>       *** WARNING: Outflow volume is less than inflow volume.
03231>  005:0007 ROUTE RESERVOIR
03232>       *** WARNING: Outflow volume is less than inflow volume.
03233>  005:0010 ROUTE RESERVOIR
03234>       *** WARNING: Outflow volume is less than inflow volume.
03235>  005:0012 ROUTE RESERVOIR
03236>       *** WARNING: Outflow volume is less than inflow volume.
03237>  005:0018 ROUTE RESERVOIR
03238>       *** WARNING: Outflow volume is less than inflow volume.
03239>  005:0022 ROUTE RESERVOIR
03240>       *** WARNING: Outflow volume is less than inflow volume.
03241>  006:0004 ROUTE RESERVOIR
03242>       *** WARNING: Outflow volume is less than inflow volume.
03243>  006:0007 ROUTE RESERVOIR
03244>       *** WARNING: Outflow volume is less than inflow volume.
03245>  006:0010 ROUTE RESERVOIR
03246>       *** WARNING: Outflow volume is less than inflow volume.
03247>  006:0012 ROUTE RESERVOIR
03248>       *** WARNING: Outflow volume is less than inflow volume.
03249>  006:0015 ROUTE RESERVOIR
03250>       *** WARNING: Outflow volume is less than inflow volume.
03251>  006:0018 ROUTE RESERVOIR
03252>       *** WARNING: Outflow volume is less than inflow volume.
03253>  006:0022 ROUTE RESERVOIR
03254>       *** WARNING: Outflow volume is less than inflow volume.
03255>  007:0004 ROUTE RESERVOIR
03256>       *** WARNING: Outflow volume is less than inflow volume.
03257>  007:0007 ROUTE RESERVOIR
03258>       *** WARNING: Outflow volume is less than inflow volume.
03259>  007:0010 ROUTE RESERVOIR
03260>       *** WARNING: Outflow volume is less than inflow volume.
03261>  007:0012 ROUTE RESERVOIR
03262>       *** WARNING: Outflow volume is less than inflow volume.
03263>  007:0018 ROUTE RESERVOIR
03264>       *** WARNING: Outflow volume is less than inflow volume.
03265>  007:0022 ROUTE RESERVOIR
03266>       *** WARNING: Outflow volume is less than inflow volume.
03267>    Simulation ended on 2018-01-12     at 11:31:46
03268> ==============================================================================
03269>
```

```
00001> ================================================================================
00002>
00003>    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
00004>    S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
00006>        S  W W  M  M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
00007>    SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9    =========
00008>                                                          9   9  9   9   # 4730904
00009>          StormWater Management HYdrologic Model           999    999    =========
00010>
00011> ********************************************************************************
00012> ****************************** SWMHYMO Ver/4.05  *******************************
00013> *********  A single event and continuous hydrologic simulation model  *********
00014> *********     based on the principles of HYMO and its successors      *********
00015> *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
00016> ********************************************************************************
00017> ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
00018> *********                  Ottawa,  Ontario: (613) 836-3884            *********
00019> *********                  Gatineau, Quebec: (819) 243-6858            *********
00020> *********                  E-Mail: swmhymo@jfsa.com                    *********
00021> ********************************************************************************
00022>
00023> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024> +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
00025> +++++++++                 Kitchener            SERIAL#:4730904       +++++++++
00026> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028> ********************************************************************************
00029> **********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++              **********
00030> **********           Maximum value for ID numbers  :     10             **********
00031> **********           Max. number of rainfall points: 105408             **********
00032> **********           Max. number of flow points    : 105408             **********
00033> ********************************************************************************
00034>
00035>
00036> **********************   D E T A I L E D   O U T P U T   **********************
00037> ********************************************************************************
00038> *         DATE: 2018-01-12     TIME: 11:34:14     RUN COUNTER: 001845         *
00039> ********************************************************************************
00040> * Input   filename: C:\TREVOR-1\$13356~1\AMCIII\CPR-1.dat                       *
00041> * Output  filename: C:\TREVOR-1\$13356~1\AMCIII\CPR-1.out                       *
00042> * Summary filename: C:\TREVOR-1\$13356~1\AMCIII\CPR-1.sum                       *
00043> * User comments:                                                               *
00044> * 1:_____________________________________________________________________________*
00045> * 2:_____________________________________________________________________________*
00046> * 3:_____________________________________________________________________________*
00047> ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001--------------------------------------------------------------------------
00051> *#*****************************************************************************
00052> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00053> *#  Date        : 2017/11/24
00054> *#  Modeller    : [C. Fischer]
00055> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00056> *#  License #   : 4730904
00057> *#*****************************************************************************
00058> *#
00059> *#                       Block C - PROPOSED CONDITIONS
00060> *#
00061> *#*****************************************************************************
00062> ---------------------
00063> | START             |  Project  dir.: C:\TREVOR-1\$13356~1\AMCIII\
00064> ---------------------  Rainfall dir.: C:\TREVOR-1\$13356~1\AMCIII\
00065>     TZERO =   .00 hrs on      0
00066>     METOUT=   2 (output = METRIC)
00067>     NRUN  = 001
00068>     NSTORM=   1
00069>           #  1=LYA2.1hr
00070> --------------------------------------------------------------------------------
00071> 001:0002--------------------------------------------------------------------------
00072> ---------------------
00073> | READ STORM        |    Filename: Belleville IDF (1-hr 30% AES - 2 Year)
00074> | Ptotal=  22.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 2 Year)
00075> ---------------------
00076>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>               .08  23.868 |    .33  29.172 |    .58  26.520 |    .83   7.956
00079>               .17  37.128 |    .42  34.476 |    .67  13.260 |    .92   2.652
00080>               .25  55.692 |    .50  23.868 |    .75  10.608 |   1.00    .000
00081>
00082> --------------------------------------------------------------------------------
00083> 001:0003--------------------------------------------------------------------------
00084> *#*****************************************************************************
00085> *#
00086> *#                                AMC III Conditions
00087> *#
00088> *#*****************************************************************************
00089> ----------------------
00090> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=75.00
00091> | 01:C-200  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00092> ----------------------   U.H. Tp(hrs)=    .270
00093>
00094>     Unit Hyd Qpeak  (cms)=     .646
00095>
00096>     PEAK FLOW       (cms)=     .070 (i)
00097>     TIME TO PEAK    (hrs)=     .767
00098>     RUNOFF VOLUME    (mm)=    4.031
00099>     TOTAL RAINFALL   (mm)=   22.100
00100>     RUNOFF COEFFICIENT   =     .182
00101>
00102>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00103>
00104> --------------------------------------------------------------------------------
00105> 001:0004--------------------------------------------------------------------------
00106> ---------------------
00107> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00108> |  IN>01:(C-200 )   |
00109> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
00110> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00111>                           (cms)     (ha.m.)  |    (cms)     (ha.m.)
00112>                            .000  .0000E+00   |   2.000  .1372E+00
00113>                            .000  .1285E+00   |   5.000  .1462E+00
00114>
00115>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00116>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00117>     INFLOW >01: (C-200 )       4.57      .070      .767      4.031
00118>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
00119>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
00120>
00121>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00122>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00123>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00124>
00125>
00126>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00127>                    TIME SHIFT OF PEAK FLOW         (min)=   -46.00
00128>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1842E-01
00129>
00130>      *** WARNING: Outflow volume is less than inflow volume.
00131> --------------------------------------------------------------------------------
00132> 001:0005--------------------------------------------------------------------------
00133> ---------------------
00134> | DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=80.00
00135> | 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00136> ---------------------   U.H. Tp(hrs)=    .340
00137>
00138>     Unit Hyd Qpeak  (cms)=     .073
00139>
00140>     PEAK FLOW       (cms)=     .011 (i)
00141>     TIME TO PEAK    (hrs)=     .850
00142>     RUNOFF VOLUME    (mm)=    5.046
00143>     TOTAL RAINFALL   (mm)=   22.100
00144>     RUNOFF COEFFICIENT   =     .228
00145>
00146>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00147>
00148> --------------------------------------------------------------------------------
00149> 001:0006--------------------------------------------------------------------------
00150> ---------------------
00151> | DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number   (CN)=70.00
00152> | 02:C-201  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00153> ---------------------   U.H. Tp(hrs)=    .350
00154>
00155>     Unit Hyd Qpeak  (cms)=     .914
00156>
00157>     PEAK FLOW       (cms)=     .091 (i)
00158>     TIME TO PEAK    (hrs)=     .867
00159>     RUNOFF VOLUME    (mm)=    3.278
00160>     TOTAL RAINFALL   (mm)=   22.100
00161>     RUNOFF COEFFICIENT   =     .148
00162>
00163>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00164>
00165> --------------------------------------------------------------------------------
00166> 001:0007--------------------------------------------------------------------------
00167> ---------------------
00168> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00169> |  IN>02:(C-201 )   |
00170> | OUT<03:(SWM1  )   |    =========  OUTLFOW STORAGE TABLE  =========
00171> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00172>                           (cms)     (ha.m.)  |    (cms)     (ha.m.)
00173>                            .000  .0000E+00   |   1.000  .1918E+00
00174>                            .000  .1796E+00   |   4.000  .2044E+00
00175>
00176>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00177>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00178>     INFLOW >02: (C-201 )       8.38      .091      .867      3.278
00179>     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
00180>    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
00181>
00182>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00183>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00184>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00185>
00186>
00187>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00188>                    TIME SHIFT OF PEAK FLOW         (min)=   -52.00
00189>                    MAXIMUM  STORAGE   USED       (ha.m.)=.2747E-01
00190>
00191>      *** WARNING: Outflow volume is less than inflow volume.
00192> --------------------------------------------------------------------------------
00193> 001:0008--------------------------------------------------------------------------
00194> ---------------------
00195> | DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=80.00
00196> | 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00197> ---------------------   U.H. Tp(hrs)=    .560
00198>
00199>     Unit Hyd Qpeak  (cms)=     .981
00200>
00201>     PEAK FLOW       (cms)=     .174 (i)
00202>     TIME TO PEAK    (hrs)=    1.067
00203>     RUNOFF VOLUME    (mm)=    5.046
00204>     TOTAL RAINFALL   (mm)=   22.100
00205>     RUNOFF COEFFICIENT   =     .228
00206>
00207>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00208>
00209> --------------------------------------------------------------------------------
00210> 001:0009--------------------------------------------------------------------------
00211> ---------------------
00212> | DESIGN NASHYD      |   Area     (ha)=    3.19   Curve Number   (CN)=71.00
00213> | 05:C-202  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00214> ---------------------   U.H. Tp(hrs)=    .260
00215>
00216>     Unit Hyd Qpeak  (cms)=     .469
00217>
00218>     PEAK FLOW       (cms)=     .042 (i)
00219>     TIME TO PEAK    (hrs)=     .767
00220>     RUNOFF VOLUME    (mm)=    3.413
00221>     TOTAL RAINFALL   (mm)=   22.100
00222>     RUNOFF COEFFICIENT   =     .154
00223>
00224>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00225>
00226> --------------------------------------------------------------------------------
00227> 001:0010--------------------------------------------------------------------------
00228> ---------------------
00229> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00230> |  IN>05:(C-202 )   |
00231> | OUT<06:(SWM2A )   |    =========  OUTLFOW STORAGE TABLE  =========
00232> ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00233>                           (cms)     (ha.m.)  |    (cms)     (ha.m.)
00234>                            .000  .0000E+00   |   1.000  .6400E-01
00235>                            .000  .5990E-01   |   2.000  .6820E-01
00236>
00237>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00238>     ---------------------       (ha)     (cms)     (hrs)       (mm)
00239>     INFLOW >05: (C-202 )       3.19      .042      .767      3.413
00240>     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
00241>    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
00242>
00243>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00244>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00245>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00246>
00247>
00248>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00249>                    TIME SHIFT OF PEAK FLOW         (min)=   -46.00
00250>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1089E-01
00251>
00252>      *** WARNING: Outflow volume is less than inflow volume.
00253> --------------------------------------------------------------------------------
00254> 001:0011--------------------------------------------------------------------------
```

```
00255> ----------------------
00256> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00257> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00258>                        ID1 04:EXC-2       14.38     .174    1.07   5.05    .000
00259>                       +ID2 06:SWM2A        3.19     .000     .00    .00    .000
00260>                        ============================================================
00261>                        SUM 07:CTR1A       17.57     .174    1.07   4.13    .000
00262>
00263>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00264>
00265> ---------------------------------------------------------------------------------
00266> 001:0012-----------------------------------------------------------------------
00267> ----------------------
00268> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00269> |  IN>07:(CTR1A )   |
00270> | OUT<08:(SWM2B )   |    =========  OUTLFOW STORAGE TABLE  =========
00271> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00272>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00273>                             .000  .0000E+00    |     .000  .1618E+00
00274>                             .000  .1260E-01    |     .862  .2671E+00
00275>                             .000  .4270E-01    |    2.728  .4058E+00
00276>                             .000  .8980E-01    |    4.016  .4888E+00
00277>
00278>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00279>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00280>      INFLOW >07: (CTR1A )      17.57      .174     1.067      4.130
00281>      OUTFLOW<08: (SWM2B )      17.57      .000      .000       .000
00282>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
00283>
00284>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00285>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00286>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00287>
00288>
00289>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00290>                     TIME SHIFT OF PEAK FLOW          (min)=   -64.00
00291>                     MAXIMUM  STORAGE   USED        (ha.m.)=.7256E-01
00292>
00293>       *** WARNING: Outflow volume is less than inflow volume.
00294> ---------------------------------------------------------------------------------
00295> 001:0013-----------------------------------------------------------------------
00296> ----------------------
00297> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
00298> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00299> ----------------------   U.H. Tp(hrs)=    .500
00300>
00301>      Unit Hyd Qpeak  (cms)=     .000
00302>
00303>      PEAK FLOW       (cms)=     .000 (i)
00304>      TIME TO PEAK    (hrs)=    1.000
00305>      RUNOFF VOLUME    (mm)=     .006
00306>      TOTAL RAINFALL   (mm)=   22.100
00307>      RUNOFF COEFFICIENT   =     .000
00308>
00309>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00310>
00311> ---------------------------------------------------------------------------------
00312> 001:0014-----------------------------------------------------------------------
00313> ----------------------
00314> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00315> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00316>                        ID1 08:SWM2B       17.57     .000     .00    .00    .000
00317>                       +ID2 09:BLANK         .00     .000    1.00    .01    .000
00318>                        ============================================================
00319>                        SUM 04:SB&BLK      17.57     .000    1.00    .00    .000
00320>
00321>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00322>
00323> ---------------------------------------------------------------------------------
00324> 001:0015-----------------------------------------------------------------------
00325> ----------------------
00326> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00327> |  IN>04:(SB&BLK)   |
00328> | OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
00329> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00330>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00331>                             .000  .0000E+00    |     .500  .1054E+00
00332>                             .000  .9880E-01    |    1.300  .1124E+00
00333>
00334>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00335>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00336>      INFLOW >04: (SB&BLK)      17.57      .000     1.000       .000
00337>      OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
00338>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
00339>
00340>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00341>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00342>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00343>
00344>
00345>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00346>                     TIME SHIFT OF PEAK FLOW          (min)=   -60.00
00347>                     MAXIMUM  STORAGE   USED        (ha.m.)=.6353E-10
00348>
00349> ---------------------------------------------------------------------------------
00350> 001:0016-----------------------------------------------------------------------
00351> ----------------------
00352> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00353> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00354>                        ID1 01:CTR1          .65     .011     .85   5.05    .000
00355>                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
00356>                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
00357>                        ============================================================
00358>                        SUM 01:CTR1        26.60     .011     .85    .12    .000
00359>
00360>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00361>
00362> ---------------------------------------------------------------------------------
00363> 001:0017-----------------------------------------------------------------------
00364> ----------------------
00365> | DESIGN NASHYD      |   Area    (ha)=    8.99   Curve Number   (CN)=82.00
00366> | 01:C-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00367> ----------------------   U.H. Tp(hrs)=    .300
00368>
00369>      Unit Hyd Qpeak  (cms)=    1.145
00370>
00371>      PEAK FLOW       (cms)=     .179 (i)
00372>      TIME TO PEAK    (hrs)=     .800
00373>      RUNOFF VOLUME    (mm)=    5.558
00374>      TOTAL RAINFALL   (mm)=   22.100
00375>      RUNOFF COEFFICIENT   =     .251
00376>
00377>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00378>
00379> ---------------------------------------------------------------------------------
00380> 001:0018-----------------------------------------------------------------------
00381> ----------------------
00382> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00383> |  IN>01:(C-203 )   |
00384> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
00385> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00386>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00387>                             .000  .0000E+00    |    3.000  .2660E+00
00388>                             .000  .2491E+00    |    7.000  .2834E+00
00389>
00390>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00391>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00392>      INFLOW >01: (C-203 )       8.99      .179      .800      5.558
00393>      OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
00394>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
00395>
00396>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00397>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00398>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00399>
00400>
00401>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00402>                     TIME SHIFT OF PEAK FLOW          (min)=   -48.00
00403>                     MAXIMUM  STORAGE   USED        (ha.m.)=.4996E-01
00404>
00405>       *** WARNING: Outflow volume is less than inflow volume.
00406> ---------------------------------------------------------------------------------
00407> 001:0019-----------------------------------------------------------------------
00408> ----------------------
00409> | DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=80.00
00410> | 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00411> ----------------------   U.H. Tp(hrs)=    .390
00412>
00413>      Unit Hyd Qpeak  (cms)=     .504
00414>
00415>      PEAK FLOW       (cms)=     .081 (i)
00416>      TIME TO PEAK    (hrs)=     .900
00417>      RUNOFF VOLUME    (mm)=    5.046
00418>      TOTAL RAINFALL   (mm)=   22.100
00419>      RUNOFF COEFFICIENT   =     .228
00420>
00421>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00422>
00423> ---------------------------------------------------------------------------------
00424> 001:0020-----------------------------------------------------------------------
00425> ----------------------
00426> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00427> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00428>                        ID1 02:SWM3         8.99     .000     .00    .00    .000
00429>                       +ID2 03:EXC-3        5.15     .081     .90   5.05    .000
00430>                        ============================================================
00431>                        SUM 01:CTR2        14.14     .081     .90   1.84    .000
00432>
00433>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00434>
00435> ---------------------------------------------------------------------------------
00436> 001:0021-----------------------------------------------------------------------
00437> ----------------------
00438> | DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=86.00
00439> | 01:C-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00440> ----------------------   U.H. Tp(hrs)=    .260
00441>
00442>      Unit Hyd Qpeak  (cms)=     .854
00443>
00444>      PEAK FLOW       (cms)=     .153 (i)
00445>      TIME TO PEAK    (hrs)=     .733
00446>      RUNOFF VOLUME    (mm)=    6.850
00447>      TOTAL RAINFALL   (mm)=   22.100
00448>      RUNOFF COEFFICIENT   =     .310
00449>
00450>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00451>
00452> ---------------------------------------------------------------------------------
00453> 001:0022-----------------------------------------------------------------------
00454> ----------------------
00455> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00456> |  IN>01:(C-204 )   |
00457> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
00458> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00459>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00460>                             .000  .0000E+00    |    1.000  .1925E+00
00461>                             .000  .1803E+00    |    2.000  .2051E+00
00462>
00463>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00464>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00465>      INFLOW >01: (C-204 )       5.81      .153      .733      6.850
00466>      OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
00467>     OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
00468>
00469>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00470>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00471>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00472>
00473>
00474>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00475>                     TIME SHIFT OF PEAK FLOW          (min)=   -44.00
00476>                     MAXIMUM  STORAGE   USED        (ha.m.)=.3980E-01
00477>
00478>       *** WARNING: Outflow volume is less than inflow volume.
00479> ---------------------------------------------------------------------------------
00480> 001:0023-----------------------------------------------------------------------
00481>   ** END OF RUN :   1
00482>
00483> *********************************************************************************
00484>
00485>
00486>
00487>
00488>
00489> --------------------
00490> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
00491> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
00492>     TZERO =   .00 hrs on        0
00493>     METOUT=   2 (output = METRIC)
00494>     NRUN  = 002
00495>     NSTORM=   1
00496>            #  1=LYA2.12h
00497> ---------------------------------------------------------------------------------
00498> 002:0002-----------------------------------------------------------------------
00499> *#*****************************************************************************
00500> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00501> *#  Date        : 2017/11/24
00502> *#  Modeller    : [C. Fischer]
00503> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00504> *#  License #   : 4730904
00505> *#*****************************************************************************
00506> *#
00507> *#                     Block C - PROPOSED CONDITIONS
00508> *#
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00509> *#*************************************************************************
00510> ---------------------------------------------------------------------------
00511> 002:0002-----------------------------------------------------------------
00512> --------------------
00513> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 2 Year)
00514> | Ptotal=  42.24 mm|    Comments: Belleville IDF (12-hr 30% AES - 2 Year)
00515> --------------------
00516>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00517>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00518>              1.00   3.960 |   4.00   6.600 |   7.00   1.320 |  10.00    .000
00519>              2.00  11.440 |   5.00   6.160 |   8.00    .440 |  11.00    .000
00520>              3.00   8.800 |   6.00   3.520 |   9.00    .000 |  12.00    .000
00521>
00522> ---------------------------------------------------------------------------
00523> 002:0003-----------------------------------------------------------------
00524> *#*************************************************************************
00525> *#
00526> *#                              AMC III Conditions
00527> *#
00528> *#*************************************************************************
00529> ----------------------
00530> | DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=75.00
00531> | 01:C-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00532> ----------------------   U.H. Tp(hrs)=    .270
00533>
00534>      Unit Hyd Qpeak  (cms)=     .646
00535>
00536>      PEAK FLOW       (cms)=     .038 (i)
00537>      TIME TO PEAK    (hrs)=    3.100
00538>      RUNOFF VOLUME    (mm)=   13.235
00539>      TOTAL RAINFALL   (mm)=   42.240
00540>      RUNOFF COEFFICIENT   =     .313
00541>
00542>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00543>
00544> ---------------------------------------------------------------------------
00545> 002:0004-----------------------------------------------------------------
00546> ----------------------
00547> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00548> |  IN>01:(C-200 )    |
00549> | OUT<02:(SWM0  )    |    =========  OUTLFOW STORAGE TABLE  =========
00550> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00551>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00552>                              .000  .0000E+00     |    2.000  .1372E+00
00553>                              .000  .1285E+00     |    5.000  .1462E+00
00554>
00555>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00556>      ----------------------      (ha)     (cms)     (hrs)       (mm)
00557>      INFLOW >01: (C-200 )       4.57      .038     3.100     13.235
00558>      OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
00559>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
00560>
00561>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00562>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00563>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00564>
00565>
00566>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00567>                     TIME SHIFT OF PEAK FLOW          (min)=  -186.00
00568>                     MAXIMUM  STORAGE   USED       (ha.m.)=.6048E-01
00569>
00570>       *** WARNING: Outflow volume is less than inflow volume.
00571> ---------------------------------------------------------------------------
00572> 002:0005-----------------------------------------------------------------
00573> ----------------------
00574> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=80.00
00575> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00576> ----------------------   U.H. Tp(hrs)=    .340
00577>
00578>      Unit Hyd Qpeak  (cms)=     .073
00579>
00580>      PEAK FLOW       (cms)=     .007 (i)
00581>      TIME TO PEAK    (hrs)=    3.150
00582>      RUNOFF VOLUME    (mm)=   15.922
00583>      TOTAL RAINFALL   (mm)=   42.240
00584>      RUNOFF COEFFICIENT   =     .377
00585>
00586>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00587>
00588> ---------------------------------------------------------------------------
00589> 002:0006-----------------------------------------------------------------
00590> ----------------------
00591> | DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=70.00
00592> | 02:C-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00593> ----------------------   U.H. Tp(hrs)=    .350
00594>
00595>      Unit Hyd Qpeak  (cms)=     .914
00596>
00597>      PEAK FLOW       (cms)=     .059 (i)
00598>      TIME TO PEAK    (hrs)=    5.050
00599>      RUNOFF VOLUME    (mm)=   11.095
00600>      TOTAL RAINFALL   (mm)=   42.240
00601>      RUNOFF COEFFICIENT   =     .263
00602>
00603>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00604>
00605> ---------------------------------------------------------------------------
00606> 002:0007-----------------------------------------------------------------
00607> ----------------------
00608> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00609> |  IN>02:(C-201 )    |
00610> | OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
00611> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00612>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00613>                              .000  .0000E+00     |    1.000  .1918E+00
00614>                              .000  .1796E+00     |    4.000  .2044E+00
00615>
00616>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00617>      ----------------------      (ha)     (cms)     (hrs)       (mm)
00618>      INFLOW >02: (C-201 )       8.38      .059     5.050     11.095
00619>      OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
00620>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
00621>
00622>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00623>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00624>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00625>
00626>
00627>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00628>                     TIME SHIFT OF PEAK FLOW          (min)=  -303.00
00629>                     MAXIMUM  STORAGE   USED       (ha.m.)=.9298E-01
00630>
00631>       *** WARNING: Outflow volume is less than inflow volume.
00632> ---------------------------------------------------------------------------
00633> 002:0008-----------------------------------------------------------------
00634> ----------------------
00635> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=80.00
00636> | 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00637> ----------------------   U.H. Tp(hrs)=    .560
00638>
00639>      Unit Hyd Qpeak  (cms)=     .981
00640>
00641>      PEAK FLOW       (cms)=     .137 (i)
00642>      TIME TO PEAK    (hrs)=    5.083
00643>      RUNOFF VOLUME    (mm)=   15.922
00644>      TOTAL RAINFALL   (mm)=   42.240
00645>      RUNOFF COEFFICIENT   =     .377
00646>
00647>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00648>
00649> ---------------------------------------------------------------------------
00650> 002:0009-----------------------------------------------------------------
00651> ----------------------
00652> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=71.00
00653> | 05:C-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00654> ----------------------   U.H. Tp(hrs)=    .260
00655>
00656>      Unit Hyd Qpeak  (cms)=     .469
00657>
00658>      PEAK FLOW       (cms)=     .023 (i)
00659>      TIME TO PEAK    (hrs)=    5.033
00660>      RUNOFF VOLUME    (mm)=   11.487
00661>      TOTAL RAINFALL   (mm)=   42.240
00662>      RUNOFF COEFFICIENT   =     .272
00663>
00664>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00665>
00666> ---------------------------------------------------------------------------
00667> 002:0010-----------------------------------------------------------------
00668> ----------------------
00669> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00670> |  IN>05:(C-202 )    |
00671> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
00672> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00673>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00674>                              .000  .0000E+00     |    1.000  .6400E-01
00675>                              .000  .5990E-01     |    2.000  .6820E-01
00676>
00677>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00678>      ----------------------      (ha)     (cms)     (hrs)       (mm)
00679>      INFLOW >05: (C-202 )       3.19      .023     5.033     11.487
00680>      OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
00681>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
00682>
00683>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00684>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00685>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00686>
00687>
00688>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
00689>                     TIME SHIFT OF PEAK FLOW          (min)=  -302.00
00690>                     MAXIMUM  STORAGE   USED       (ha.m.)=.3664E-01
00691>
00692>       *** WARNING: Outflow volume is less than inflow volume.
00693> ---------------------------------------------------------------------------
00694> 002:0011-----------------------------------------------------------------
00695> ----------------------
00696> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00697> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00698>                          ID1 04:EXC-2      14.38     .137    5.08  15.92    .000
00699>                         +ID2 06:SWM2A       3.19     .000     .00    .00    .000
00700>                          ================================================
00701>                          SUM 07:CTR1A       17.57     .137    5.08  13.03    .000
00702>
00703>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00704>
00705> ---------------------------------------------------------------------------
00706> 002:0012-----------------------------------------------------------------
00707> ----------------------
00708> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00709> |  IN>07:(CTR1A )    |
00710> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
00711> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
00712>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
00713>                              .000  .0000E+00     |     .000  .1618E+00
00714>                              .000  .1260E-01     |     .862  .2671E+00
00715>                              .000  .4270E-01     |    2.728  .4058E+00
00716>                              .000  .8980E-01     |    4.016  .4888E+00
00717>
00718>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00719>      ----------------------      (ha)     (cms)     (hrs)       (mm)
00720>      INFLOW >07: (CTR1A )       17.57      .137     5.083     13.032
00721>      OUTFLOW<08: (SWM2B )       17.57      .093     6.200      3.854
00722>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
00723>
00724>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
00725>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00726>                     PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00727>
00728>
00729>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=    68.079
00730>                     TIME SHIFT OF PEAK FLOW          (min)=    67.00
00731>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1732E+00
00732>
00733>       *** WARNING: Outflow volume is less than inflow volume.
00734> ---------------------------------------------------------------------------
00735> 002:0013-----------------------------------------------------------------
00736> ----------------------
00737> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
00738> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00739> ----------------------   U.H. Tp(hrs)=    .500
00740>
00741>      Unit Hyd Qpeak  (cms)=     .000
00742>
00743>      PEAK FLOW       (cms)=     .000 (i)
00744>      TIME TO PEAK    (hrs)=    5.133
00745>      RUNOFF VOLUME    (mm)=     .066
00746>      TOTAL RAINFALL   (mm)=   42.240
00747>      RUNOFF COEFFICIENT   =     .002
00748>
00749>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00750>
00751> ---------------------------------------------------------------------------
00752> 002:0014-----------------------------------------------------------------
00753> ----------------------
00754> | ADD HYD (SB&BLK     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00755> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00756>                          ID1 08:SWM2B      17.57     .093    6.20   3.85    .000
00757>                         +ID2 09:BLANK        .00     .000    5.13    .07    .000
00758>                          ================================================
00759>                          SUM 04:SB&BLK     17.57     .093    6.20   3.85    .000
00760>
00761>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00762>
```

```
00763> ------------------------------------------------------------------------------
00764> 002:0015------------------------------------------------------------------------
00765> ----------------------
00766> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00767> |  IN>04:(SB&BLK)    |
00768> | OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
00769> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00770>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00771>                              .000  .0000E+00    |     .500  .1054E+00
00772>                              .000  .9880E-01    |    1.300  .1124E+00
00773>
00774>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00775>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00776>      INFLOW >04: (SB&BLK)      17.57      .093     6.200      3.854
00777>      OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
00778>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
00779>
00780>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00781>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00782>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00783>
00784>
00785>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00786>                     TIME SHIFT OF PEAK FLOW          (min)=  -372.00
00787>                     MAXIMUM  STORAGE   USED       (ha.m.)=.6771E-01
00788>
00789>       *** WARNING: Outflow volume is less than inflow volume.
00790> ------------------------------------------------------------------------------
00791> 002:0016------------------------------------------------------------------------
00792> ----------------------
00793> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00794> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
00795>                         ID1 01:CTR1          .65      .007    3.15  15.92    .000
00796>                        +ID2 03:SWM1         8.38      .000     .00    .00    .000
00797>                        +ID3 09:SWM2C       17.57      .000     .00    .00    .000
00798>                         ==========================================================
00799>                         SUM 01:CTR1         26.60      .007    3.15    .39    .000
00800>
00801>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00802>
00803> ------------------------------------------------------------------------------
00804> 002:0017------------------------------------------------------------------------
00805> ----------------------
00806> | DESIGN NASHYD      |   Area     (ha)=    8.99   Curve Number   (CN)=82.00
00807> | 01:C-203  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00808> ----------------------   U.H. Tp(hrs)=    .300
00809>
00810>      Unit Hyd Qpeak  (cms)=    1.145
00811>
00812>      PEAK FLOW       (cms)=     .099 (i)
00813>      TIME TO PEAK    (hrs)=    3.117
00814>      RUNOFF VOLUME    (mm)=   17.200
00815>      TOTAL RAINFALL   (mm)=   42.240
00816>      RUNOFF COEFFICIENT   =     .407
00817>
00818>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00819>
00820> ------------------------------------------------------------------------------
00821> 002:0018------------------------------------------------------------------------
00822> ----------------------
00823> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00824> |  IN>01:(C-203 )    |
00825> | OUT<02:(SWM3  )    |    =========  OUTLFOW STORAGE TABLE  =========
00826> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00827>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00828>                              .000  .0000E+00    |    3.000  .2660E+00
00829>                              .000  .2491E+00    |    7.000  .2834E+00
00830>
00831>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00832>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00833>      INFLOW >01: (C-203 )       8.99      .099     3.117     17.200
00834>      OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
00835>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
00836>
00837>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00838>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00839>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00840>
00841>
00842>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00843>                     TIME SHIFT OF PEAK FLOW          (min)=  -187.00
00844>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1546E+00
00845>
00846>       *** WARNING: Outflow volume is less than inflow volume.
00847> ------------------------------------------------------------------------------
00848> 002:0019------------------------------------------------------------------------
00849> ----------------------
00850> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=80.00
00851> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00852> ----------------------   U.H. Tp(hrs)=    .390
00853>
00854>      Unit Hyd Qpeak  (cms)=     .504
00855>
00856>      PEAK FLOW       (cms)=     .051 (i)
00857>      TIME TO PEAK    (hrs)=    3.183
00858>      RUNOFF VOLUME    (mm)=   15.922
00859>      TOTAL RAINFALL   (mm)=   42.240
00860>      RUNOFF COEFFICIENT   =     .377
00861>
00862>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00863>
00864> ------------------------------------------------------------------------------
00865> 002:0020------------------------------------------------------------------------
00866> ----------------------
00867> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00868> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
00869>                         ID1 02:SWM3          8.99      .000     .00    .00    .000
00870>                        +ID2 03:EXC-3         5.15      .051    3.18  15.92    .000
00871>                         ==========================================================
00872>                         SUM 01:CTR2         14.14      .051    3.18   5.80    .000
00873>
00874>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00875>
00876> ------------------------------------------------------------------------------
00877> 002:0021------------------------------------------------------------------------
00878> ----------------------
00879> | DESIGN NASHYD      |   Area     (ha)=    5.81   Curve Number   (CN)=86.00
00880> | 01:C-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00881> ----------------------   U.H. Tp(hrs)=    .260
00882>
00883>      Unit Hyd Qpeak  (cms)=     .854
00884>
00885>      PEAK FLOW       (cms)=     .077 (i)
00886>      TIME TO PEAK    (hrs)=    3.083
00887>      RUNOFF VOLUME    (mm)=   20.219
00888>      TOTAL RAINFALL   (mm)=   42.240
00889>      RUNOFF COEFFICIENT   =     .479
00890>
00891>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00892>
00893> ------------------------------------------------------------------------------
00894> 002:0022------------------------------------------------------------------------
00895> ----------------------
00896> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00897> |  IN>01:(C-204 )    |
00898> | OUT<02:(SWM4  )    |    =========  OUTLFOW STORAGE TABLE  =========
00899> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00900>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00901>                              .000  .0000E+00    |    1.000  .1925E+00
00902>                              .000  .1803E+00    |    2.000  .2051E+00
00903>
00904>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00905>      ---------------------       (ha)     (cms)     (hrs)       (mm)
00906>      INFLOW >01: (C-204 )       5.81      .077     3.083     20.219
00907>      OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
00908>     OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
00909>
00910>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00911>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00912>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00913>
00914>
00915>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
00916>                     TIME SHIFT OF PEAK FLOW          (min)=  -185.00
00917>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1175E+00
00918>
00919>       *** WARNING: Outflow volume is less than inflow volume.
00920> ------------------------------------------------------------------------------
00921> 002:0023------------------------------------------------------------------------
00922> ------------------------------------------------------------------------------
00923> 002:0002------------------------------------------------------------------------
00924>   ** END OF RUN :   2
00925>
00926> ******************************************************************************
00927>
00928>
00929>
00930>
00931>
00932> --------------------
00933> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
00934> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
00935>     TZERO =   .00 hrs on       0
00936>     METOUT=   2 (output = METRIC)
00937>     NRUN  = 003
00938>     NSTORM=   1
00939>            #  1=LYA5.1hr
00940> ------------------------------------------------------------------------------
00941> 003:0002------------------------------------------------------------------------
00942> *#*****************************************************************************
00943> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
00944> *#  Date        : 2017/11/24
00945> *#  Modeller    : [C. Fischer]
00946> *#  Company     : Stantec Consulting Ltd. (Waterloo)
00947> *#  License #   : 4730904
00948> *#*****************************************************************************
00949> *#
00950> *#                      Block C - PROPOSED CONDITIONS
00951> *#
00952> *#*****************************************************************************
00953> ------------------------------------------------------------------------------
00954> 003:0002------------------------------------------------------------------------
00955> --------------------
00956> | READ STORM        |    Filename: Belleville IDF (1-hr 30% AES - 5 Year)
00957> | Ptotal=  28.00 mm|    Comments: Belleville IDF (1-hr 30% AES - 5 Year)
00958> --------------------
00959>                TIME     RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00960>                hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr
00961>                .08   30.240 |    .33  36.960 |    .58  33.600 |    .83  10.080
00962>                .17   47.040 |    .42  43.680 |    .67  16.800 |    .92   3.360
00963>                .25   70.560 |    .50  30.240 |    .75  13.440 |   1.00    .000
00964>
00965> ------------------------------------------------------------------------------
00966> 003:0003------------------------------------------------------------------------
00967> *#*****************************************************************************
00968> *#
00969> *#                              AMC III Conditions
00970> *#
00971> *#*****************************************************************************
00972> ----------------------
00973> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=75.00
00974> | 01:C-200  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00975> ----------------------   U.H. Tp(hrs)=    .270
00976>
00977>      Unit Hyd Qpeak  (cms)=     .646
00978>
00979>      PEAK FLOW       (cms)=     .109 (i)
00980>      TIME TO PEAK    (hrs)=     .767
00981>      RUNOFF VOLUME    (mm)=    6.317
00982>      TOTAL RAINFALL   (mm)=   28.000
00983>      RUNOFF COEFFICIENT   =     .226
00984>
00985>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00986>
00987> ------------------------------------------------------------------------------
00988> 003:0004------------------------------------------------------------------------
00989> ----------------------
00990> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00991> |  IN>01:(C-200 )    |
00992> | OUT<02:(SWM0  )    |    =========  OUTLFOW STORAGE TABLE  =========
00993> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00994>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00995>                              .000  .0000E+00    |    2.000  .1372E+00
00996>                              .000  .1285E+00    |    5.000  .1462E+00
00997>
00998>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00999>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01000>      INFLOW >01: (C-200 )       4.57      .109      .767      6.317
01001>      OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
01002>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
01003>
01004>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01005>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01006>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01007>
01008>
01009>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01010>                     TIME SHIFT OF PEAK FLOW          (min)=   -46.00
01011>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2887E-01
01012>
01013>       *** WARNING: Outflow volume is less than inflow volume.
01014> ------------------------------------------------------------------------------
01015> 003:0005------------------------------------------------------------------------
01016> ----------------------
```

```
| DESIGN NASHYD      |   Area    (ha)=    .65   Curve Number   (CN)=80.00
| 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .017 (i)
     TIME TO PEAK    (hrs)=     .833
     RUNOFF VOLUME    (mm)=    7.802
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .279

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

------------------------------------------------------------------------------
003:0006----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   8.38   Curve Number   (CN)=70.00
| 02:C-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .350

     Unit Hyd Qpeak  (cms)=     .914

     PEAK FLOW       (cms)=     .143 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=   5.188
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .185

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

------------------------------------------------------------------------------
003:0007----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>02:(C-201 )    |
| OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |   1.000  .1918E+00
                            .000  .1796E+00    |   4.000  .2044E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (C-201 )       8.38      .143      .867      5.188
     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -52.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4348E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0008----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=  14.38   Curve Number   (CN)=80.00
| 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .560

     Unit Hyd Qpeak  (cms)=     .981

     PEAK FLOW       (cms)=     .269 (i)
     TIME TO PEAK    (hrs)=    1.050
     RUNOFF VOLUME    (mm)=    7.803
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .279

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

------------------------------------------------------------------------------
003:0009----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   3.19   Curve Number   (CN)=71.00
| 05:C-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .469

     PEAK FLOW       (cms)=     .066 (i)
     TIME TO PEAK    (hrs)=     .750
     RUNOFF VOLUME    (mm)=    5.392
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .193

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

------------------------------------------------------------------------------
003:0010----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>05:(C-202 )    |
| OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |   1.000  .6400E-01
                            .000  .5990E-01    |   2.000  .6820E-01

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (C-202 )       3.19      .066      .750      5.392
     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -45.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1720E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0011----------------------------------------------------------------------
----------------------
| ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 04:EXC-2       14.38     .269    1.05   7.80    .000
                      +ID2 06:SWM2A        3.19     .000     .00    .00    .000
                       ==========================================================
                            SUM 07:CTR1A         17.57     .269    1.05   6.39    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0012----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>07:(CTR1A )    |
| OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |    .000  .1618E+00
                            .000  .1260E-01    |    .862  .2671E+00
                            .000  .4270E-01    |   2.728  .4058E+00
                            .000  .8980E-01    |   4.016  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >07: (CTR1A )       17.57      .269    1.050      6.386
     OUTFLOW<08: (SWM2B )       17.57      .000     .000       .000
    OVERFLOW<10: (OSWM2B)        .00      .000     .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -63.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1122E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0013----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    .00   Curve Number   (CN)= 1.00
| 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .000

     PEAK FLOW       (cms)=     .000 (i)
     TIME TO PEAK    (hrs)=    1.000
     RUNOFF VOLUME    (mm)=     .011
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .000

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

------------------------------------------------------------------------------
003:0014----------------------------------------------------------------------
----------------------
| ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 08:SWM2B       17.57     .000     .00    .00    .000
                      +ID2 09:BLANK         .00     .000    1.00    .01    .000
                       ==========================================================
                            SUM 04:SB&BLK        17.57     .000    1.00    .00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0015----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>04:(SB&BLK)    |
| OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |    .500  .1054E+00
                            .000  .9880E-01    |   1.300  .1124E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (SB&BLK)       17.57      .000    1.000       .000
     OUTFLOW<09: (SWM2C )       17.57      .000     .000       .000
    OVERFLOW<10: (OSWM2C)        .00      .000     .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=   -60.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1060E-09

------------------------------------------------------------------------------
003:0016----------------------------------------------------------------------
----------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:CTR1          .65     .017     .83   7.80    .000
                      +ID2 03:SWM1         8.38     .000     .00    .00    .000
                      +ID3 09:SWM2C       17.57     .000     .00    .00    .000
                       ==========================================================
                            SUM 01:CTR1          26.60     .017     .83    .19    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0017----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   8.99   Curve Number   (CN)=82.00
| 01:C-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .300

     Unit Hyd Qpeak  (cms)=    1.145

     PEAK FLOW       (cms)=     .274 (i)
     TIME TO PEAK    (hrs)=     .783
     RUNOFF VOLUME    (mm)=    8.537
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .305

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

------------------------------------------------------------------------------
003:0018----------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(C-203 )    |
| OUT<02:(SWM3  )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |   3.000  .2660E+00
```

```
                          .000  .2491E+00   |    7.000  .2834E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-203 )       8.99      .274      .783      8.537
     OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -47.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.7675E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
003:0019-----------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area    (ha)=    5.15   Curve Number   (CN)=80.00
| 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .124 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    7.803
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .279

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

-------------------------------------------------------------------------------
003:0020-----------------------------------------------------------------------
----------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 02:SWM3          8.99     .000     .00    .00    .000
                       +ID2 03:EXC-3         5.15     .124     .90   7.80    .000
                        ============================================================
                        SUM 01:CTR2         14.14     .124     .90   2.84    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0021-----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    5.81   Curve Number   (CN)=86.00
| 01:C-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .854

     PEAK FLOW       (cms)=     .230 (i)
     TIME TO PEAK    (hrs)=     .733
     RUNOFF VOLUME    (mm)=   10.350
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .370

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

-------------------------------------------------------------------------------
003:0022-----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>01:(C-204 )    |
| OUT<02:(SWM4  )    |   =========  OUTLFOW STORAGE TABLE  =========
---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00    |    1.000  .1925E+00
                           .000  .1803E+00    |    2.000  .2051E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-204 )       5.81      .230      .733     10.350
     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -44.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6014E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
003:0023-----------------------------------------------------------------------
-------------------------------------------------------------------------------
003:0002-----------------------------------------------------------------------
-------------------------------------------------------------------------------
003:0002-----------------------------------------------------------------------
  ** END OF RUN :   3

 ***************************************************************************



--------------------
| START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
--------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 004
    NSTORM=   1
           #  1=LYA5.12h
-------------------------------------------------------------------------------
004:0002-----------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/11/24
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
*#  License #   : 4730904
*#*************************************************************************
*#
*#                     Block C - PROPOSED CONDITIONS
*#
*#*************************************************************************
-------------------------------------------------------------------------------
004:0002-----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 5 Year)
| Ptotal=  55.97 mm|    Comments: Belleville IDF (12-hr 30% AES - 5 Year)
--------------------
               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               1.00   5.247 |   4.00   8.745 |   7.00   1.749 |  10.00    .000
               2.00  15.158 |   5.00   8.162 |   8.00    .583 |  11.00    .000
               3.00  11.660 |   6.00   4.664 |   9.00    .000 |  12.00    .000

-------------------------------------------------------------------------------
004:0003-----------------------------------------------------------------------
*#*************************************************************************
*#
*#                              AMC III Conditions
*#
*#*************************************************************************
--------------------
| DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=75.00
| 01:C-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=     .646

     PEAK FLOW       (cms)=     .062 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   21.323
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .381

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

-------------------------------------------------------------------------------
004:0004-----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>01:(C-200 )    |
| OUT<02:(SWM0  )    |   =========  OUTLFOW STORAGE TABLE  =========
---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00    |    2.000  .1372E+00
                           .000  .1285E+00    |    5.000  .1462E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-200 )       4.57      .062     3.100     21.323
     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
                    TIME SHIFT OF PEAK FLOW         (min)=  -186.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9745E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
004:0005-----------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=80.00
| 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .010 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   25.149
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .449

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

-------------------------------------------------------------------------------
004:0006-----------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=70.00
| 02:C-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .350

     Unit Hyd Qpeak  (cms)=     .914

     PEAK FLOW       (cms)=     .094 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   18.165
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .325

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

-------------------------------------------------------------------------------
004:0007-----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>02:(C-201 )    |
| OUT<03:(SWM1  )    |   =========  OUTLFOW STORAGE TABLE  =========
---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00    |    1.000  .1918E+00
                           .000  .1796E+00    |    4.000  .2044E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (C-201 )       8.38      .094     3.167     18.165
     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
                    TIME SHIFT OF PEAK FLOW         (min)=  -190.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1522E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
004:0008-----------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=80.00
| 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .560
```

```
01525>
01526>      Unit Hyd Qpeak  (cms)=     .981
01527>
01528>      PEAK FLOW       (cms)=     .218 (i)
01529>      TIME TO PEAK    (hrs)=    3.350
01530>      RUNOFF VOLUME    (mm)=   25.149
01531>      TOTAL RAINFALL   (mm)=   55.968
01532>      RUNOFF COEFFICIENT   =     .449
01533>
01534>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01535>
01536> ---------------------------------------------------------------------------
01537> 004:0009-----------------------------------------------------------------
01538> ---------------------
01539> | DESIGN NASHYD      |   Area     (ha)=    3.19   Curve Number   (CN)=71.00
01540> | 05:C-202  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01541> ---------------------   U.H. Tp(hrs)=    .260
01542>
01543>      Unit Hyd Qpeak  (cms)=     .469
01544>
01545>      PEAK FLOW       (cms)=     .038 (i)
01546>      TIME TO PEAK    (hrs)=    3.083
01547>      RUNOFF VOLUME    (mm)=   18.752
01548>      TOTAL RAINFALL   (mm)=   55.968
01549>      RUNOFF COEFFICIENT   =     .335
01550>
01551>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01552>
01553> ---------------------------------------------------------------------------
01554> 004:0010-----------------------------------------------------------------
01555> ---------------------
01556> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01557> |  IN>05:(C-202 )    |
01558> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
01559> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01560>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01561>                             .000  .0000E+00    |   1.000  .6400E-01
01562>                             .000  .5990E-01    |   2.000  .6820E-01
01563>
01564>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01565>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01566>      INFLOW >05: (C-202 )       3.19      .038     3.083     18.752
01567>      OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
01568>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
01569>
01570>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01571>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01572>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01573>
01574>
01575>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01576>                     TIME SHIFT OF PEAK FLOW          (min)=  -185.00
01577>                     MAXIMUM  STORAGE   USED       (ha.m.)=.5982E-01
01578>
01579>       *** WARNING: Outflow volume is less than inflow volume.
01580> ---------------------------------------------------------------------------
01581> 004:0011-----------------------------------------------------------------
01582> ---------------------
01583> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01584> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
01585>                        ID1 04:EXC-2        14.38     .218    3.35  25.15    .000
01586>                       +ID2 06:SWM2A         3.19     .000     .00    .00    .000
01587>                        ========================================================
01588>                        SUM 07:CTR1A        17.57     .218    3.35  20.58    .000
01589>
01590>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01591>
01592> ---------------------------------------------------------------------------
01593> 004:0012-----------------------------------------------------------------
01594> ---------------------
01595> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01596> |  IN>07:(CTR1A )    |
01597> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
01598> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01599>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01600>                             .000  .0000E+00    |    .000  .1618E+00
01601>                             .000  .1260E-01    |    .862  .2671E+00
01602>                             .000  .4270E-01    |   2.728  .4058E+00
01603>                             .000  .8980E-01    |   4.016  .4888E+00
01604>
01605>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01606>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01607>      INFLOW >07: (CTR1A )      17.57      .218     3.350     20.583
01608>      OUTFLOW<08: (SWM2B )      17.57      .202     5.317     11.374
01609>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
01610>
01611>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01612>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01613>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01614>
01615>
01616>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   92.677
01617>                     TIME SHIFT OF PEAK FLOW          (min)=   118.00
01618>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1865E+00
01619>
01620>       *** WARNING: Outflow volume is less than inflow volume.
01621> ---------------------------------------------------------------------------
01622> 004:0013-----------------------------------------------------------------
01623> ---------------------
01624> | DESIGN NASHYD      |   Area     (ha)=     .00   Curve Number   (CN)= 1.00
01625> | 09:BLANK  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01626> ---------------------   U.H. Tp(hrs)=    .500
01627>
01628>      Unit Hyd Qpeak  (cms)=     .000
01629>
01630>      PEAK FLOW       (cms)=     .000 (i)
01631>      TIME TO PEAK    (hrs)=    5.117
01632>      RUNOFF VOLUME    (mm)=     .118
01633>      TOTAL RAINFALL   (mm)=   55.968
01634>      RUNOFF COEFFICIENT   =     .002
01635>
01636>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01637>
01638> ---------------------------------------------------------------------------
01639> 004:0014-----------------------------------------------------------------
01640> ---------------------
01641> | ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01642> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
01643>                        ID1 08:SWM2B        17.57     .202    5.32  11.37    .000
01644>                       +ID2 09:BLANK          .00     .000    5.12    .12    .000
01645>                        ========================================================
01646>                        SUM 04:SB&BLK       17.57     .202    5.32  11.37    .000
01647>
01648>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01649>
01650> ---------------------------------------------------------------------------
01651> 004:0015-----------------------------------------------------------------
01652> ---------------------
01653> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01654> |  IN>04:(SB&BLK)    |
01655> | OUT<09:(SWM2C )    |    =========  OUTLFOW STORAGE TABLE  =========
01656> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01657>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01658>                             .000  .0000E+00    |     .500  .1054E+00
01659>                             .000  .9880E-01    |    1.300  .1124E+00
01660>
01661>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01662>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01663>      INFLOW >04: (SB&BLK)      17.57      .202     5.317     11.374
01664>      OUTFLOW<09: (SWM2C )      17.57      .177     5.933      5.751
01665>     OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
01666>
01667>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01668>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01669>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01670>
01671>
01672>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   87.462
01673>                     TIME SHIFT OF PEAK FLOW          (min)=    37.00
01674>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1011E+00
01675>
01676>       *** WARNING: Outflow volume is less than inflow volume.
01677> ---------------------------------------------------------------------------
01678> 004:0016-----------------------------------------------------------------
01679> ---------------------
01680> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01681> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
01682>                        ID1 01:CTR1          .65      .010    3.13  25.15    .000
01683>                       +ID2 03:SWM1         8.38      .000     .00    .00    .000
01684>                       +ID3 09:SWM2C       17.57      .177    5.93   5.75    .000
01685>                        ========================================================
01686>                        SUM 01:CTR1         26.60      .183    5.93   4.41    .000
01687>
01688>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01689>
01690> ---------------------------------------------------------------------------
01691> 004:0017-----------------------------------------------------------------
01692> ---------------------
01693> | DESIGN NASHYD      |   Area     (ha)=    8.99   Curve Number   (CN)=82.00
01694> | 01:C-203  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01695> ---------------------   U.H. Tp(hrs)=    .300
01696>
01697>      Unit Hyd Qpeak  (cms)=    1.145
01698>
01699>      PEAK FLOW       (cms)=     .156 (i)
01700>      TIME TO PEAK    (hrs)=    3.100
01701>      RUNOFF VOLUME    (mm)=   26.916
01702>      TOTAL RAINFALL   (mm)=   55.968
01703>      RUNOFF COEFFICIENT   =     .481
01704>
01705>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01706>
01707> ---------------------------------------------------------------------------
01708> 004:0018-----------------------------------------------------------------
01709> ---------------------
01710> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
01711> |  IN>01:(C-203 )    |
01712> | OUT<02:(SWM3  )    |    =========  OUTLFOW STORAGE TABLE  =========
01713> ---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
01714>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01715>                             .000  .0000E+00    |   3.000  .2660E+00
01716>                             .000  .2491E+00    |   7.000  .2834E+00
01717>
01718>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01719>      ---------------------       (ha)     (cms)     (hrs)       (mm)
01720>      INFLOW >01: (C-203 )       8.99      .156     3.100     26.916
01721>      OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
01722>     OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
01723>
01724>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01725>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
01726>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
01727>
01728>
01729>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
01730>                     TIME SHIFT OF PEAK FLOW          (min)=  -186.00
01731>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2420E+00
01732>
01733>       *** WARNING: Outflow volume is less than inflow volume.
01734> ---------------------------------------------------------------------------
01735> 004:0019-----------------------------------------------------------------
01736> ---------------------
01737> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=80.00
01738> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01739> ---------------------   U.H. Tp(hrs)=    .390
01740>
01741>      Unit Hyd Qpeak  (cms)=     .504
01742>
01743>      PEAK FLOW       (cms)=     .081 (i)
01744>      TIME TO PEAK    (hrs)=    3.167
01745>      RUNOFF VOLUME    (mm)=   25.149
01746>      TOTAL RAINFALL   (mm)=   55.968
01747>      RUNOFF COEFFICIENT   =     .449
01748>
01749>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01750>
01751> ---------------------------------------------------------------------------
01752> 004:0020-----------------------------------------------------------------
01753> ---------------------
01754> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01755> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
01756>                        ID1 02:SWM3          8.99      .000     .00    .00    .000
01757>                       +ID2 03:EXC-3         5.15      .081    3.17  25.15    .000
01758>                        ========================================================
01759>                        SUM 01:CTR2         14.14      .081    3.17   9.16    .000
01760>
01761>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01762>
01763> ---------------------------------------------------------------------------
01764> 004:0021-----------------------------------------------------------------
01765> ---------------------
01766> | DESIGN NASHYD      |   Area     (ha)=    5.81   Curve Number   (CN)=86.00
01767> | 01:C-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
01768> ---------------------   U.H. Tp(hrs)=    .260
01769>
01770>      Unit Hyd Qpeak  (cms)=     .854
01771>
01772>      PEAK FLOW       (cms)=     .118 (i)
01773>      TIME TO PEAK    (hrs)=    3.067
01774>      RUNOFF VOLUME    (mm)=   30.963
01775>      TOTAL RAINFALL   (mm)=   55.968
01776>      RUNOFF COEFFICIENT   =     .553
01777>
01778>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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01779>
01780> ------------------------------------------------------------------------------
01781> 004:0022----------------------------------------------------------------------
01782> ---------------------
01783> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01784> |  IN>01:(C-204 )   |
01785> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
01786> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01787>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01788>                             .000  .0000E+00    |   1.000  .1925E+00
01789>                             .000  .1803E+00    |   2.000  .2051E+00
01790>
01791>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01792>     ---------------------      (ha)     (cms)     (hrs)       (mm)
01793>     INFLOW >01: (C-204 )       5.81      .118     3.067     30.963
01794>     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
01795>    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
01796>
01797>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01798>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01799>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01800>
01801>
01802>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01803>                    TIME SHIFT OF PEAK FLOW          (min)=  -184.00
01804>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1799E+00
01805>
01806>       *** WARNING: Outflow volume is less than inflow volume.
01807> ------------------------------------------------------------------------------
01808> 004:0023----------------------------------------------------------------------
01809> ------------------------------------------------------------------------------
01810> 004:0002----------------------------------------------------------------------
01811> ------------------------------------------------------------------------------
01812> 004:0002----------------------------------------------------------------------
01813> ------------------------------------------------------------------------------
01814> 004:0002----------------------------------------------------------------------
01815>   ** END OF RUN :   4
01816>
01817> ******************************************************************************
01818>
01819>
01820>
01821>
01822>
01823> --------------------
01824> | START            |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
01825> --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
01826>     TZERO =   .00 hrs on       0
01827>     METOUT=   2 (output = METRIC)
01828>     NRUN  = 005
01829>     NSTORM=   1
01830>            #  1=LYA100.1hr
01831> ------------------------------------------------------------------------------
01832> 005:0002----------------------------------------------------------------------
01833> *#*************************************************************************
01834> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
01835> *#  Date        : 2017/11/24
01836> *#  Modeller    : [C. Fischer]
01837> *#  Company     : Stantec Consulting Ltd. (Waterloo)
01838> *#  License #   : 4730904
01839> *#*************************************************************************
01840> *#
01841> *#                        Block C - PROPOSED CONDITIONS
01842> *#
01843> *#*************************************************************************
01844> ------------------------------------------------------------------------------
01845> 005:0002----------------------------------------------------------------------
01846> --------------------
01847> | READ STORM       |    Filename: Belleville IDF (1-hr 30% AES - 100 Year)
01848> | Ptotal=  44.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 100 Year)
01849> --------------------
01850>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
01851>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
01852>               .08  47.628 |    .33  58.212 |    .58  52.920 |    .83  15.876
01853>               .17  74.088 |    .42  68.796 |    .67  26.460 |    .92   5.292
01854>               .25 111.132 |    .50  47.628 |    .75  21.168 |   1.00    .000
01855>
01856> ------------------------------------------------------------------------------
01857> 005:0003----------------------------------------------------------------------
01858> *#*************************************************************************
01859> *#
01860> *#                              AMC III Conditions
01861> *#
01862> *#*************************************************************************
01863> ----------------------
01864> | DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=75.00
01865> | 01:C-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01866> ----------------------   U.H. Tp(hrs)=    .270
01867>
01868>     Unit Hyd Qpeak  (cms)=     .646
01869>
01870>     PEAK FLOW       (cms)=     .244 (i)
01871>     TIME TO PEAK    (hrs)=     .750
01872>     RUNOFF VOLUME    (mm)=   14.259
01873>     TOTAL RAINFALL   (mm)=   44.100
01874>     RUNOFF COEFFICIENT   =     .323
01875>
01876>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01877>
01878> ------------------------------------------------------------------------------
01879> 005:0004----------------------------------------------------------------------
01880> ---------------------
01881> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01882> |  IN>01:(C-200 )   |
01883> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
01884> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01885>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01886>                             .000  .0000E+00    |   2.000  .1372E+00
01887>                             .000  .1285E+00    |   5.000  .1462E+00
01888>
01889>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01890>     ---------------------      (ha)     (cms)     (hrs)       (mm)
01891>     INFLOW >01: (C-200 )       4.57      .244      .750     14.259
01892>     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
01893>    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
01894>
01895>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01896>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01897>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01898>
01899>
01900>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01901>                    TIME SHIFT OF PEAK FLOW          (min)=   -45.00
01902>                    MAXIMUM  STORAGE   USED       (ha.m.)=.6517E-01
01903>
01904>       *** WARNING: Outflow volume is less than inflow volume.
01905> ------------------------------------------------------------------------------
01906> 005:0005----------------------------------------------------------------------
01907> ----------------------
01908> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=80.00
01909> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01910> ----------------------   U.H. Tp(hrs)=    .340
01911>
01912>     Unit Hyd Qpeak  (cms)=     .073
01913>
01914>     PEAK FLOW       (cms)=     .037 (i)
01915>     TIME TO PEAK    (hrs)=     .817
01916>     RUNOFF VOLUME    (mm)=   17.104
01917>     TOTAL RAINFALL   (mm)=   44.100
01918>     RUNOFF COEFFICIENT   =     .388
01919>
01920>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01921>
01922> ------------------------------------------------------------------------------
01923> 005:0006----------------------------------------------------------------------
01924> ----------------------
01925> | DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=70.00
01926> | 02:C-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01927> ----------------------   U.H. Tp(hrs)=    .350
01928>
01929>     Unit Hyd Qpeak  (cms)=     .914
01930>
01931>     PEAK FLOW       (cms)=     .329 (i)
01932>     TIME TO PEAK    (hrs)=     .850
01933>     RUNOFF VOLUME    (mm)=   11.982
01934>     TOTAL RAINFALL   (mm)=   44.100
01935>     RUNOFF COEFFICIENT   =     .272
01936>
01937>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01938>
01939> ------------------------------------------------------------------------------
01940> 005:0007----------------------------------------------------------------------
01941> ---------------------
01942> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
01943> |  IN>02:(C-201 )   |
01944> | OUT<03:(SWM1  )   |    =========  OUTLFOW STORAGE TABLE  =========
01945> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
01946>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
01947>                             .000  .0000E+00    |   1.000  .1918E+00
01948>                             .000  .1796E+00    |   4.000  .2044E+00
01949>
01950>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
01951>     ---------------------      (ha)     (cms)     (hrs)       (mm)
01952>     INFLOW >02: (C-201 )       8.38      .329      .850     11.982
01953>     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
01954>    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
01955>
01956>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
01957>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
01958>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
01959>
01960>
01961>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
01962>                    TIME SHIFT OF PEAK FLOW          (min)=   -51.00
01963>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1004E+00
01964>
01965>       *** WARNING: Outflow volume is less than inflow volume.
01966> ------------------------------------------------------------------------------
01967> 005:0008----------------------------------------------------------------------
01968> ----------------------
01969> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=80.00
01970> | 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01971> ----------------------   U.H. Tp(hrs)=    .560
01972>
01973>     Unit Hyd Qpeak  (cms)=     .981
01974>
01975>     PEAK FLOW       (cms)=     .588 (i)
01976>     TIME TO PEAK    (hrs)=    1.033
01977>     RUNOFF VOLUME    (mm)=   17.104
01978>     TOTAL RAINFALL   (mm)=   44.100
01979>     RUNOFF COEFFICIENT   =     .388
01980>
01981>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01982>
01983> ------------------------------------------------------------------------------
01984> 005:0009----------------------------------------------------------------------
01985> ----------------------
01986> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=71.00
01987> | 05:C-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01988> ----------------------   U.H. Tp(hrs)=    .260
01989>
01990>     Unit Hyd Qpeak  (cms)=     .469
01991>
01992>     PEAK FLOW       (cms)=     .151 (i)
01993>     TIME TO PEAK    (hrs)=     .733
01994>     RUNOFF VOLUME    (mm)=   12.400
01995>     TOTAL RAINFALL   (mm)=   44.100
01996>     RUNOFF COEFFICIENT   =     .281
01997>
01998>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01999>
02000> ------------------------------------------------------------------------------
02001> 005:0010----------------------------------------------------------------------
02002> ---------------------
02003> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02004> |  IN>05:(C-202 )   |
02005> | OUT<06:(SWM2A )   |    =========  OUTLFOW STORAGE TABLE  =========
02006> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02007>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02008>                             .000  .0000E+00    |   1.000  .6400E-01
02009>                             .000  .5990E-01    |   2.000  .6820E-01
02010>
02011>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02012>     ---------------------      (ha)     (cms)     (hrs)       (mm)
02013>     INFLOW >05: (C-202 )       3.19      .151      .733     12.400
02014>     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
02015>    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
02016>
02017>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02018>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
02019>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
02020>
02021>
02022>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=      .000
02023>                    TIME SHIFT OF PEAK FLOW          (min)=   -44.00
02024>                    MAXIMUM  STORAGE   USED       (ha.m.)=.3956E-01
02025>
02026>       *** WARNING: Outflow volume is less than inflow volume.
02027> ------------------------------------------------------------------------------
02028> 005:0011----------------------------------------------------------------------
02029> ----------------------
02030> | ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02031> ----------------------    (ha)     (cms)   (hrs)   (mm)   (cms)
02032>                      ID1 04:EXC-2         14.38     .588    1.03  17.10    .000
```

```
                     +ID2 06:SWM2A          3.19     .000     .00    .00    .000
                      ============================================================
                      SUM 07:CTR1A          17.57     .588    1.03  14.00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0012-------------------------------------------------------------------------
 ---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>07:(CTR1A )   |
| OUT<08:(SWM2B )   |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)  |    (cms)     (ha.m.)
                            .000  .0000E+00    |     .000  .1618E+00
                            .000  .1260E-01    |     .862  .2671E+00
                            .000  .4270E-01    |    2.728  .4058E+00
                            .000  .8980E-01    |    4.016  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >07: (CTR1A )      17.57      .588     1.033     13.999
     OUTFLOW<08: (SWM2B )      17.57      .220     1.817      4.821
    OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   37.320
                    TIME SHIFT OF PEAK FLOW         (min)=    47.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1886E+00

      *** WARNING: Outflow volume is less than inflow volume.
005:0013-------------------------------------------------------------------------
 ---------------------
| DESIGN NASHYD     |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
| 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .000

     PEAK FLOW       (cms)=     .000 (i)
     TIME TO PEAK    (hrs)=    1.000
     RUNOFF VOLUME    (mm)=     .028
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .001

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

005:0014-------------------------------------------------------------------------
 ------------------------
| ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 08:SWM2B         17.57     .220    1.82   4.82    .000
                     +ID2 09:BLANK           .00     .000    1.00    .03    .000
                      ============================================================
                      SUM 04:SB&BLK        17.57     .220    1.82   4.82    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0015-------------------------------------------------------------------------
 ---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>04:(SB&BLK)   |
| OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)  |    (cms)     (ha.m.)
                             .000  .0000E+00    |     .500  .1054E+00
                             .000  .9880E-01    |    1.300  .1124E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (SB&BLK)      17.57      .220     1.817      4.821
     OUTFLOW<09: (SWM2C )      17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=  -109.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.8471E-01

      *** WARNING: Outflow volume is less than inflow volume.
005:0016-------------------------------------------------------------------------
 ------------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 01:CTR1            .65     .037     .82  17.10    .000
                     +ID2 03:SWM1           8.38     .000     .00    .00    .000
                     +ID3 09:SWM2C         17.57     .000     .00    .00    .000
                      ============================================================
                      SUM 01:CTR1          26.60     .037     .82    .42    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0017-------------------------------------------------------------------------
 ---------------------
| DESIGN NASHYD     |   Area    (ha)=    8.99   Curve Number   (CN)=82.00
| 01:C-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .300

     Unit Hyd Qpeak  (cms)=    1.145

     PEAK FLOW       (cms)=     .588 (i)
     TIME TO PEAK    (hrs)=     .767
     RUNOFF VOLUME    (mm)=   18.451
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .418

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

005:0018-------------------------------------------------------------------------
 ---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-203 )   |
| OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)  |    (cms)     (ha.m.)
                             .000  .2491E+00    |    7.000  .2834E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-203 )       8.99      .588      .767     18.451
     OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -46.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1659E+00

      *** WARNING: Outflow volume is less than inflow volume.
005:0019-------------------------------------------------------------------------
 ---------------------
| DESIGN NASHYD     |   Area    (ha)=    5.15   Curve Number   (CN)=80.00
| 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .270 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=   17.104
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .388

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

005:0020-------------------------------------------------------------------------
 ------------------------
| ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:SWM3          8.99     .000     .00    .00    .000
                     +ID2 03:EXC-3         5.15     .270     .88  17.10    .000
                      ============================================================
                      SUM 01:CTR2         14.14     .270     .88   6.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0021-------------------------------------------------------------------------
 ---------------------
| DESIGN NASHYD     |   Area    (ha)=    5.81   Curve Number   (CN)=86.00
| 01:C-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .854

     PEAK FLOW       (cms)=     .477 (i)
     TIME TO PEAK    (hrs)=     .717
     RUNOFF VOLUME    (mm)=   21.617
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .490

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

005:0022-------------------------------------------------------------------------
 ---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-204 )   |
| OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)     (ha.m.)  |    (cms)     (ha.m.)
                             .000  .0000E+00    |    1.000  .1925E+00
                             .000  .1803E+00    |    2.000  .2051E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-204 )       5.81      .477      .717     21.617
     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW         (min)=   -43.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1256E+00

      *** WARNING: Outflow volume is less than inflow volume.
005:0023-------------------------------------------------------------------------
005:0002-------------------------------------------------------------------------
005:0002-------------------------------------------------------------------------
005:0002-------------------------------------------------------------------------
005:0002-------------------------------------------------------------------------
005:0002-------------------------------------------------------------------------
  ** END OF RUN :   5
********************************************************************************



 --------------------
| START             |  Project  dir.: C:\TREVOR~1\$13356~1\AMCIII\
 --------------------  Rainfall dir.: C:\TREVOR~1\$13356~1\AMCIII\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
           #  1=LYA100.12h
006:0002-------------------------------------------------------------------------
*#*******************************************************************************
*#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
*#  Date        : 2017/11/24
*#  Modeller    : [C. Fischer]
*#  Company     : Stantec Consulting Ltd. (Waterloo)
```

```
02287> *#  License #   : 4730904
02288> *#*****************************************************************************
02289> *#
02290> *#                      Block C - PROPOSED CONDITIONS
02291> *#
02292> *#*****************************************************************************
02293> ------------------------------------------------------------------------------
02294> 006:0002----------------------------------------------------------------------
02295> ---------------------
02296> | READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 100 Year
02297> | Ptotal=  93.70 mm|    Comments: Belleville IDF (12-hr 30% AES - 100 Year
02298> ---------------------
02299>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
02300>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
02301>              1.00   8.784 |   4.00  14.640 |   7.00   2.928 |  10.00    .000
02302>              2.00  25.376 |   5.00  13.664 |   8.00    .976 |  11.00    .000
02303>              3.00  19.520 |   6.00   7.808 |   9.00    .000 |  12.00    .000
02304>
02305> ------------------------------------------------------------------------------
02306> 006:0003----------------------------------------------------------------------
02307> *#*****************************************************************************
02308> *#
02309> *#                            AMC III Conditions
02310> *#
02311> *#*****************************************************************************
02312> ----------------------
02313> | DESIGN NASHYD      |   Area    (ha)=    4.57   Curve Number   (CN)=75.00
02314> | 01:C-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02315> ----------------------  U.H. Tp(hrs)=    .270
02316>
02317>      Unit Hyd Qpeak  (cms)=     .646
02318>
02319>      PEAK FLOW       (cms)=     .143 (i)
02320>      TIME TO PEAK    (hrs)=    3.067
02321>      RUNOFF VOLUME    (mm)=   48.061
02322>      TOTAL RAINFALL   (mm)=   93.696
02323>      RUNOFF COEFFICIENT   =     .513
02324>
02325>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02326>
02327> ------------------------------------------------------------------------------
02328> 006:0004----------------------------------------------------------------------
02329> ----------------------
02330> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02331> |  IN>01:(C-200 )    |
02332> | OUT<02:(SWM0  )    |    =========  OUTLFOW STORAGE TABLE  =========
02333> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02334>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02335>                              .000  .0000E+00     |   2.000  .1372E+00
02336>                              .000  .1285E+00     |   5.000  .1462E+00
02337>
02338>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02339>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02340>      INFLOW >01: (C-200 )       4.57      .143     3.067     48.061
02341>      OUTFLOW<02: (SWM0  )       4.57      .125     5.033     19.943
02342>     OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000
02343>
02344>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02345>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02346>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02347>
02348>
02349>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   87.537
02350>                     TIME SHIFT OF PEAK FLOW          (min)=   118.00
02351>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1290E+00
02352>
02353>       *** WARNING: Outflow volume is less than inflow volume.
02354> ------------------------------------------------------------------------------
02355> 006:0005----------------------------------------------------------------------
02356> ----------------------
02357> | DESIGN NASHYD      |   Area    (ha)=     .65   Curve Number   (CN)=80.00
02358> | 01:EXC-1  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02359> ----------------------  U.H. Tp(hrs)=    .340
02360>
02361>      Unit Hyd Qpeak  (cms)=     .073
02362>
02363>      PEAK FLOW       (cms)=     .023 (i)
02364>      TIME TO PEAK    (hrs)=    3.100
02365>      RUNOFF VOLUME    (mm)=   54.594
02366>      TOTAL RAINFALL   (mm)=   93.696
02367>      RUNOFF COEFFICIENT   =     .583
02368>
02369>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02370>
02371> ------------------------------------------------------------------------------
02372> 006:0006----------------------------------------------------------------------
02373> ----------------------
02374> | DESIGN NASHYD      |   Area    (ha)=    8.38   Curve Number   (CN)=70.00
02375> | 02:C-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02376> ----------------------  U.H. Tp(hrs)=    .350
02377>
02378>      Unit Hyd Qpeak  (cms)=     .914
02379>
02380>      PEAK FLOW       (cms)=     .224 (i)
02381>      TIME TO PEAK    (hrs)=    3.133
02382>      RUNOFF VOLUME    (mm)=   42.278
02383>      TOTAL RAINFALL   (mm)=   93.696
02384>      RUNOFF COEFFICIENT   =     .451
02385>
02386>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02387>
02388> ------------------------------------------------------------------------------
02389> 006:0007----------------------------------------------------------------------
02390> ----------------------
02391> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02392> |  IN>02:(C-201 )    |
02393> | OUT<03:(SWM1  )    |    =========  OUTLFOW STORAGE TABLE  =========
02394> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02395>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02396>                              .000  .0000E+00     |   1.000  .1918E+00
02397>                              .000  .1796E+00     |   4.000  .2044E+00
02398>
02399>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02400>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02401>      INFLOW >02: (C-201 )       8.38      .224     3.133     42.278
02402>      OUTFLOW<03: (SWM1  )       8.38      .206     5.067     20.846
02403>     OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000
02404>
02405>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02406>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02407>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02408>
02409>
02410>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   91.834
02411>                     TIME SHIFT OF PEAK FLOW          (min)=   116.00
02412>                     MAXIMUM  STORAGE   USED       (ha.m.)=.1821E+00
02413>
02414>       *** WARNING: Outflow volume is less than inflow volume.
02415> ------------------------------------------------------------------------------
02416> 006:0008----------------------------------------------------------------------
02417> ----------------------
02418> | DESIGN NASHYD      |   Area    (ha)=   14.38   Curve Number   (CN)=80.00
02419> | 04:EXC-2  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02420> ----------------------  U.H. Tp(hrs)=    .560
02421>
02422>      Unit Hyd Qpeak  (cms)=     .981
02423>
02424>      PEAK FLOW       (cms)=     .487 (i)
02425>      TIME TO PEAK    (hrs)=    3.250
02426>      RUNOFF VOLUME    (mm)=   54.594
02427>      TOTAL RAINFALL   (mm)=   93.696
02428>      RUNOFF COEFFICIENT   =     .583
02429>
02430>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02431>
02432> ------------------------------------------------------------------------------
02433> 006:0009----------------------------------------------------------------------
02434> ----------------------
02435> | DESIGN NASHYD      |   Area    (ha)=    3.19   Curve Number   (CN)=71.00
02436> | 05:C-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02437> ----------------------  U.H. Tp(hrs)=    .260
02438>
02439>      Unit Hyd Qpeak  (cms)=     .469
02440>
02441>      PEAK FLOW       (cms)=     .089 (i)
02442>      TIME TO PEAK    (hrs)=    3.083
02443>      RUNOFF VOLUME    (mm)=   43.381
02444>      TOTAL RAINFALL   (mm)=   93.696
02445>      RUNOFF COEFFICIENT   =     .463
02446>
02447>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02448>
02449> ------------------------------------------------------------------------------
02450> 006:0010----------------------------------------------------------------------
02451> ----------------------
02452> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02453> |  IN>05:(C-202 )    |
02454> | OUT<06:(SWM2A )    |    =========  OUTLFOW STORAGE TABLE  =========
02455> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02456>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02457>                              .000  .0000E+00     |   1.000  .6400E-01
02458>                              .000  .5990E-01     |   2.000  .6820E-01
02459>
02460>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02461>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02462>      INFLOW >05: (C-202 )       3.19      .089     3.083     43.381
02463>      OUTFLOW<06: (SWM2A )       3.19      .081     5.033     24.603
02464>     OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000
02465>
02466>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02467>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02468>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02469>
02470>
02471>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   89.979
02472>                     TIME SHIFT OF PEAK FLOW          (min)=   117.00
02473>                     MAXIMUM  STORAGE   USED       (ha.m.)=.6023E-01
02474>
02475>       *** WARNING: Outflow volume is less than inflow volume.
02476> ------------------------------------------------------------------------------
02477> 006:0011----------------------------------------------------------------------
02478> ----------------------
02479> | ADD HYD (CTR1A     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02480> ----------------------                     (ha)     (cms)   (hrs)   (mm)    (cms)
02481>                         ID1 04:EXC-2        14.38     .487    3.25  54.59    .000
02482>                        +ID2 06:SWM2A         3.19     .081    5.03  24.60    .000
02483>                         ==========================================================
02484>                         SUM 07:CTR1A         17.57     .550    3.60  49.15    .000
02485>
02486>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02487>
02488> ------------------------------------------------------------------------------
02489> 006:0012----------------------------------------------------------------------
02490> ----------------------
02491> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
02492> |  IN>07:(CTR1A )    |
02493> | OUT<08:(SWM2B )    |    =========  OUTLFOW STORAGE TABLE  =========
02494> ----------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
02495>                             (cms)     (ha.m.)    |    (cms)    (ha.m.)
02496>                              .000  .0000E+00     |    .000  .1618E+00
02497>                              .000  .1260E-01     |    .862  .2671E+00
02498>                              .000  .4270E-01     |   2.728  .4058E+00
02499>                              .000  .8980E-01     |   4.016  .4888E+00
02500>
02501>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02502>      ---------------------       (ha)     (cms)     (hrs)       (mm)
02503>      INFLOW >07: (CTR1A )      17.57      .550     3.600     49.149
02504>      OUTFLOW<08: (SWM2B )      17.57      .518     4.400     39.940
02505>     OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000
02506>
02507>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02508>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02509>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02510>
02511>
02512>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   94.165
02513>                     TIME SHIFT OF PEAK FLOW          (min)=    48.00
02514>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2251E+00
02515>
02516>       *** WARNING: Outflow volume is less than inflow volume.
02517> ------------------------------------------------------------------------------
02518> 006:0013----------------------------------------------------------------------
02519> ----------------------
02520> | DESIGN NASHYD      |   Area    (ha)=     .00   Curve Number   (CN)= 1.00
02521> | 09:BLANK  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02522> ----------------------  U.H. Tp(hrs)=    .500
02523>
02524>      Unit Hyd Qpeak  (cms)=     .000
02525>
02526>      PEAK FLOW       (cms)=     .000 (i)
02527>      TIME TO PEAK    (hrs)=    5.117
02528>      RUNOFF VOLUME    (mm)=     .337
02529>      TOTAL RAINFALL   (mm)=   93.696
02530>      RUNOFF COEFFICIENT   =     .004
02531>
02532>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02533>
02534> ------------------------------------------------------------------------------
02535> 006:0014----------------------------------------------------------------------
02536> ----------------------
02537> | ADD HYD (SB&BLK    ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
02538> ----------------------                     (ha)     (cms)   (hrs)   (mm)    (cms)
02539>                         ID1 08:SWM2B        17.57     .518    4.40  39.94    .000
02540>                        +ID2 09:BLANK         .00     .000    5.12    .34    .000
```

```
02541>                    ============================================================
02542>                    SUM 04:SB&BLK        17.57     .518    4.40  39.94    .000
02543>
02544>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02545>
02546> ------------------------------------------------------------------------------
02547> 006:0015-----------------------------------------------------------------------
02548> ---------------------
02549> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02550> |  IN>04:(SB&BLK)   |
02551> | OUT<09:(SWM2C )   |    =========  OUTLFOW STORAGE TABLE  =========
02552> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02553>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02554>                             .000  .0000E+00    |     .500  .1054E+00
02555>                             .000  .9880E-01    |    1.300  .1124E+00
02556>
02557>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02558>     ---------------------       (ha)     (cms)     (hrs)       (mm)
02559>     INFLOW >04: (SB&BLK)      17.57      .518     4.400     39.940
02560>     OUTFLOW<09: (SWM2C )      17.57      .518     4.417     34.317
02561>    OVERFLOW<10: (OSWM2C)        .00      .000      .000       .000
02562>
02563>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02564>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02565>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02566>
02567>
02568>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   99.994
02569>                    TIME SHIFT OF PEAK FLOW          (min)=    1.00
02570>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1056E+00
02571>
02572>       *** WARNING: Outflow volume is less than inflow volume.
02573> ------------------------------------------------------------------------------
02574> 006:0016-----------------------------------------------------------------------
02575> ------------------------
02576> | ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02577> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
02578>                         ID1 01:CTR1          .65      .023    3.10  54.59    .000
02579>                        +ID2 03:SWM1         8.38      .206    5.07  20.85    .000
02580>                        +ID3 09:SWM2C       17.57      .518    4.42  34.32    .000
02581>                         ============================================================
02582>                         SUM 01:CTR1         26.60      .740    4.38  30.57    .000
02583>
02584>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02585>
02586> ------------------------------------------------------------------------------
02587> 006:0017-----------------------------------------------------------------------
02588> ----------------------
02589> | DESIGN NASHYD      |   Area     (ha)=    8.99   Curve Number   (CN)=82.00
02590> | 01:C-203  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02591> ----------------------   U.H. Tp(hrs)=    .300
02592>
02593>     Unit Hyd Qpeak  (cms)=    1.145
02594>
02595>     PEAK FLOW       (cms)=     .337 (i)
02596>     TIME TO PEAK    (hrs)=    3.067
02597>     RUNOFF VOLUME    (mm)=   57.452
02598>     TOTAL RAINFALL   (mm)=   93.696
02599>     RUNOFF COEFFICIENT   =     .613
02600>
02601>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02602>
02603> ------------------------------------------------------------------------------
02604> 006:0018-----------------------------------------------------------------------
02605> ---------------------
02606> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02607> |  IN>01:(C-203 )   |
02608> | OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
02609> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02610>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02611>                             .000  .0000E+00    |    3.000  .2660E+00
02612>                             .000  .2491E+00    |    7.000  .2834E+00
02613>
02614>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02615>     ---------------------       (ha)     (cms)     (hrs)       (mm)
02616>     INFLOW >01: (C-203 )       8.99      .337     3.067     57.452
02617>     OUTFLOW<02: (SWM3  )       8.99      .285     3.783     29.743
02618>    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000
02619>
02620>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02621>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02622>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02623>
02624>
02625>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   84.501
02626>                    TIME SHIFT OF PEAK FLOW          (min)=   43.00
02627>                    MAXIMUM  STORAGE   USED       (ha.m.)=.2507E+00
02628>
02629>       *** WARNING: Outflow volume is less than inflow volume.
02630> ------------------------------------------------------------------------------
02631> 006:0019-----------------------------------------------------------------------
02632> ----------------------
02633> | DESIGN NASHYD      |   Area     (ha)=    5.15   Curve Number   (CN)=80.00
02634> | 03:EXC-3  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02635> ----------------------   U.H. Tp(hrs)=    .390
02636>
02637>     Unit Hyd Qpeak  (cms)=     .504
02638>
02639>     PEAK FLOW       (cms)=     .180 (i)
02640>     TIME TO PEAK    (hrs)=    3.117
02641>     RUNOFF VOLUME    (mm)=   54.594
02642>     TOTAL RAINFALL   (mm)=   93.696
02643>     RUNOFF COEFFICIENT   =     .583
02644>
02645>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02646>
02647> ------------------------------------------------------------------------------
02648> 006:0020-----------------------------------------------------------------------
02649> ------------------------
02650> | ADD HYD (CTR2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02651> ------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
02652>                         ID1 02:SWM3          8.99      .285    3.78  29.74    .000
02653>                        +ID2 03:EXC-3         5.15      .180    3.12  54.59    .000
02654>                         ============================================================
02655>                         SUM 01:CTR2         14.14      .445    3.77  38.79    .000
02656>
02657>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02658>
02659> ------------------------------------------------------------------------------
02660> 006:0021-----------------------------------------------------------------------
02661> ----------------------
02662> | DESIGN NASHYD      |   Area     (ha)=    5.81   Curve Number   (CN)=86.00
02663> | 01:C-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02664> ----------------------   U.H. Tp(hrs)=    .260
02665>
02666>     Unit Hyd Qpeak  (cms)=     .854
02667>
02668>     PEAK FLOW       (cms)=     .247 (i)
02669>     TIME TO PEAK    (hrs)=    2.150
02670>     RUNOFF VOLUME    (mm)=   63.650
02671>     TOTAL RAINFALL   (mm)=   93.696
02672>     RUNOFF COEFFICIENT   =     .679
02673>
02674>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02675>
02676> ------------------------------------------------------------------------------
02677> 006:0022-----------------------------------------------------------------------
02678> ---------------------
02679> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02680> |  IN>01:(C-204 )   |
02681> | OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
02682> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02683>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
02684>                             .000  .0000E+00    |    1.000  .1925E+00
02685>                             .000  .1803E+00    |    2.000  .2051E+00
02686>
02687>     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02688>     ---------------------       (ha)     (cms)     (hrs)       (mm)
02689>     INFLOW >01: (C-204 )       5.81      .247     2.150     63.650
02690>     OUTFLOW<02: (SWM4  )       5.81      .199     3.750     32.618
02691>    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000
02692>
02693>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
02694>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
02695>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
02696>
02697>
02698>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   80.719
02699>                    TIME SHIFT OF PEAK FLOW          (min)=   96.00
02700>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1827E+00
02701>
02702>       *** WARNING: Outflow volume is less than inflow volume.
02703> ------------------------------------------------------------------------------
02704> 006:0023-----------------------------------------------------------------------
02705> ------------------------------------------------------------------------------
02706> 006:0002-----------------------------------------------------------------------
02707> ------------------------------------------------------------------------------
02708> 006:0002-----------------------------------------------------------------------
02709> ------------------------------------------------------------------------------
02710> 006:0002-----------------------------------------------------------------------
02711> ------------------------------------------------------------------------------
02712> 006:0002-----------------------------------------------------------------------
02713> ------------------------------------------------------------------------------
02714> 006:0002-----------------------------------------------------------------------
02715>   ** END OF RUN :   6
02716>
02717> ******************************************************************************
02718>
02719>
02720>
02721>
02722>
02723> --------------------
02724> | START            |  Project  dir.: C:\TREVOR-1\$13356-1\AMCIII\
02725> --------------------  Rainfall dir.: C:\TREVOR-1\$13356-1\AMCIII\
02726>     TZERO =   .00 hrs on        0
02727>     METOUT=   2 (output = METRIC)
02728>     NRUN  = 007
02729>     NSTORM=   1
02730>               #  1=25mm.4hr
02731> ------------------------------------------------------------------------------
02732> 007:0002-----------------------------------------------------------------------
02733> *#*****************************************************************************
02734> *#  Project Name: [Loyalist Block C SWM] Project Number:[133560220]
02735> *#  Date        : 2017/11/24
02736> *#  Modeller    : [C. Fischer]
02737> *#  Company     : Stantec Consulting Ltd. (Waterloo)
02738> *#  License #   : 4730904
02739> *#*****************************************************************************
02740> *#
02741> *#                     Block C - PROPOSED CONDITIONS
02742> *#
02743> *#*****************************************************************************
02744> ------------------------------------------------------------------------------
02745> 007:0002-----------------------------------------------------------------------
02746> --------------------
02747> | READ STORM       |    Filename: 25 mm, 4hr Chicago Storm
02748> | Ptotal=  25.00 mm|    Comments: 25 mm, 4hr Chicago Storm
02749> --------------------
02750>               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
02751>                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
02752>                .08   1.465 |  1.08   4.024 |  2.08   5.764 |  3.08   2.074
02753>                .17   1.540 |  1.17   4.814 |  2.17   4.969 |  3.17   1.977
02754>                .25   1.625 |  1.25   6.025 |  2.25   4.374 |  3.25   1.889
02755>                .33   1.720 |  1.33   8.114 |  2.33   3.913 |  3.33   1.810
02756>                .42   1.829 |  1.42  12.526 |  2.42   3.545 |  3.42   1.737
02757>                .50   1.955 |  1.50  27.198 |  2.50   3.245 |  3.50   1.671
02758>                .58   2.101 |  1.58  74.855 |  2.58   2.994 |  3.58   1.610
02759>                .67   2.274 |  1.67  31.410 |  2.67   2.782 |  3.67   1.553
02760>                .75   2.482 |  1.75  16.819 |  2.75   2.601 |  3.75   1.501
02761>                .83   2.736 |  1.83  11.357 |  2.83   2.443 |  3.83   1.453
02762>                .92   3.055 |  1.92   8.563 |  2.92   2.305 |  3.92   1.408
02763>               1.00   3.468 |  2.00   6.882 |  3.00   2.183 |  4.00   1.366
02764>
02765> ------------------------------------------------------------------------------
02766> 007:0003-----------------------------------------------------------------------
02767> *#*****************************************************************************
02768> *#
02769> *#                              AMC III Conditions
02770> *#
02771> *#*****************************************************************************
02772> ----------------------
02773> | DESIGN NASHYD      |   Area     (ha)=    4.57   Curve Number   (CN)=75.00
02774> | 01:C-200  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
02775> ----------------------   U.H. Tp(hrs)=    .270
02776>
02777>     Unit Hyd Qpeak  (cms)=     .646
02778>
02779>     PEAK FLOW       (cms)=     .063 (i)
02780>     TIME TO PEAK    (hrs)=    1.917
02781>     RUNOFF VOLUME    (mm)=    5.106
02782>     TOTAL RAINFALL   (mm)=   25.000
02783>     RUNOFF COEFFICIENT   =     .204
02784>
02785>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02786>
02787> ------------------------------------------------------------------------------
02788> 007:0004-----------------------------------------------------------------------
02789> ---------------------
02790> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
02791> |  IN>01:(C-200 )   |
02792> | OUT<02:(SWM0  )   |    =========  OUTLFOW STORAGE TABLE  =========
02793> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02794>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
```

```
                              .000  .0000E+00   |    2.000  .1372E+00
                              .000  .1285E+00   |    5.000  .1462E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-200 )       4.57      .063     1.917      5.106
     OUTFLOW<02: (SWM0  )       4.57      .000      .000       .000
    OVERFLOW<10: (OVSWM0)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)= -115.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2333E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
007:0005--------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area     (ha)=     .65   Curve Number   (CN)=80.00
| 01:EXC-1  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .340

     Unit Hyd Qpeak  (cms)=     .073

     PEAK FLOW       (cms)=     .010 (i)
     TIME TO PEAK    (hrs)=    2.000
     RUNOFF VOLUME    (mm)=    6.347
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .254

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

--------------------------------------------------------------------------------
007:0006--------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area     (ha)=    8.38   Curve Number   (CN)=70.00
| 02:C-201  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .350

     Unit Hyd Qpeak  (cms)=     .914

     PEAK FLOW       (cms)=     .080 (i)
     TIME TO PEAK    (hrs)=    2.033
     RUNOFF VOLUME    (mm)=    4.172
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .167

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

--------------------------------------------------------------------------------
007:0007--------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>02:(C-201 )    |
| OUT<03:(SWM1  )    |   =========  OUTLFOW STORAGE TABLE  =========
---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   1.000  .1918E+00
                           .000  .1796E+00    |   4.000  .2044E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (C-201 )       8.38      .080     2.033      4.172
     OUTFLOW<03: (SWM1  )       8.38      .000      .000       .000
    OVERFLOW<10: (OVSWM1)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)= -122.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.3497E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
007:0008--------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area     (ha)=   14.38   Curve Number   (CN)=80.00
| 04:EXC-2  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .560

     Unit Hyd Qpeak  (cms)=     .981

     PEAK FLOW       (cms)=     .154 (i)
     TIME TO PEAK    (hrs)=    2.300
     RUNOFF VOLUME    (mm)=    6.348
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .254

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

--------------------------------------------------------------------------------
007:0009--------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area     (ha)=    3.19   Curve Number   (CN)=71.00
| 05:C-202  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .469

     PEAK FLOW       (cms)=     .038 (i)
     TIME TO PEAK    (hrs)=    1.900
     RUNOFF VOLUME    (mm)=    4.340
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .174

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

--------------------------------------------------------------------------------
007:0010--------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>05:(C-202 )    |
| OUT<06:(SWM2A )    |   =========  OUTLFOW STORAGE TABLE  =========
---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   1.000  .6400E-01
                           .000  .5990E-01    |   2.000  .6820E-01

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (C-202 )       3.19      .038     1.900      4.340
     OUTFLOW<06: (SWM2A )       3.19      .000      .000       .000
    OVERFLOW<10: (OSWM2A)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=  -114.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1384E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
007:0011--------------------------------------------------------------------------
----------------------
| ADD HYD (CTR1A     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 04:EXC-2       14.38     .154    2.30   6.35    .000
                       +ID2 06:SWM2A        3.19     .000     .00    .00    .000
                        ==========================================================
                        SUM 07:CTR1A       17.57     .154    2.30   5.20    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0012--------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>07:(CTR1A )    |
| OUT<08:(SWM2B )    |   =========  OUTLFOW STORAGE TABLE  =========
---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    .000  .1618E+00
                           .000  .1260E-01    |    .862  .2671E+00
                           .000  .4270E-01    |   2.728  .4058E+00
                           .000  .8980E-01    |   4.016  .4888E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >07: (CTR1A )       17.57      .154     2.300      5.195
     OUTFLOW<08: (SWM2B )       17.57      .000      .000       .000
    OVERFLOW<10: (OSWM2B)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=  -138.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9128E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
007:0013--------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area     (ha)=     .00   Curve Number   (CN)= 1.00
| 09:BLANK  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .000

     PEAK FLOW       (cms)=     .000 (i)
     TIME TO PEAK    (hrs)=    2.250
     RUNOFF VOLUME    (mm)=    .020
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .001

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

--------------------------------------------------------------------------------
007:0014--------------------------------------------------------------------------
----------------------
| ADD HYD (SB&BLK    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 08:SWM2B       17.57     .000     .00    .00    .000
                       +ID2 09:BLANK         .00     .000    2.25    .02    .000
                        ==========================================================
                        SUM 04:SB&BLK      17.57     .000    2.25    .00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0015--------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>04:(SB&BLK)    |
| OUT<09:(SWM2C )    |   =========  OUTLFOW STORAGE TABLE  =========
---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    .500  .1054E+00
                           .000  .9880E-01    |   1.300  .1124E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >04: (SB&BLK)       17.57      .000     2.250      .000
     OUTFLOW<09: (SWM2C )       17.57      .000      .000      .000
    OVERFLOW<10: (OSWM2C)        .00      .000      .000      .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                    TIME SHIFT OF PEAK FLOW          (min)=  -135.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1968E-09

--------------------------------------------------------------------------------
007:0016--------------------------------------------------------------------------
----------------------
| ADD HYD (CTR1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 01:CTR1          .65     .010    2.00   6.35    .000
                       +ID2 03:SWM1         8.38     .000     .00    .00    .000
                       +ID3 09:SWM2C       17.57     .000     .00    .00    .000
                        ==========================================================
                        SUM 01:CTR1        26.60     .010    2.00    .16    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0017--------------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area     (ha)=    8.99   Curve Number   (CN)=82.00
```

```
| 01:C-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .300

     Unit Hyd Qpeak  (cms)=    1.145

     PEAK FLOW       (cms)=     .162 (i)
     TIME TO PEAK    (hrs)=    1.950
     RUNOFF VOLUME    (mm)=    6.968
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .279

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

007:0018--------------------------------------------------------------------------------
 --------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-203 )   |
| OUT<02:(SWM3  )   |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |    3.000  .2660E+00
                            .000  .2491E+00    |    7.000  .2834E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-203 )       8.99      .162     1.950      6.968
     OUTFLOW<02: (SWM3  )       8.99      .000      .000       .000
    OVERFLOW<10: (OVSWM3)        .00      .000      .000       .000

                   TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
                   CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                   PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                   TIME SHIFT OF PEAK FLOW          (min)=  -117.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.6264E-01

      *** WARNING: Outflow volume is less than inflow volume.
007:0019--------------------------------------------------------------------------------
 ---------------------
| DESIGN NASHYD     |   Area    (ha)=    5.15   Curve Number   (CN)=80.00
| 03:EXC-3  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .504

     PEAK FLOW       (cms)=     .071 (i)
     TIME TO PEAK    (hrs)=    2.067
     RUNOFF VOLUME    (mm)=    6.348
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .254

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

007:0020--------------------------------------------------------------------------------
 ----------------------
| ADD HYD (CTR2     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
 ----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:SWM3          8.99     .000     .00    .00    .000
                      +ID2 03:EXC-3         5.15     .071    2.07   6.35    .000
                       ==========================================================
                       SUM 01:CTR2          14.14     .071    2.07   2.31    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

007:0021--------------------------------------------------------------------------------
 ---------------------
| DESIGN NASHYD     |   Area    (ha)=    5.81   Curve Number   (CN)=86.00
| 01:C-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
 ---------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=     .854

     PEAK FLOW       (cms)=     .143 (i)
     TIME TO PEAK    (hrs)=    1.900
     RUNOFF VOLUME    (mm)=    8.516
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .341

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

007:0022--------------------------------------------------------------------------------
 --------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(C-204 )   |
| OUT<02:(SWM4  )   |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |    1.000  .1925E+00
                            .000  .1803E+00    |    2.000  .2051E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (C-204 )       5.81      .143     1.900      8.516
     OUTFLOW<02: (SWM4  )       5.81      .000      .000       .000
    OVERFLOW<05: (OVSWM4)        .00      .000      .000       .000

                   TOTAL NUMBER OF SIMULATED OVERFLOWS  =         0
                   CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                   PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=     .000
                   TIME SHIFT OF PEAK FLOW          (min)=  -114.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.4948E-01

      *** WARNING: Outflow volume is less than inflow volume.
007:0023--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------------

      FINISH
--------------------------------------------------------------------------------
********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0015 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 003:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0015 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 004:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0015 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 005:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0015 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 006:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0007 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0010 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0018 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 007:0022 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
   Simulation ended on 2018-01-12     at 11:34:16
================================================================================
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APPENDIX E – PUBLICATIONS

Hydrologic Response of Solar Farms
Effects of Tillage on soil Microrelief, Surface Depression Storage and Soil Water Storage

Hydrologic Response of Solar Farms

Lauren M. Cook, S.M.ASCE[1]; and Richard H. McCuen, M.ASCE[2]

Abstract: Because of the benefits of solar energy, the number of solar farms is increasing; however, their hydrologic impacts have not been studied. The goal of this study was to determine the hydrologic effects of solar farms and examine whether or not storm-water management is needed to control runoff volumes and rates. A model of a solar farm was used to simulate runoff for two conditions: the pre- and postpaneled conditions. Using sensitivity analyses, modeling showed that the solar panels themselves did not have a significant effect on the runoff volumes, peaks, or times to peak. However, if the ground cover under the panels is gravel or bare ground, owing to design decisions or lack of maintenance, the peak discharge may increase significantly with storm-water management needed. In addition, the kinetic energy of the flow that drains from the panels was found to be greater than that of the rainfall, which could cause erosion at the base of the panels. Thus, it is recommended that the grass beneath the panels be well maintained or that a buffer strip be placed after the most downgradient row of panels. This study, along with design recommendations, can be used as a guide for the future design of solar farms. **DOI: 10.1061/(ASCE)HE.1943-5584.0000530.** *© 2013 American Society of Civil Engineers.*

CE Database subject headings: Hydrology; Land use; Solar power; Floods; Surface water; Runoff; Stormwater management.

Author keywords: Hydrology; Land use change; Solar energy; Flooding; Surface water runoff; Storm-water management.

Introduction

Storm-water management practices are generally implemented to reverse the effects of land-cover changes that cause increases in volumes and rates of runoff. This is a concern posed for new types of land-cover change such as the solar farm. Solar energy is a renewable energy source that is expected to increase in importance in the near future. Because solar farms require considerable land, it is necessary to understand the design of solar farms and their potential effect on erosion rates and storm runoff, especially the impact on offsite properties and receiving streams. These farms can vary in size from 8 ha (20 acres) in residential areas to 250 ha (600 acres) in areas where land is abundant.

The solar panels are impervious to rain water; however, they are mounted on metal rods and placed over pervious land. In some cases, the area below the panel is paved or covered with gravel. Service roads are generally located between rows of panels. Although some panels are stationary, others are designed to move so that the angle of the panel varies with the angle of the sun. The angle can range, depending on the latitude, from 22° during the summer months to 74° during the winter months. In addition, the angle and direction can also change throughout the day. The issue posed is whether or not these rows of impervious panels will change the runoff characteristics of the site, specifically increase runoff volumes or peak discharge rates. If the increases are hydrologically significant, storm-water management facilities may be needed. Additionally, it is possible that the velocity of water draining from the edge of the panels is sufficient to cause erosion of the soil below the panels, especially where the maintenance roadways are bare ground.

The outcome of this study provides guidance for assessing the hydrologic effects of solar farms, which is important to those who plan, design, and install arrays of solar panels. Those who design solar farms may need to provide for storm-water management. This study investigated the hydrologic effects of solar farms, assessed whether or not storm-water management might be needed, and if the velocity of the runoff from the panels could be sufficient to cause erosion of the soil below the panels.

Model Development

Solar farms are generally designed to maximize the amount of energy produced per unit of land area, while still allowing space for maintenance. The hydrologic response of solar farms is not usually considered in design. Typically, the panels will be arrayed in long rows with separations between the rows to allow for maintenance vehicles. To model a typical layout, a unit width of one panel was assumed, with the length of the downgradient strip depending on the size of the farm. For example, a solar farm with 30 rows of 200 panels each could be modeled as a strip of 30 panels with space between the panels for maintenance vehicles. Rainwater that drains from the upper panel onto the ground will flow over the land under the 29 panels on the downgradient strip. Depending on the land cover, infiltration losses would be expected as the runoff flows to the bottom of the slope.

To determine the effects that the solar panels have on runoff characteristics, a model of a solar farm was developed. Runoff in the form of sheet flow without the addition of the solar panels served as the prepaneled condition. The paneled condition assumed a downgradient series of cells with one solar panel per ground cell. Each cell was separated into three sections: wet, dry, and spacer.

The dry section is that portion directly underneath the solar panel, unexposed directly to the rainfall. As the angle of the panel from the horizontal increases, more of the rain will fall directly onto

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the ground; this section of the cell is referred to as the wet section. The spacer section is the area between the rows of panels used by maintenance vehicles. Fig. 1 is an image of two solar panels and the spacer section allotted for maintenance vehicles. Fig. 2 is a schematic of the wet, dry, and spacer sections with their respective dimensions. In Fig. 1, tracks from the vehicles are visible on what is modeled within as the spacer section. When the solar panel is horizontal, then the length longitudinal to the direction that runoff will occur is the length of the dry and wet sections combined. Runoff from a dry section drains onto the downgradient spacer section. Runoff from the spacer section flows to the wet section of the next downgradient cell. Water that drains from a solar panel falls directly onto the spacer section of that cell.

The length of the spacer section is constant. During a storm event, the loss rate was assumed constant for the 24-h storm because a wet antecedent condition was assumed. The lengths of the wet and dry sections changed depending on the angle of the solar panel. The total length of the wet and dry sections was set equal to the length of one horizontal solar panel, which was assumed to be 3.5 m. When a solar panel is horizontal, the dry section length would equal 3.5 m and the wet section length would be zero. In the paneled condition, the dry section does not receive direct rainfall because the rain first falls onto the solar panel then drains onto the spacer section. However, the dry section does infiltrate some of the runoff that comes from the upgradient wet section. The wet section was modeled similar to the spacer section with rain falling directly onto the section and assuming a constant loss rate.

For the presolar panel condition, the spacer and wet sections are modeled the same as in the paneled condition; however, the cell does not include a dry section. In the prepaneled condition, rain falls directly onto the entire cell. When modeling the prepaneled condition, all cells receive rainfall at the same rate and are subject to losses. All other conditions were assumed to remain the same such that the prepaneled and paneled conditions can be compared.

Rainfall was modeled after an natural resources conservation service (NRCS) Type II Storm (McCuen 2005) because it is an accurate representation of actual storms of varying characteristics that are imbedded in intensity-duration-frequency (IDF) curves. For each duration of interest, a dimensionless hyetograph was developed using a time increment of 12 s over the duration of the storm (see Fig. 3). The depth of rainfall that corresponds to each storm magnitude was then multiplied by the dimensionless hyetograph. For a 2-h storm duration, depths of 40.6, 76.2, and 101.6 mm were used for the 2-, 25-, and 100-year events. The 2- and 6-h duration hyetographs were developed using the center portion of the 24-h storm, with the rainfall depths established with the Baltimore IDF curve. The corresponding depths for a 6-h duration were 53.3, 106.7, and 132.1 mm, respectively. These magnitudes were chosen to give a range of storm conditions.

During each time increment, the depth of rain is multiplied by the cell area to determine the volume of rain added to each section of each cell. This volume becomes the storage in each cell. Depending on the soil group, a constant volume of losses was subtracted from the storage. The runoff velocity from a solar panel was calculated using Manning's equation, with the hydraulic radius for sheet flow assumed to equal the depth of the storage on the panel (Bedient and Huber 2002). Similar assumptions were made to compute the velocities in each section of the surface sections.

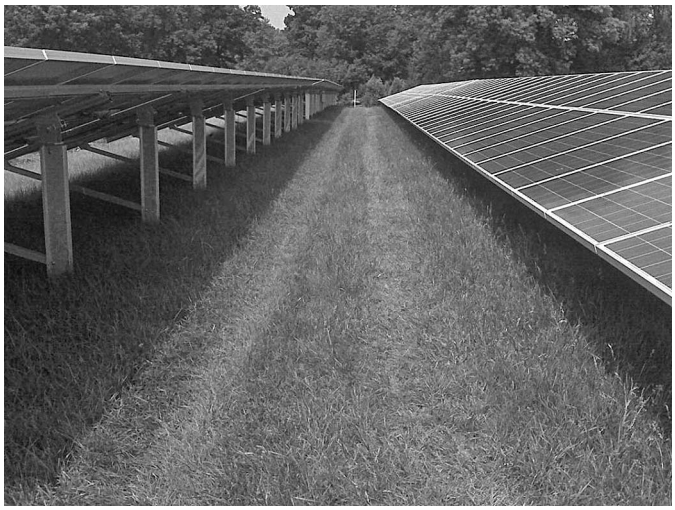

Fig. 1. Maintenance or "spacer" section between two rows of solar panels (photo by John E. Showler, reprinted with permission)

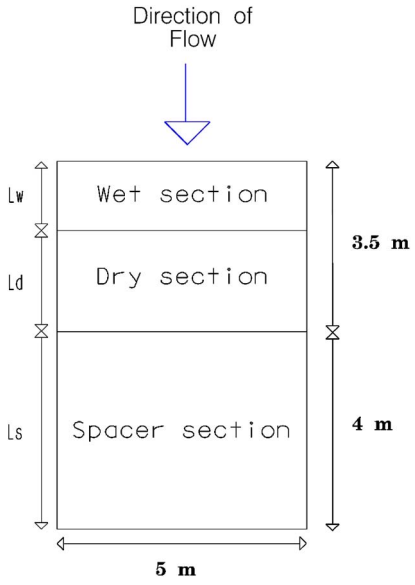

Fig. 2. Wet, dry, and spacer sections of a single cell with lengths *Lw*, *Ls*, and *Ld* with the solar panel covering the dry section

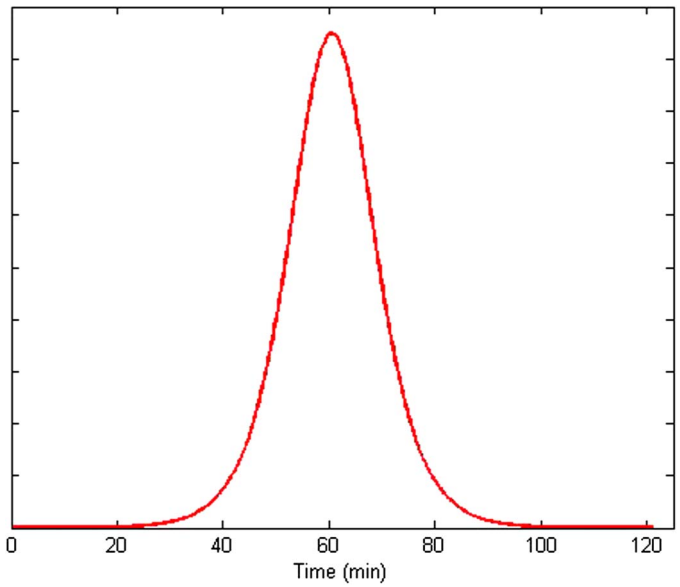

Fig. 3. Dimensionless hyetograph of 2-h Type II storm

Runoff from one section to the next and then to the next downgradient cell was routed using the continuity of mass. The routing coefficient depended on the depth of flow in storage and the velocity of runoff. Flow was routed from the wet section to the dry section to the spacer section, with flow from the spacer section draining to the wet section of the next cell. Flow from the most downgradient cell was assumed to be the outflow. Discharge rates and volumes from the most downgradient cell were used for comparisons between the prepaneled and paneled conditions.

Alternative Model Scenarios

To assess the effects of the different variables, a section of 30 cells, each with a solar panel, was assumed for the base model. Each cell was separated individually into wet, dry, and spacer sections. The area had a total ground length of 225 m with a ground slope of 1% and width of 5 m, which was the width of an average solar panel. The roughness coefficient (Engman 1986) for the silicon solar panel was assumed to be that of glass, 0.01. Roughness coefficients of 0.15 for grass and 0.02 for bare ground were also assumed. Loss rates of 0.5715 cm/h (0.225 in./h) and 0.254 cm/h (0.1 in./h) for B and C soils, respectively, were assumed.

The prepaneled condition using the 2-h, 25-year rainfall was assumed for the base condition, with each cell assumed to have a good grass cover condition. All other analyses were made assuming a paneled condition. For most scenarios, the runoff volumes and peak discharge rates from the paneled model were not significantly greater than those for the prepaneled condition. Over a total length of 225 m with 30 solar panels, the runoff increased by 0.26 m^3, which was a difference of only 0.35%. The slight increase in runoff volume reflects the slightly higher velocities for the paneled condition. The peak discharge increased by 0.0013 m^3, a change of only 0.31%. The time to peak was delayed by one time increment, i.e., 12 s. Inclusion of the panels did not have a significant hydrologic impact.

Storm Magnitude

The effect of storm magnitude was investigated by changing the magnitude from a 25-year storm to a 2-year storm. For the 2-year storm, the rainfall and runoff volumes decreased by approximately 50%. However, the runoff from the paneled watershed condition increased compared to the prepaneled condition by approximately the same volume as for the 25-year analysis, 0.26 m^3. This increase represents only a 0.78% increase in volume. The peak discharge and the time to peak did not change significantly. These results reflect runoff from a good grass cover condition and indicated that the general conclusion of very minimal impacts was the same for different storm magnitudes.

Ground Slope

The effect of the downgradient ground slope of the solar farm was also examined. The angle of the solar panels would influence the velocity of flows from the panels. As the ground slope was increased, the velocity of flow over the ground surface would be closer to that on the panels. This could cause an overall increase in discharge rates. The ground slope was changed from 1 to 5%, with all other conditions remaining the same as the base conditions.

With the steeper incline, the volume of losses decreased from that for the 1% slope, which is to be expected because the faster velocity of the runoff would provide less opportunity for infiltration. However, between the prepaneled and paneled conditions, the increase in runoff volume was less than 1%. The peak discharge and the time to peak did not change. Therefore, the greater ground slope did not significantly influence the response of the solar farm.

Soil Type

The effect of soil type on the runoff was also examined. The soil group was changed from B soil to C soil by varying the loss rate. As expected, owing to the higher loss rate for the C soil, the depths of runoff increased by approximately 7.5% with the C soil when compared with the volume for B soils. However, the runoff volume for the C soil condition only increased by 0.17% from the prepaneled condition to the paneled condition. In comparison with the B soil, a difference of 0.35% in volume resulted between the two conditions. Therefore, the soil group influenced the actual volumes and rates, but not the relative effect of the paneled condition when compared to the prepaneled condition.

Panel Angle

Because runoff velocities increase with slope, the effect of the angle of the solar panel on the hydrologic response was examined. Analyses were made for angles of 30° and 70° to test an average range from winter to summer. The hydrologic response for these angles was compared to that of the base condition angle of 45°. The other site conditions remained the same. The analyses showed that the angle of the panel had only a slight effect on runoff volumes and discharge rates. The lower angle of 30° was associated with an increased runoff volume, whereas the runoff volume decreased for the steeper angle of 70° when compared with the base condition of 45°. However, the differences (~0.5%) were very slight. Nevertheless, these results indicate that, when the solar panel was closer to horizontal, i.e., at a lower angle, a larger difference in runoff volume occurred between the prepaneled and paneled conditions. These differences in the response result are from differences in loss rates.

The peak discharge was also lower at the lower angle. At an angle of 30°, the peak discharge was slightly lower than at the higher angle of 70°. For the 2-h storm duration, the time to peak of the 30° angle was 2 min delayed from the time to peak of when the panel was positioned at a 70° angle, which reflects the longer travel times across the solar panels.

Storm Duration

To assess the effect of storm duration, analyses were made for 6-h storms, testing magnitudes for 2-, 25-, and 100-year return periods, with the results compared with those for the 2-h rainfall events. The longer storm duration was tested to determine whether a longer duration storm would produce a different ratio of increase in runoff between the prepaneled and paneled conditions. When compared to runoff volumes from the 2-h storm, those for the 6-h storm were 34% greater in both the paneled and prepaneled cases. However, when comparing the prepaneled to the paneled condition, the increase in the runoff volume with the 6-h storm was less than 1% regardless of the return period. The peak discharge and the time-to-peak did not differ significantly between the two conditions. The trends in the hydrologic response of the solar farm did not vary with storm duration.

Ground Cover

The ground cover under the panels was assumed to be a native grass that received little maintenance. For some solar farms, the area beneath the panel is covered in gravel or partially paved because the panels prevent the grass from receiving sunlight. Depending on the

volume of traffic, the spacer cell could be grass, patches of grass, or bare ground. Thus, it was necessary to determine whether or not these alternative ground-cover conditions would affect the runoff characteristics. This was accomplished by changing the Manning's n for the ground beneath the panels. The value of n under the panels, i.e., the dry section, was set to 0.015 for gravel, with the value for the spacer or maintenance section set to 0.02, i.e., bare ground. These can be compared to the base condition of a native grass ($n = 0.15$). A good cover should promote losses and delay the runoff.

For the smoother surfaces, the velocity of the runoff increased and the losses decreased, which resulted in increasing runoff volumes. This occurred both when the ground cover under the panels was changed to gravel and when the cover in the spacer section was changed to bare ground. Owing to the higher velocities of the flow, runoff rates from the cells increased significantly such that it was necessary to reduce the computational time increment. Fig. 4(a) shows the hydrograph from a 30-panel area with a time increment of 12 s. With a time increment of 12 s, the water in each cell is discharged at the end of every time increment, which results in no attenuation of the flow; thus, the undulations shown in Fig. 4(a) result. The time increment was reduced to 3 s for the 2-h storm, which resulted in watershed smoothing and a rational hydrograph shape [Fig. 4(b)]. The results showed that the storm runoff

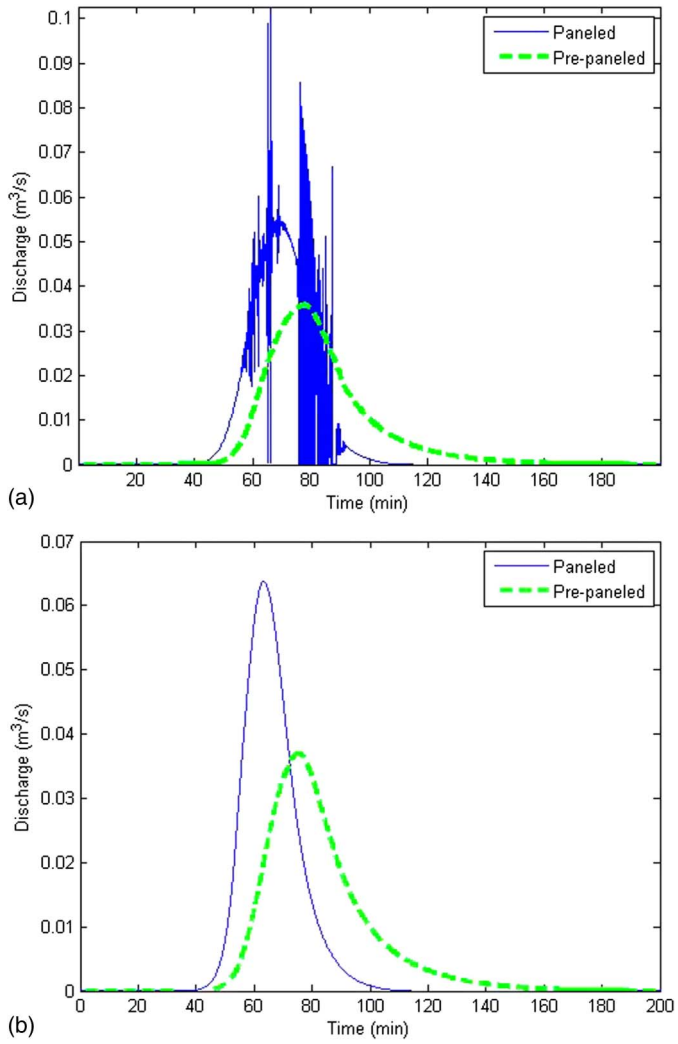

Fig. 4. Hydrograph with time increment of (a) 12 s; (b) 3 s with Manning's n for bare ground

increased by 7% from the grass-covered scenario to the scenario with gravel under the panel. The peak discharge increased by 73% for the gravel ground cover when compared with the grass cover without the panels. The time to peak was 10 min less with the gravel than with the grass, which reflects the effect of differences in surface roughness and the resulting velocities.

If maintenance vehicles used the spacer section regularly and the grass cover was not adequately maintained, the soil in the spacer section would be compacted and potentially the runoff volumes and rates would increase. Grass that is not maintained has the potential to become patchy and turn to bare ground. The grass under the panel may not get enough sunlight and die. Fig. 1 shows the result of the maintenance trucks frequently driving in the spacer section, which diminished the grass cover.

The effect of the lack of solar farm maintenance on runoff characteristics was modeled by changing the Manning's n to a value of 0.02 for bare ground. In this scenario, the roughness coefficient for the ground under the panels, i.e., the dry section, as well as in the spacer cell was changed from grass covered to bare ground ($n = 0.02$).The effects were nearly identical to that of the gravel. The runoff volume increased by 7% from the grass-covered to the bare-ground condition. The peak discharge increased by 72% when compared with the grass-covered condition. The runoff for the bare-ground condition also resulted in an earlier time to peak by approximately 10 min. Two other conditions were also modeled, showing similar results. In the first scenario, gravel was placed directly under the panel, and healthy grass was placed in the spacer section, which mimics a possible design decision. Under these conditions, the peak discharge increased by 42%, and the volume of runoff increased by 4%, which suggests that storm-water management would be necessary if gravel is placed anywhere.

Fig. 5 shows two solar panels from a solar farm in New Jersey. The bare ground between the panels can cause increased runoff rates and reductions in time of concentration, both of which could necessitate storm-water management. The final condition modeled involved the assumption of healthy grass beneath the panels and bare ground in the spacer section, which would simulate the condition of unmaintained grass resulting from vehicles that drive over the spacer section. Because the spacer section is 53% of the cell, the change in land cover to bare ground would reduce losses and decrease runoff travel times, which would cause runoff to amass as it

Fig. 5. Site showing the initiation of bare ground below the panels, which increases the potential for erosion (photo by John Showler, reprinted with permission)

moves downgradient. With the spacer section as bare ground, the peak discharge increased by 100%, which reflected the increases in volume and decrease in timing. These results illustrate the need for maintenance of the grass below and between the panels.

Design Suggestions

With well-maintained grass underneath the panels, the solar panels themselves do not have much effect on total volumes of the runoff or peak discharge rates. Although the panels are impervious, the rainwater that drains from the panels appears as runoff over the downgradient cells. Some of the runoff infiltrates. If the grass cover of a solar farm is not maintained, it can deteriorate either because of a lack of sunlight or maintenance vehicle traffic. In this case, the runoff characteristics can change significantly with both runoff rates and volumes increasing by significant amounts. In addition, if gravel or pavement is placed underneath the panels, this can also contribute to a significant increase in the hydrologic response.

If bare ground is foreseen to be a problem or gravel is to be placed under the panels to prevent erosion, it is necessary to counteract the excess runoff using some form of storm-water management. A simple practice that can be implemented is a buffer strip (Dabney et al. 2006) at the downgradient end of the solar farm. The buffer strip length must be sufficient to return the runoff characteristics with the panels to those of runoff experienced before the gravel and panels were installed. Alternatively, a detention basin can be installed.

A buffer strip was modeled along with the panels. For approximately every 200 m of panels, or 29 cells, the buffer must be 5 cells long (or 35 m) to reduce the runoff volume to that which occurred before the panels were added. Even if a gravel base is not placed under the panels, the inclusion of a buffer strip may be a good practice when grass maintenance is not a top funding priority. Fig. 6 shows the peak discharge from the graveled surface versus the length of the buffer needed to keep the discharge to prepaneled peak rate.

Water draining from a solar panel can increase the potential for erosion of the spacer section. If the spacer section is bare ground, the high kinetic energy of water draining from the panel can cause soil detachment and transport (Garde and Raju 1977; Beuselinck et al. 2002). The amount and risk of erosion was modeled using the velocity of water coming off a solar panel compared with the velocity and intensity of the rainwater. The velocity of panel

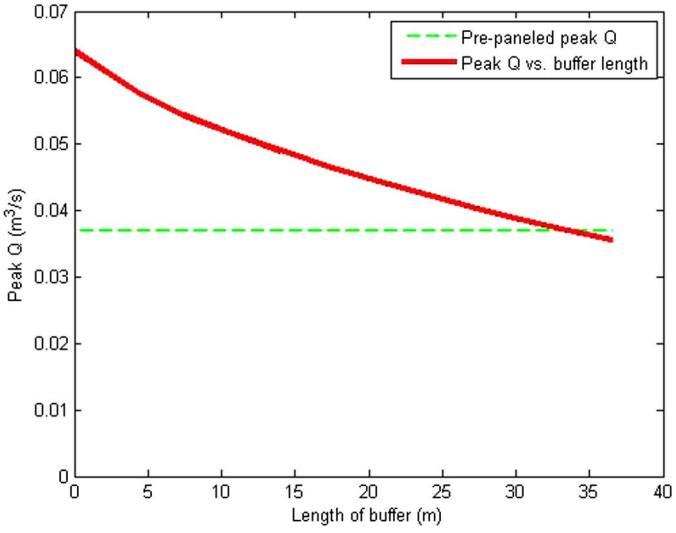

Fig. 6. Peak discharge over gravel compared with buffer length

runoff was calculated using Manning's equation, and the velocity of falling rainwater was calculated using the following:

$$V_t = 120\, d_r^{0.35} \tag{1}$$

where d_r = diameter of a raindrop, assumed to be 1 mm. The relationship between kinetic energy and rainfall intensity is

$$K_e = 916 + 330 \log_{10} i \tag{2}$$

where i = rainfall intensity (in./h) and K_e = kinetic energy (ft-tons per ac-in. of rain) of rain falling onto the wet section and the panel, as well as the water flowing off of the end of the panel (Wischmeier and Smith 1978). The kinetic energy (Salles et al. 2002) of the rainfall was greater than that coming off the panel, but the area under the panel (i.e., the product of the length, width, and cosine of the panel angle) is greater than the area under the edge of the panel where the water drains from the panel onto the ground. Thus, dividing the kinetic energy by the respective areas gives a more accurate representation of the kinetic energy experienced by the soil. The energy of the water draining from the panel onto the ground can be nearly 10 times greater than the rain itself falling onto the ground area. If the solar panel runoff falls onto an unsealed soil, considerable detachment can result (Motha et al. 2004). Thus, because of the increased kinetic energy, it is possible that the soil is much more prone to erosion with the panels than without. Where panels are installed, methods of erosion control should be included in the design.

Conclusions

Solar farms are the energy generators of the future; thus, it is important to determine the environmental and hydrologic effects of these farms, both existing and proposed. A model was created to simulate storm-water runoff over a land surface without panels and then with solar panels added. Various sensitivity analyses were conducted including changing the storm duration and volume, soil type, ground slope, panel angle, and ground cover to determine the effect that each of these factors would have on the volumes and peak discharge rates of the runoff.

The addition of solar panels over a grassy field does not have much of an effect on the volume of runoff, the peak discharge, nor the time to peak. With each analysis, the runoff volume increased slightly but not enough to require storm-water management facilities. However, when the land-cover type was changed under the panels, the hydrologic response changed significantly. When gravel or pavement was placed under the panels, with the spacer section left as patchy grass or bare ground, the volume of the runoff increased significantly and the peak discharge increased by approximately 100%. This was also the result when the entire cell was assumed to be bare ground.

The potential for erosion of the soil at the base of the solar panels was also studied. It was determined that the kinetic energy of the water draining from the solar panel could be as much as 10 times greater than that of rainfall. Thus, because the energy of the water draining from the panels is much higher, it is very possible that soil below the base of the solar panel could erode owing to the concentrated flow of water off the panel, especially if there is bare ground in the spacer section of the cell. If necessary, erosion control methods should be used.

Bare ground beneath the panels and in the spacer section is a realistic possibility (see Figs. 1 and 5). Thus, a good, well-maintained grass cover beneath the panels and in the spacer section is highly recommended. If gravel, pavement, or bare ground is

deemed unavoidable below the panels or in the spacer section, it may necessary to add a buffer section to control the excess runoff volume and ensure adequate losses. If these simple measures are taken, solar farms will not have an adverse hydrologic impact from excess runoff or contribute eroded soil particles to receiving streams and waterways.

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References

Bedient, P. B., and Huber, W. C. (2002). *Hydrology and floodplain analysis*, Prentice-Hall, Upper Saddle River, NJ.

Beuselinck, L., Govers, G., Hairsince, P. B., Sander, G. C., and Breynaert, M. (2002). "The influence of rainfall on sediment transport by overland flow over areas of net deposition." *J. Hydrol.*, 257(1–4), 145–163.

Dabney, S. M., Moore, M. T., and Locke, M. A. (2006). "Integrated management of in-field, edge-of-field, and after-field buffers." *J. Amer. Water Resour. Assoc.*, 42(1), 15–24.

Engman, E. T. (1986). "Roughness coefficients for routing surface runoff." *J. Irrig. Drain. Eng.*, 112(1), 39–53.

Garde, R. J., and Raju, K. G. (1977). *Mechanics of sediment transportation and alluvial stream problems*, Wiley, New York.

McCuen, R. H. (2005). *Hydrologic analysis and design*, 3rd Ed., Pearson/Prentice-Hall, Upper Saddle River, NJ.

Motha, J. A., Wallbrink, P. J., Hairsine, P. B., and Grayson, R. B. (2004). "Unsealed roads as suspended sediment sources in agricultural catchment in south-eastern Australia." *J. Hydrol.*, 286(1–4), 1–18.

Salles, C., Poesen, J., and Sempere-Torres, D. (2002). "Kinetic energy of rain and its functional relationship with intensity." *J. Hydrol.*, 257(1–4), 256–270.

Wischmeier, W. H., and Smith, D. D. (1978). *Predicting rainfall erosion losses: A guide to conservation planning, USDA Handbook 537*, U.S. Government Printing Office, Washington, DC.

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Effects of tillage on soil microrelief, surface depression storage and soil water storage

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Abstract

Conservation of soil water is an important management objective for crop production in the semi-arid tropics where droughts are persistent. Identification of the best tillage methods to achieve this objective is thus imperative. The integrated effects of conservation tillage on soil micro topography and soil moisture on a sandy loam soil were evaluated. The field experiment consisted of five tillage treatments, namely tied ridging (TR), no till (NT), disc plough (DP), strip catchment tillage (SCT) and hand hoe (HH). Data measured in the field included soil moisture content, surface roughness, infiltration and sorghum grain yield. A depth storage model was used to estimate depression storage TR treatment and the higher the surface roughness, the greater the depression storage volume. Regression analysis showed that random roughness decreased exponentially with increase in cumulative rainfall. Higher moisture contents were associated with treatments having higher depressional storage. Infiltration rate was significantly higher in the tilled soils than the untilled soils. The DP treatment had the highest cumulative infiltration while NT had the lowest. The Infiltration model which was fitted to the infiltration data gave good fit. Grain yield was highest in TR and least in NT, whereas DP and HH had similar yields.
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Keywords: Depression storage; Soil water storage; Soil microrelief; Sorghum yield; Cumulative infiltration

1. Introduction

1.1. Background to tillage research

Tillage research has proceeded along two distinctly separate but complimentary directions. One direction referred to as the engineering approach (Hillel, 1980) has concentrated on the tillage operations (the forces involved and the soil conditions produced and described). The other referred to as the agronomic approach direction involves investigating the effects of the tillage induced conditions on crop production. A lot of work has been done to investigate the effects of various tillage techniques on crop yields (Nyakatawa et al., 1994; Thomlow and Bruneau, 1999; Li et al., 2001). Henderson (1979) remarked that most of the literature deal with studies on the effect of a tillage procedure on crop yield without providing an insight into how the procedure influenced crop growth and, therefore yield. Due to these general objectives, the results obtained were often site and year specific. In recent years, research on tillage has narrowed down to a few parameters and how they influence crop growth. It was observed, for example, that tillage could have an impact on crop production if physical properties of the soil hindering crop growth such as hard pans were

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removed. As a result many subsequent studies narrowed down their objectives to specific factors, such as tillage effects on bulk density and water infiltration. However, with this later approach, results have been contradictory and inconclusive due to variability in soils different researchers worked on. Therefore further research work on different types of soil is still being carried out. The new approach in tillage research moved away from associating crop yield with the type of implement used to associate it with the soil conditions produced by tillage implement. Research has also moved away from using crop yields as an indicator of the suitability for the soil conditions produced by tillage. The new dimension is to use soil physical properties such as soil water storage, soil temperature and mechanical impendence as indicators.

1.2. Surface roughness

Surface roughness is the configuration of the soil caused by the randomly oriented arrangement of soil clods. Tillage implements can produce two types of roughness; oriented roughness and random roughness (Allmaras et al., 1966). The second type of roughness is caused by the random occurrence of peaks and depressions resulting from soil clods and organization of aggregates which cannot be attributed to oriented roughness resulting from tillage tool marks or general slope effects. Random roughness is a very important property of tilled soils in terms of soil water storage. Infiltration, evaporation and runoff retardation are closely associated with random roughness. Burwell and Larson (1969) have shown highly significant correlation of infiltration capacities prior to the start of runoff with a roughness index and that differences can only occur due to the nature of the sealed or crusted layer formed at the soil surface. Allmaras et al. (1972) observed higher evaporation rates from rough surfaces, as well as increased porosity, which increased infiltration. The water stored in the surface depressions on the soil surface is termed depressional storage. It has been found that there is a positive correlation between the surface roughness and the depressional storage. Work has been done on how to measure depressional storage and predict storage values using different models that consider roughness (Linden, 1979; Onstad, 1984). Seginer (1971) developed a model to predict both drainage pattern and surface storage capacity of the cultivated surfaces taking into account the slope of the field, direction of the furrows and roughness of the field. Mitchell and Jones (1976) developed models that use geometric models of the surface configuration. However most of these models are complex and very laborious. Their empirical nature often limits their use in estimating depression storage. Mitchell and Jones (1976) also developed another simpler depth storage model that can be expressed as

$$W = aD^b \tag{1}$$

where W is the water storage on the surface (cm), D the depth above the lowest point on the surface (cm), and a and b the fitted equation parameters.

The selection of appropriate methods for use needs careful consideration and the selection of any one single model depends on the purpose of the calculation and the objectives of the investigation (Makungu, 1991).

2. Dynamic nature of tillage induced soil physical conditions

Initially, tillage induced soil conditions have been found to decline as time progresses (Zoebeck and Onstad, 1987). The major cause of the decline is normally cumulative rainfall. A rough cloddy surface will gradually slake and be smoothed by raindrop energy. Dexter (1977) measured the random roughness of the soil and related it to cumulative natural rainfall. Johnson et al. (1979) and Zoebeck and Onstad (1987) also observed a similar exponential decay of the form shown in Eq. (2):

$$\mathrm{RR} = \alpha \mathrm{RR}_0 \, \mathrm{e}^{-\beta P} \tag{2}$$

where RR is the random roughness on any day, RR_0 the initial random roughness, P the cumulative rainfall, e the exponential factor, and α and β the regression coefficients representing rate of decline in random roughness and the shape of the exponential curve, respectively.

Burwell and Larson (1969) observed that much of the random roughness and total pore space created by tillage decreased significantly by the time runoff begins. Similarly, porosity decreases in freshly tilled soils with cumulative rainfall. They found bulk density

increase to be very rapid at the beginning and gradually declines at later stages of water application.

The variations of the results obtained in previous studies prompted this study. This study was carried out in the semi-arid region of Dodoma, in Tanzania with a view to investigate the effect of tillage method on soil surface micro topography and how this influences the soil's ability to store and transmit water.

3. Materials and methods

3.1. Study area

The research work was conducted at Hombolo agricultural research institute (ARI) in Dodoma, central region of Tanzania. The institute is located 58 km northeast of the Dodoma town, 5°53′S latitude and 35°55′S longitude. The altitude is 1097 m a.s.l.

The soils are classified as Typic Untorthent in the US Soil Taxonomy and as Dystric Regosols in the FAO classification. The profile is fairly deep with texture ranging from sandy to sandy clay on the surface and loam subsoil. The structure is weakly developed. It is characterised by an ochric epipedon and no other diagnostic horizon is recognized. The sand fraction is dominated by quartz. The moisture and temperature regimes of the soil are ustic and thermic, respectively.

The general rainfall pattern in the study area is influenced by the movements of the inter-tropical convergence zone (ITCZ) between the northern and the southern hemispheres. The year is divided into two distinct seasons: a dry season between May and November and a rainy season from December to March. The average monthly rainfall amounts at Hombolo Meteorological Station from 1974 to 1992 are compared with the monthly totals during the experimental period are shown in Table 1.

The average annual rainfall is 589 mm but the distribution is highly variable with high intensities.

The mean temperature shows seasonal variation although the transition is not sharply marked. In July–August, it is relatively cooler than the rest of the year and July is the coolest month with an average temperature of 19.6 °C. November is the hottest month when temperatures soar up to as high as 35 °C. The average annual temperature is 22.7 °C. Average annual potential evaporation of 2123 mm (Christianson, 1981). The actual evaporation is 650 mm and on very few occasions the rainfall meets the evapotranspiration demand.

3.2. Tillage treatments

The five tillage treatments used in the experiments are described in Table 2.

3.3. Experimental design and layout

The experiment was laid out in a completely randomised design. The five tillage treatments were replicated three times thus a total of 15 field plots measuring 20 m long and 5 m wide were used. The lengths of all the plots were parallel to the direction of the slope and the general slope average was 4%. Plots were separated by pathways of 1 m wide each. Each plot was bordered with iron sheets on all the sides. This was done to prevent loss of water from the plots. The iron sheets were placed immediately after the tillage operations. Tillage was performed after the first rains in November and platting was done immediately. Drainage channels were cut at the top and bottom of the plots in order to drain away runoff from outside the plots as well as for emptying water from the surface runoff measurement drums.

Sorghum (*Sorghum bicolor* var. *Tegemeo*) was planted at a spacing of 0.75 m between rows and 0.3 m within rows to achieve a plant population of about 45 000–46 000 plants per hectare.

Table 1
Monthly averages of rainfall (mm) at Hombolo during the experiment period compared with the long-term (1974–1992) monthly averages

	Month											
	August	September	October	November	December	January	February	March	April	May	June	July
1974–1992	0	0	7	37	14	118	107	63	8	9	1	0
Period of study	0	9	0	34	55	120	45	67	32	0	0	0

Table 2
Tillage methods

Treatment	Description
NT	Soil remained undisturbed throughout the season. The only disturbance was during planting when the hand hoe was used to dig the holes for the seeds
HH	Flat cultivation with a hand hoe which involved digging across the slope to a depth of 10 cm. It produced uniform sized clods (8–15 cm diameter) and a relatively rough surface configuration
DP	Involved a three-furrow disc plough, pulled by a 50 HP tractor ploughing at a depth of 15 cm. It resulted in partial soil inversion of the soil with reduced pulverisation and a very rough surface
SCT	SCT is a reduced tillage method that creates minimal disturbance of the soil structure. Involved digging to 10 cm depth with a hand hoe a strip (5–10 cm width) in which planting of the seed was done and minimal disturbance of the soil occurred and surface roughness was relatively low
TR	Topsoil was heaped in bunds forming micro basins. Ridges were 0.75 m apart and tied at 1.5 m intervals with dimensions of 450 mm by 450 mm and 250 mm deep

3.4. Instrumentation and measurements

A microrelief meter was used to measure surface roughness. The microrelief meter used in this study was similar to the one used by Kuipers (1957). The instrument consists of a 130 cm × 90 cm mainframe of aluminium bars. Across the middle of the frame is a needle locking string. The string is designed to hold 23 needles that slide up and down. Each needle is fitted with a small foot to prevent it from penetrating the soil.

For height measurement, the whole device was placed horizontally with the needles locked up. The instrument was levelled by means of a spirit level and adjusting the support pins. The needles were then allowed to slide down until their feet touched the soil surface and were then locked in position. The height of each of the needles above the top of the frame was measured with a ruler. The needles were pulled up again, locked and the instrument moved to the next measuring position. The surface roughness was determined as the standard deviation of the pin height measurement. There were six measurement positions for each plot on each measurement day. These positions were selected randomly and spaced at least 3 m apart. Analysis of variance (ANOVA) was used to compare the differences in random roughness caused by different tillage treatments. The data for random roughness was fitted to the Zoebeck and Onstad (1987) equation. There was no consideration of the TR treatment because making the tied ridges created oriented roughness while all the other treatments had random roughness.

The Mitchell and Jones (1978) method represented by Eq. (1) was used in this study to determine depression storage. Microrelief meter data was processed to obtain depth storage values on the assumption that each point measurement was the centre of a 2.5 cm square level surface.

The values of actual elevations (measured) and line of best fit (LOBF) obtained by simple regression analysis were plotted against distance from measuring points. All points below the LOBF were taken as depressional storage. For the TR, covering a pond with a plastic sheet and measuring the volume of water required to fill the pond determined plots depression storage. This was done at the same time when surface roughness was determined for each treatment. Depressional storage was determined each time the random roughness was determined during the season to observe the influence of cumulative rainfall on the depressional storage produced by each tillage treatment.

Measurement of soil moisture was done using core samplers of diameter 6 cm and a length of 12 cm. Samples were collected randomly each week from each plot at three different depths: 0–15, 15–30 and 30–45 cm. The standard gravimetric method where soil samples were dried in an oven at 105 °C for 24 h was used. The gravimetric moisture content was then converted to volumetric moisture contents by multiplying with the bulk density of the soil. Each of the three values was assumed to represent an average value in a section of the profile of thickness 15 cm and the volume (in units of depth) contained within the soil profile of depth 45 cm was determined.

3.5. Determination of soil water infiltration

Infiltration was measured using a double ring infiltrometer (falling head) with the diameters of the inner ring and an outer ring 27.9 and 54.5 cm, respectively. The infiltration measurements were carried out at the beginning of the season after the tillage operations and before planting. The procedure was repeated midway through the season and after harvesting the sorghum crop. The experiments were conducted in the middle of the each plot. Infiltration data was also fitted to the Phillip's model (1957) which is described by the following equation

$$I = St^{0.5} + At \quad (3)$$

where I is the cumulative infiltration (cm), S the soil water sorptivity, A the parameter close to saturated hydraulic conductivity, and t the time (min).

Weather data (rainfall, temperature, wind speed, evaporation) was collected from the Hombolo Meteorological station situated about 100 m from the experimental plots. Data was collected for one full season. A computer package, SAS was used to carry out the statistical analysis. ANOVA was carried out on the data. Depression storage, profile moisture content, random roughness and crop yield were the dependent variable while tillage method and sampling time were the independent variables.

4. Results and discussion

4.1. Effects of tillage on surface random roughness

Generally random roughness values were significantly higher in tilled plots than untilled plots as shown in Table 3. The DP treatments had the highest values of random roughness while the NT had the least. Random roughness however declined sharply with time in the DP due to the crumbling of the soil clods as a result of the raindrop effect. Random roughness declined rapidly with small amounts of rainfall and approached a steady rate of decline with additional rainfall. The initially high rate of decrease could probably be due to sloughing and breaking of soil clods as a result of wetting. Subsequent rate of reduction is checked by deposition into the depression and the shear resistance of the individual soil clods.

Table 3
Mean values of field measured random roughness of the four tillage treatments[a]

Cumulative rainfall (mm)	Surface roughness (cm)			
	NT	SCT	DP	HH
0	0.69 a	3.34 b	8.33 c	4.80 d
142.4	0.60 a	2.87 b	6.33 c	1.85 d
315.4	0.59 a	1.66 b	5.28 c	1.54 b
407.6	0.54 a	1.15 b	4.77 c	1.91 d
637.4	0.54 a	0.56 a	1.63 b	0.61 a

[a] Means with the same letter for each cumulative rainfall are not significantly different at the 5% level of the Duncan's multiple range test.

The derived regression equations for the tillage treatments used in this experiment are given in Table 4. The high α value for the DP indicates a more rapid decline in the DP than the other treatments. The rates of decline in the SCT and HH were almost the same. The reduction in random roughness has a great significance in the soil water storage capacity. The slow and steady decline in the SCT and HH treatments would mean that more water would be held in the depressions at any time than in the DP were the roughness declined more rapidly. This may partly explain the greater amount of soil moisture in the SCT and HH treatments at times than in the DP. The high R^2 values for the tilled soils show that the Zoebeck equation was able to fully explain the observed variations.

The relatively low regression coefficient and negative value of α for the NT suggest that the variation of random roughness as described by the above equation does not truly characterise the changes in actual physical conditions on the NT surface. A number of rills developed on the NT surface with increase in cumulative precipitation and this created some oriented roughness which gave a picture of increase in random roughness and its residual value depends to a greater extent on the initial surface conditions, which is

Table 4
Fitted Zoebeck and Onstad (1987) equations for random roughness decline

Tillage treatment	Equation	R^2 ($n = 8$)
DP	$RR = 9.39RR_0\, e^{-0.00265P}$	0.96
HH	$RR = 3.72RR_0\, e^{-0.00277P}$	0.95
SCT	$RR = 3.47RR_0\, e^{-0.00205P}$	0.96
NT	$RR = -3.37RR_0\, e^{-0.00104P}$	0.91

contrary to what Dexter (1977) observed. He observed that random roughness reduction due to rainfall was independent of the initial random roughness and the surface conditions. The reduction in random roughness that occurs with pulverisation increases susceptibility of the soil to wind erosion because a smoother surface is less effective in reducing wind velocity. A smoother surface does reduce wind turbulence, but the effect of the decreasing turbulence in reducing wind erosion usually does not compensate entirely for the increased surface wind velocity (Chepil and Milne, 1941). The considerable turbulence that would occur over a rougher surface at higher wind velocities might be expected to enhance water vapour loss from the soil surface. The susceptibility of the smoother surfaces to crust formation would be greater, than for rougher surfaces. At the end of the season, random roughness for SCT, HH, and NT was not significantly different (Table 3).

4.2. Influence of tillage on depressional storage

The TR treatment had the highest values of depressional storage at all measurement times while the NT treatment had the least as shown in Fig. 1. The pulverisation of the soil clods caused by the HH resulted in lower depressional storage for the HH than the SCT treatment. Soil tilt with larger clods would always give higher depressional storage values. It was observed that the volume of tied ridges was eroded after intense storms as well as silting of the ponds. As a result the depressional storage was reduced significantly with time. The effect of the raindrop impact on the soil clods in the HH and DP plots resulted in a sharp decline in depressional storage. Such an observation would be expected since the random roughness in these treatments also declined rapidly with cumulative rainfall. The decline in depressional storage had a significant impact on soil water storage. The decline in depressional storage would result in an increase in surface runoff that is undesirable in semi-arid regions where rainfall is low and unreliable.

4.3. Influence of tillage on soil water storage

The influences of tillage method on the soil water storage were highly significant. Fig. 2 shows the results obtained in this experiment. The TR treatment had the highest values throughout the season for profile moisture content. The depressions kept water for longer periods and allowed it to infiltrate into the soils. The results agree very well with the results obtained by Makungu (1991) and Kayombo and Lal (1992). They noted that compared to either open ridging or flat cultivation, tied ridging increased soil water content, soil water retention and available water capacity. It also decreases runoff.

The SCT and DP treatments had high values of depressional storage but these were significantly lower than that for the TR treatment. Early in the season the NT treatment had significantly higher levels of soil water storage than the HH, SCT and DP treatment. This is contrary to what was expected. However, results showing relatively high soil water storage un-

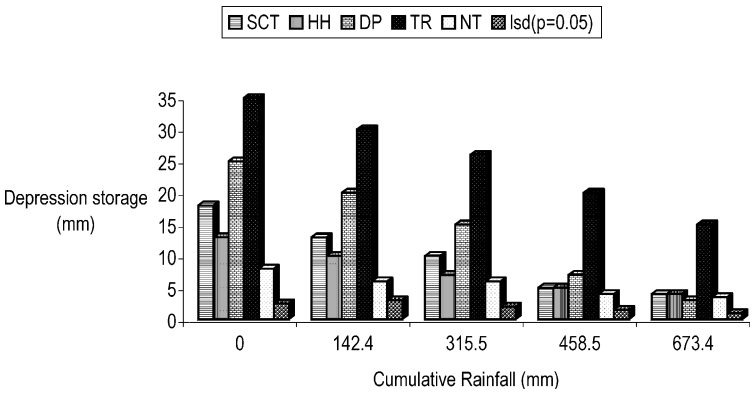

Fig. 1. The influence of rainfall on depressional storage for the five tillage methods.

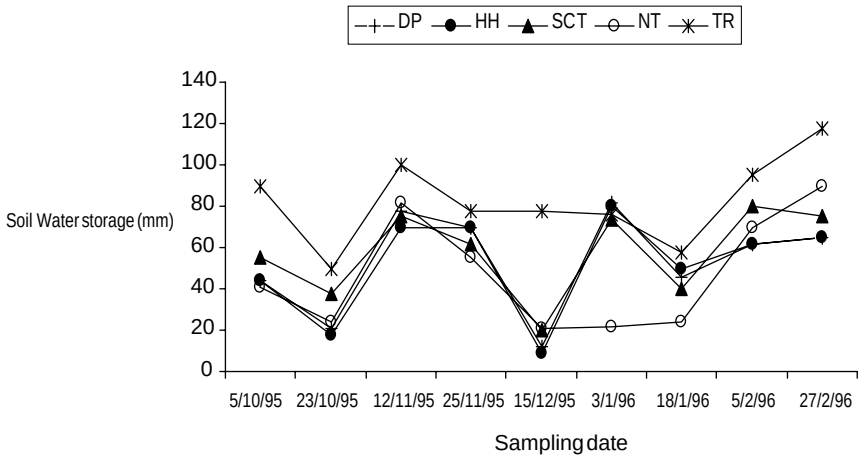

Fig. 2. Soil water content at different sampling times for the five tillage methods.

der NT in comparison to other tillage treatments have been noted in other studies (Kayombo et al., 1991; McFarland et al., 1991). The high moisture content in the NT treatment was attributed to improved infiltration rates under NT as a result of a more stable structure and existence of a more continuous pore system from dead roots and worm activity which are often lacking in the conventionally tilled soils. The merits of NT systems including soil moisture retention, in bio-structurally active soils have been documented in some tropical regions (Lal, 1985).

4.4. Influence of tillage on infiltration

Results obtained indicate that tilling the soils enhanced infiltration rates. Infiltration rates were significantly higher in the DP than the SCT treatment. This is probably due to the higher random roughness in the DP than the SCT treatment. The tilled plots had very high values of the initial infiltration rates, but these rates rapidly declined with time. This is probably due to rapid structural deterioration caused by slacking and dispersion. The large proportion of medium sized clods, which easily broke down and accelerated crust formation, might be the major cause for this behaviour.

Infiltration rates were significantly lower in the TR treatment than in the tilled soils. This is probably due to the fact that the infiltration studies were done in the furrows where the soils were scooped to form the ridges thus exposing less the porous subsoil. However, the advantage of the TR treatment is that the ponds created in the field will capture most of the rainwater and allow it to infiltrate into the soil over time (Fig. 3).

4.5. Phillip (1957) model fitting to infiltration data

Infiltration data was analysed by fitting straight lines to the plots of infiltration rate (I) against the square root of cumulative time ($t^{0.5}$) in seconds. I (cm) was divided by a corresponding value of $t^{0.5}$ (s) in the entire infiltration run. The values obtained were then regressed against $t^{0.5}$ and S was the regression coefficient and A the slope of the regression line. The mean values of parameters S and A were determined together with their correlation coefficients and significance tests as shown in Table 5.

Parameter S indicates the capacity of a soil to absorb water and theoretically it is supposed to decrease with the increase of the initial soil moisture. It controls the initial infiltration rate. In contrast, equilibrium infiltration rate is governed by the transmissivity parameter, A, which indicates the ability of a soil to transmit water. The data showed significant differences in S for most of the treatments. However the average S in the TR treatment was similar to that for NT. The high sorptivity values for the tilled plots imply that tillage

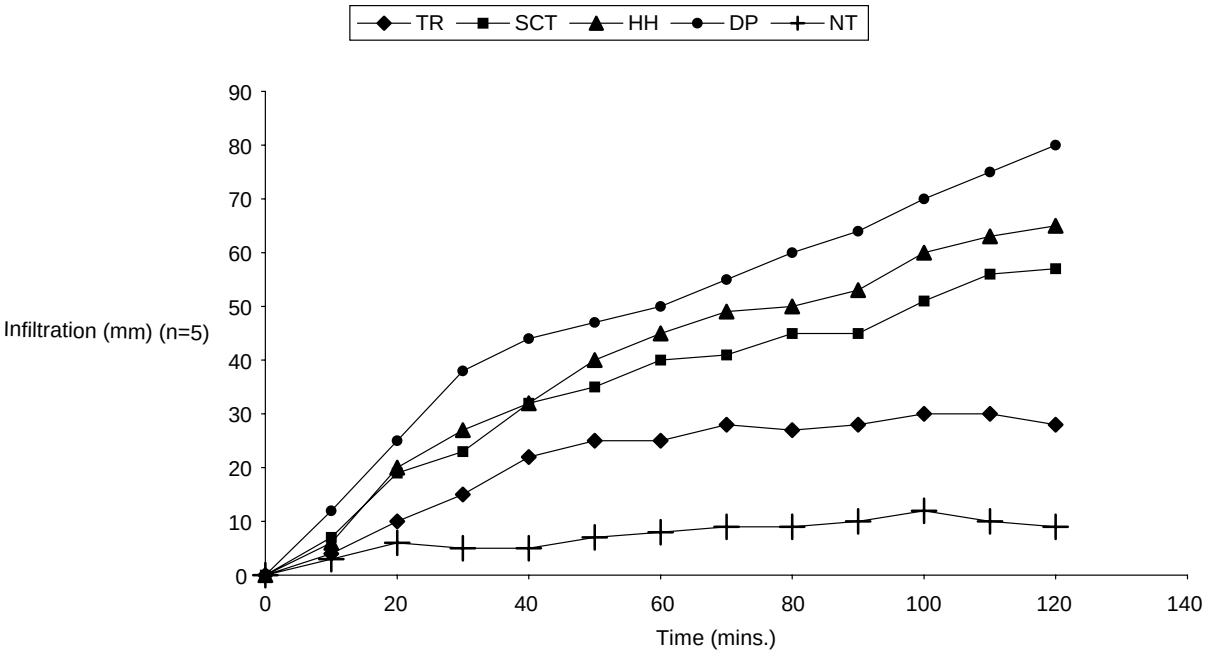

Fig. 3. Cumulative infiltration for the five tillage treatments after the tillage operations.

improves the soil's initial water intake ability. Parameter *A* had the same trend as *S*. The *A* values increased in the order TR, NT, SCT, HH and DP indicating that the soil transmissivity increased with the level of soil disturbance. Again the DP treatment had the highest significant values of parameter *A*. Similar results were obtained by Mwendera (1992) working on silty loam soils. Lal et al. (1989) however obtained negative values for the transmissivity parameter on the plough till treatments. Taylor and Ashcroft (1972) attributed the negative values of *A* to the heavy texture of the soils.

Table 5
Phillips model parameters and correlation coefficients for the five tillage treatments and their significance tests[a]

Tillage method	Phillips parameters		
	S (mm h$^{-0.5}$)	A (mm h^{-1})	R^2 ($n = 8$)
TR	10.73 a	2.08 a	0.95
NT	12.27 a	2.60 a	0.95
DP	50.74 b	14.17 b	0.90
SCT	23.24 c	5.86 c	0.92
HH	37.43 d	9.37 h	0.90

[a] Means with the same letter in column are not significantly different at the 5% level of Duncan's multiple range test.

4.6. Effect of tillage methods on sorghum grain yield

The TR treatment had the highest grain yield as shown in Table 6. This would be probably due to the high water retention that was associated with this treatment. The SCT treatment also produced relatively higher yields. Hatibu (1995) also obtained similar results in the same area. In Ohio, Dick et al. (1991) obtained higher maize yields under NT than conventionally tilled soils in a 25 year experiment. However they observed that such an advantage of the NT system was only pronounced as the experiment

Table 6
Mean sorghum yields for the five tillage methods[a]

Tillage method	Yield (kg ha^{-1})
HH	2143 a
SCT	2262 b
TR	2406 c
DP	2162 a
NT	2038 d

[a] Means with the same letter are not significantly different at the 5% level of Duncan's multiple range test.

proceeded. In the initial years there were no significant advantages of the NT system. This could be the reason why in this work the NT system had lower yields than the yield from conventionally tilled soils.

5. Conclusion and recommendations

Within the confines of the obtained results, it can be concluded that treatments associated with high values of depressional storage had higher soil moisture contents throughout the season. The results therefore suggest that depressional storage is a suitable index for characterising effects of tillage that have a bearing on soil moisture conservation. Random roughness and depressional storage followed this order: TR > DP > SCT > HH > NT. TR had the highest values of depressional storage because of the oriented roughness associated with tied ridging. With cumulative rainfall, random roughness deteriorated drastically, and at the end of the season the values were almost the same for all tillage methods.

The obtained results also show that tilling soils resulted in increased ability of soil to hold and transmit water. This was evident from the infiltration tests done. The good precision of the Phillip equation also shows the validity of the equation under the given conditions. However the fit was relatively poor on tilled soils (DP, SCT, and HH). This could be because of the equation's inability to account for the instability of the soil porous system as a result of tillage.

There were significant yield differences among the tillage treatments indicating that tillage induced soil conditions influenced the yields. A higher soil moisture regime in the TR treatment resulted in higher yields.

It can also be concluded that the high degree of surface roughness and associated total porosity created by tillage increased infiltration into the soils. However, the susceptibility of the soils to structural degradation is a very important factor in soil water infiltration in tilled soils.

Acknowledgements

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References

Allmaras, R.R., Burwell, R.E., Larson, W.E., Holt, R.F., 1966. Total porosity and random roughness of the interrow zone as influenced by tillage. USDA Conservation Research Report 7, 22 pp.

Allmaras, R.R., Nelson, W.W., Hallauer, 1972. Fall versus spring ploughing and related soil heat balance in the western belt. Minnesota Agricultural Experiment Station Technical Bulletin 283, 22 pp.

Burwell, R.E., Larson, W.E., 1969. Infiltration as influenced by tillage induced roughness and pore space. Soil Sci. Soc. Am. Proc. 33 (3), 449–452.

Chepil, D., Milne, N.Y., 1941. Effects of random roughness on erodibility of soil. Soil Sci. Soc. Am. Proc. 28, 48–56.

Christianson, C., 1981. Soil Erosion and Sedimentation in Semi-arid Tanzania—Studies of Environmental Change and Ecological Imbalance. Scandinavian Institute of African Studies, pp. 207–208.

Dexter, A.R., 1977. Effects of rainfall on the surface microrelief of tilled soils. In: Stichen, J.M. (Ed.), Infiltration and Random Roughness of a Tilled and Untilled Clay Pan Soil. Soil Till. Res. 4 (3) (1983) 251–262.

Dick, W.A., McCoy, E.L., Edwards, W.M., Lal, R., 1991. Continuous application of no tillage to Ohio Soils. Agron. J. 84, 65–73.

Hatibu, N., 1995. Soil water management in semi arid Tanzania. Final Technical Report, p. 87.

Henderson, D.W., 1979. Soil water management in semiarid environments. In: Hall, A.E., Cannel, G.H., Lawton, H.W. (Eds.), Agriculture in the Semi Arid Environments. Springer, Berlin, pp. 225–237.

Hillel, D., 1980. Applications of Soil Physics. Academic Press, London, pp. 234–246.

Johnson, C.B., Mannering, J.V., Moldenhauer, W.C., 1979. Influence of surface roughness and clod size and stability on the soil and water losses. Soil Sci. Soc. Am. J. 43, 772–777.

Kayombo, B., Lal, R., 1992. Tillage systems and soil compaction in semi arid Tanzania. Proc. Soc. Agric. Eng. 4, 80–88.

Kayombo, B., Lal, R., Mrema, G.C., Jensen, H.E., 1991. Characterizing compaction effects on soil properties and crop growth in southern Nigeria. Soil Till. Res. 21, 325–345.

Kuipers, H., 1957. A relief meter for soil cultivation studies. Neth. J. Agric. Sci. 5, 255–262.

Lal, R., 1985. Soil suitability guide for different tillage systems in the tropics. Soil Till. Res. 5, 176–196.

Lal, R., Logon, T.J., Fausey, N.R., 1989. Long term tillage and wheel traffic effects on a poorly drained mollic ochraqualf in NW Ohio. 2. Infiltrability, surface runoff, subsoil flow and sediment transport. Soil Till. Res. 14, 359–373.

Li, X., Gong, J.D., Gao, Q., Li, F.R., 2001. Incorporation of ridge and furrow method of rainfall harvesting with mulching for crop production under semiarid conditions. Agric. Water Manage. 50, 173–183.

Linden, D.R., 1979. A model to predict soil water storage as affected by tillage practices. Unpublished Ph.D. Thesis. University of Minnesota, 320 pp.

Makungu, P.S.J.J., 1991. Predication of tillage parameters for moisture conservation in the semi arid tropics. Ph.D. Thesis. University of Newcastle upon Tyne, UK, 429 pp.

McFarland, H.F., Tollner, E.W., Clark, R.L., 1991. Factors influencing the variation of some properties of soil in relation to their suitability to minimum tillage. Soil Till. Res. 4, 35–53.

Mitchell, J.K., Jones Jr., B.A., 1976. Micro relief surface depression storage: analysis of models to describe the depth storage function. Water Res. 12 (6), 1205–1222.

Mitchell, J.K., Jones Jr., B.A., 1978. Micro relief surface depression storage: changes during rainfall events and their applications to rainfall-runoff models. Water Res. Bull. 14, 777–802.

Mwendera, E., 1992. Analysis of the effect of tillage on soil water conservation. Ph.D. Thesis. K.U. Leuven, Belgium, 245 pp.

Nyakatawa, E.Z., Nyamudeza, P., Mazhangara, E.P., 1994. A review of rainwater conservation using the tied furrow technique in the south east Lowveld of Zimbabwe. In: Proceedings of the Tillage Workshop for Small Holder Farming Sector, Department of Research and Specialist Services, 27 October 1994. Harare, Zimbabwe.

Onstad, C.A., 1984. Depression on tilled soil surfaces. In: Proceedings of the Transactions of the American Society of Agricultural Engineers, pp. 729–732.

Phillip, J.R., 1957. The theory of infiltration: sorptivity and algebraic infiltration equation. Soil Sci. 84, 257–264.

Seginer, L., 1971. A model for surface drainage of cultivated fields. J. Hydrol. 13, 139–152.

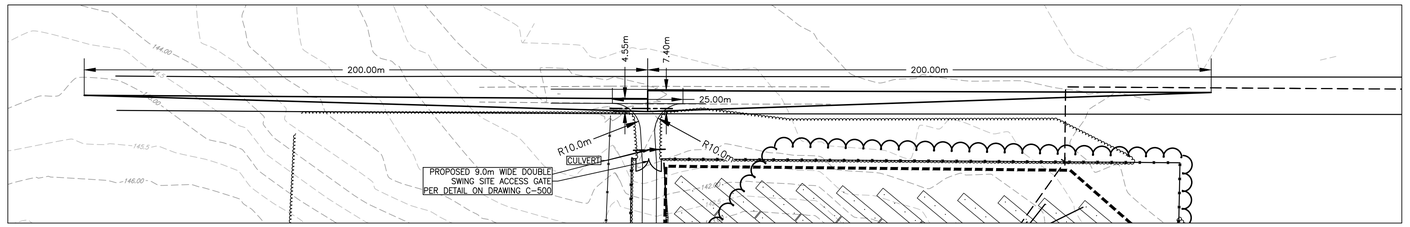
Taylor, S.A., Ashcroft, G.L., 1972. Physical Edaphology. The Physics of Irrigated and Non-irrigated Soils. Freeman, San Francisco, CA, USA, 563 pp.

Thomlow, S.J., Bruneau, P.M.C., 1999. The influence of tillage on semiarid soil water regimes in Zimbabwe. Geoderma 95, 33–51.

Zoebeck, T.M., Onstad, C.A., 1987. Tillage and rainfall effects on random roughness: a review. Soil Till. Res. 9, 1–31.

DRAWINGS

Drawing No. C-013 Block C Site Plan
Drawing No. C-053 Block C Existing Conditions, Clearing, Grubbing and Fencing Plan
Drawing No. C-403 Block C Grading Plan
Drawing No. C-603 Block C Sedimentation and Erosion Control Plan
Drawing No. C-650 Sedimentation and Erosion Control Notes and Details

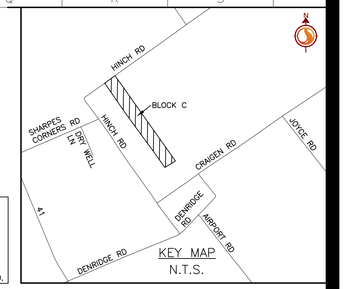


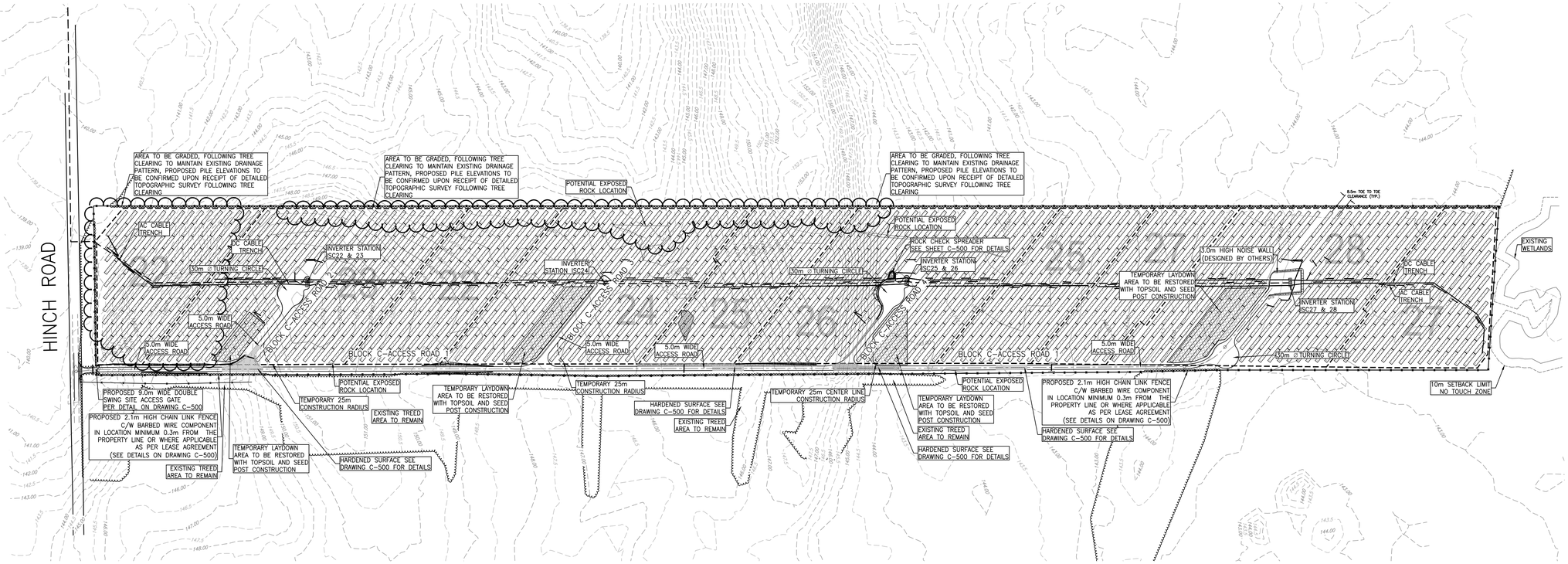
SITE TRIANGLES AT ENTRANCE TO HINCH ROAD DETAIL

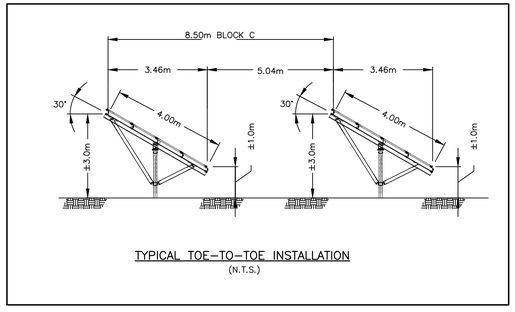
SCALE:1:1000

NOTE:

LIDAR HAS BEEN USED TO SUPPLEMENT THE TOPOGRAPHIC INFORMATION TO ILLUSTRATE EXTERNAL SITE DRAINAGE PATTERNS. CONTRACTOR IS RESPONSIBLE TO REVIEW ELEVATIONS PRIOR TO COMMENCEMENT OF ANY WORK AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER OF RECORD.







TYPICAL TOE-TO-TOE INSTALLATION

(N.T.S.)

SITE STATISTICS	
BLOCK	AREA (ha)
22	4.1
23	4.2
24	4.0
25	4.0
26	4.1
27	4.0
28	4.4

20

BLOCK NUMBER

Stantec

Stantec Consulting Ltd.
300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

PCL CONSTRUCTION LEADERS

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Notes

1. TOPOGRAPHIC INFORMATION CONDUCTED BY LESLIE M. HIGGINSON SURVEYING Ltd. RECEIVED OCTOBER 25, 2017. TOPOGRAPHIC SURVEY IS UTM 18. LIDAR INFORMATION CONDUCTED BY TULLOCH ENGINEERING ON JUNE 27, 2016. LIDAR SURVEY IS UTM 18. BEDROCK SURVEY INFORMATION PROVIDED BY PCL CONSTRUCTORS LTD. RECEIVED ON OCTOBER 31, 2017.EXISTING VEGETATION INFORMATION IS APPROXIMATE, PROVIDED FROM AERIAL IMAGERY. CONTRACTOR TO CONFIRM ALL TREE & SHRUB LOCATIONS ON SITE.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THIS SET PREPARED BY STANTEC CONSULTING LTD.
3. THE CONTRACTOR MUST CHECK AND VERIFY DIMENSIONS; OBTAIN ALL UTILITY LOCATES AND OBTAIN ALL REQUIRED PERMITS/LICENSES AND VERIFY ELEVATIONS OF EXISTING SERVICES BEFORE PROCEEDING WITH ANY WORK.
4. ALL CONSTRUCTION WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS (LATEST EDITION).
5. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR HIS/HER REPRESENTATIVE MUST ENDROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, HE/SHE MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO THE OWNER AND CONTRACTOR AND A COPY IS TO BE KEPT ON FILE ON SITE PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNERS OWN RISK.
6. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY.
7. THE CONTRACTOR IS TO BE RESPONSIBLE FOR ALL DRAINAGE AND MEASURES TO CONTROL WATER. THE SITE IS TO BE FINE GRADED/LEVELED LEAVING THE SITE IN A NEAT APPEARANCE SUCH THAT POSITIVE DRAINAGE IS ACHIEVED EVERYWHERE PRIOR TO THE INSTALLATION OF SOLAR PANELS.
8. CONSTRUCTION TURNING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
9. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
10. ALL AREAS WITHIN THE PROPOSED WORKS ARE TO BE RE-VEGETATED USING NATIVE TOPSOIL AND SEED. MIX AND APPLICATION RATE/METHOD TO BE SUBMITTED AND APPROVED BY OWNER PRIOR TO IMPLEMENTATION.
11. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
12. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
13. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
14. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
15. ALL SEEDING TO BE COMPLETE IN ACCORDANCE WITH OPSS 804.
16. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED	EXISTING
TOPOGRAPHIC SURVEY CONTOUR	184.5
LIDAR CONTOUR	184.5
FENCE	
CULVERT	
SOLAR ARRAY BLOCK DELINEATOR	
INVERTER STATION	
SOLAR PANEL TABLE	
HARDENED SURFACE REFER TO C-500 FOR DETAILS	
AC CABLE TRENCH	
DC CABLE TRENCH	
SWALE	
POTENTIAL EXPOSED ROCK LOCATIONS	
TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
TREE/VEGETATION LINE	
RIP RAP	
FILL AREA	
ROCK CHECK SPREADER	
CUT AREA	
10m SETBACK LIMIT NO TOUCH ZONE	

AREA TO BE CLEARED OF TREES, GRADED AND SURVEYED TO CONFIRM PROPOSED PILE ELEVATIONS

B	ISSUED FOR TENDER	DRR	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	DRR	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-SP-BLOCK_D.dwg	DRR	DS	DRR	17.11.07
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title

BLOCK C
OVERALL SITE PLAN

Project No.	Scale
133560220	1:2500 (0, 25, 75, 125m)
Drawing No.	Sheet / Revision
C-013	1 of 3 / B

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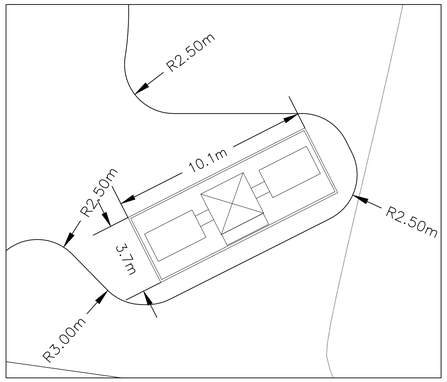
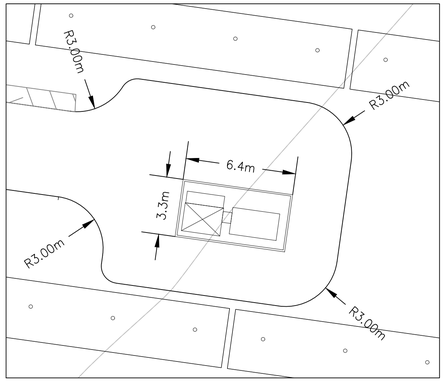


INVERTER STATION (ISC22 & 23) N.T.S.



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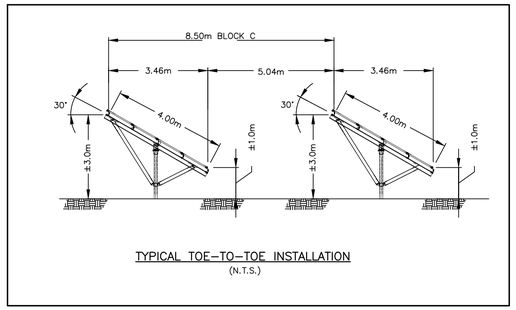
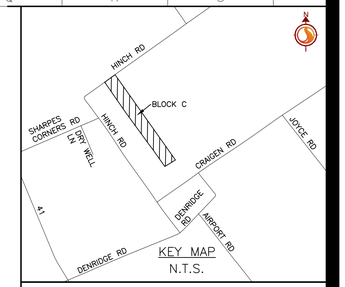


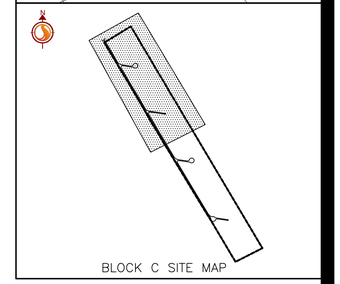
TYPICAL TOE-TO-TOE INSTALLATION (N.T.S.)

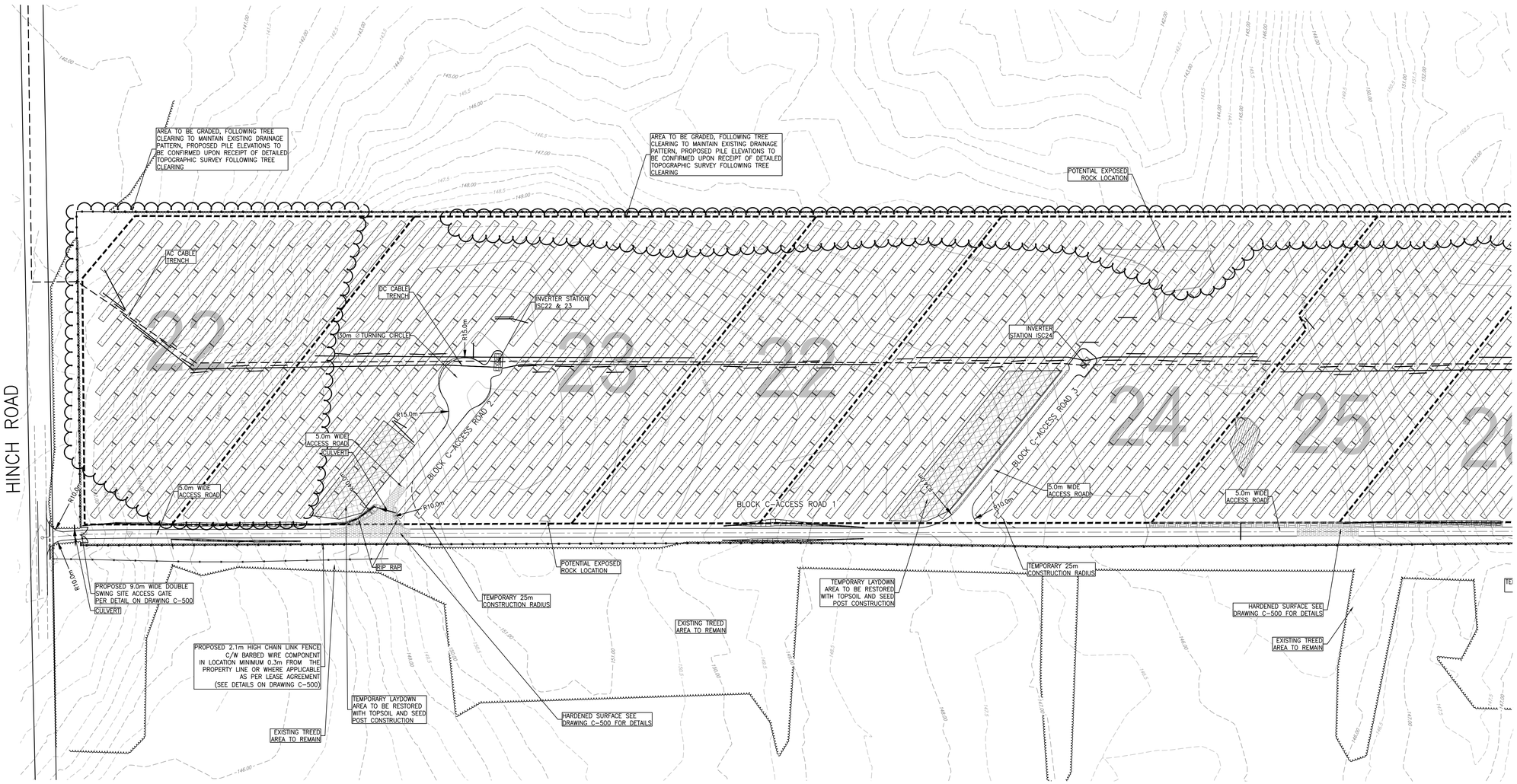
SITE STATISTICS	
BLOCK	AREA (ha)
22	4.1
23	4.2
24	4.0
25	4.0
26	4.1
27	4.0
28	4.4

20
BLOCK NUMBER

NOTE:
LIDAR HAS BEEN USED TO SUPPLEMENT THE TOPOGRAPHIC INFORMATION TO ILLUSTRATE EXTERNAL SITE DRAINAGE PATTERNS. CONTRACTOR IS RESPONSIBLE TO REVIEW ELEVATIONS PRIOR TO COMMENCEMENT OF ANY WORK AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER OF RECORD.







Legend

PROPOSED	EXISTING
TOPOGRAPHIC SURVEY CONTOUR	184.5
LIDAR CONTOUR	184.5
FENCE	
CULVERT	
SOLAR ARRAY BLOCK DELINEATOR	
INVERTER STATION	
SOLAR PANEL TABLE	
HARDENED SURFACE REFER TO C-500 FOR DETAILS	
AC CABLE TRENCH	
DC CABLE TRENCH	
SWALE	
POTENTIAL EXPOSED ROCK LOCATIONS	
TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
TREE/VEGETATION LINE	
RIP RAP	
FILL AREA	
ROCK CHECK SPREADER	
CUT AREA	
10m SETBACK LIMIT NO TOUCH ZONE	
AREA TO BE CLEARED OF TREES, GRADED AND SURVEYED TO CONFIRM PROPOSED PILE ELEVATIONS	

Revision		By	Appd.	YY.MM.DD
B	ISSUED FOR TENDER	DRR	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	DRR	DS	17.12.21

File Name: 133560220_C-SP-BLOCK_D.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	DRR	DS	DRR	17.11.07

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK C
SITE PLAN

Project No.	Scale	Sheet	Revision
133560220	1:1250 (0, 12.5, 37.5, 62.5)	2 of 3	B
Drawing No.			
C-013			

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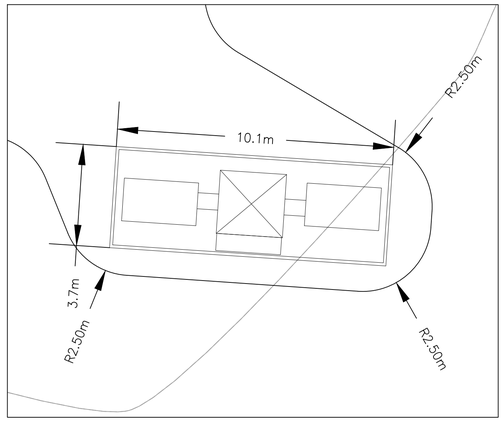
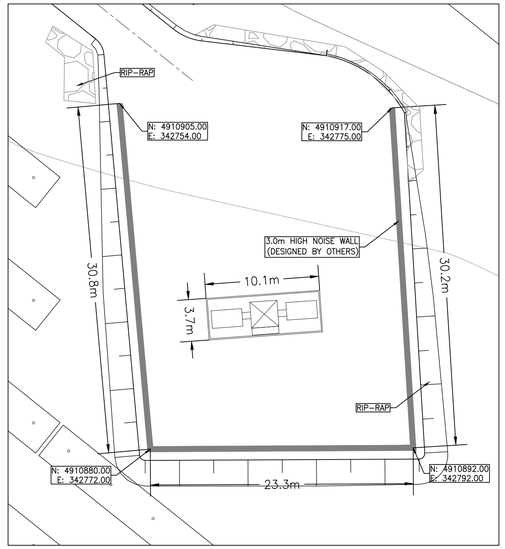
16. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

\\cd1004-01\work_group\01614\active\133560220\design\drawing_04\cvl\Block_D\sheet_files\133560220_C-SP-BLOCK_D.dwg
2018/01/16 5:31 PM By: Alex Dennick

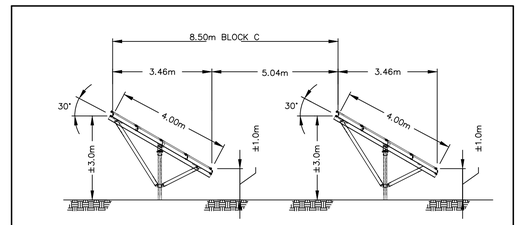
ORIGINAL SHEET - ARCH D



INVERTER STATION ISC25 & 26
N.T.S.



INVERTER STATION ISC27 & 28
N.T.S.



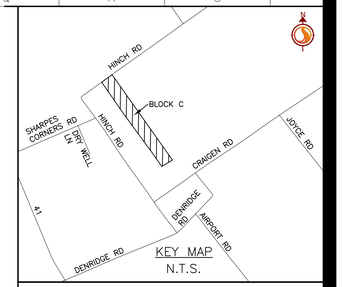
TYPICAL TOE-TO-TOE INSTALLATION
(N.T.S.)

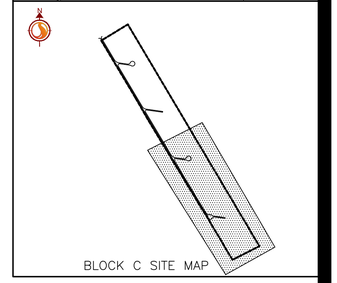
SITE STATISTICS	
BLOCK	AREA (ha)
22	4.1
23	4.2
24	4.0
25	4.0
26	4.1
27	4.0
28	4.4

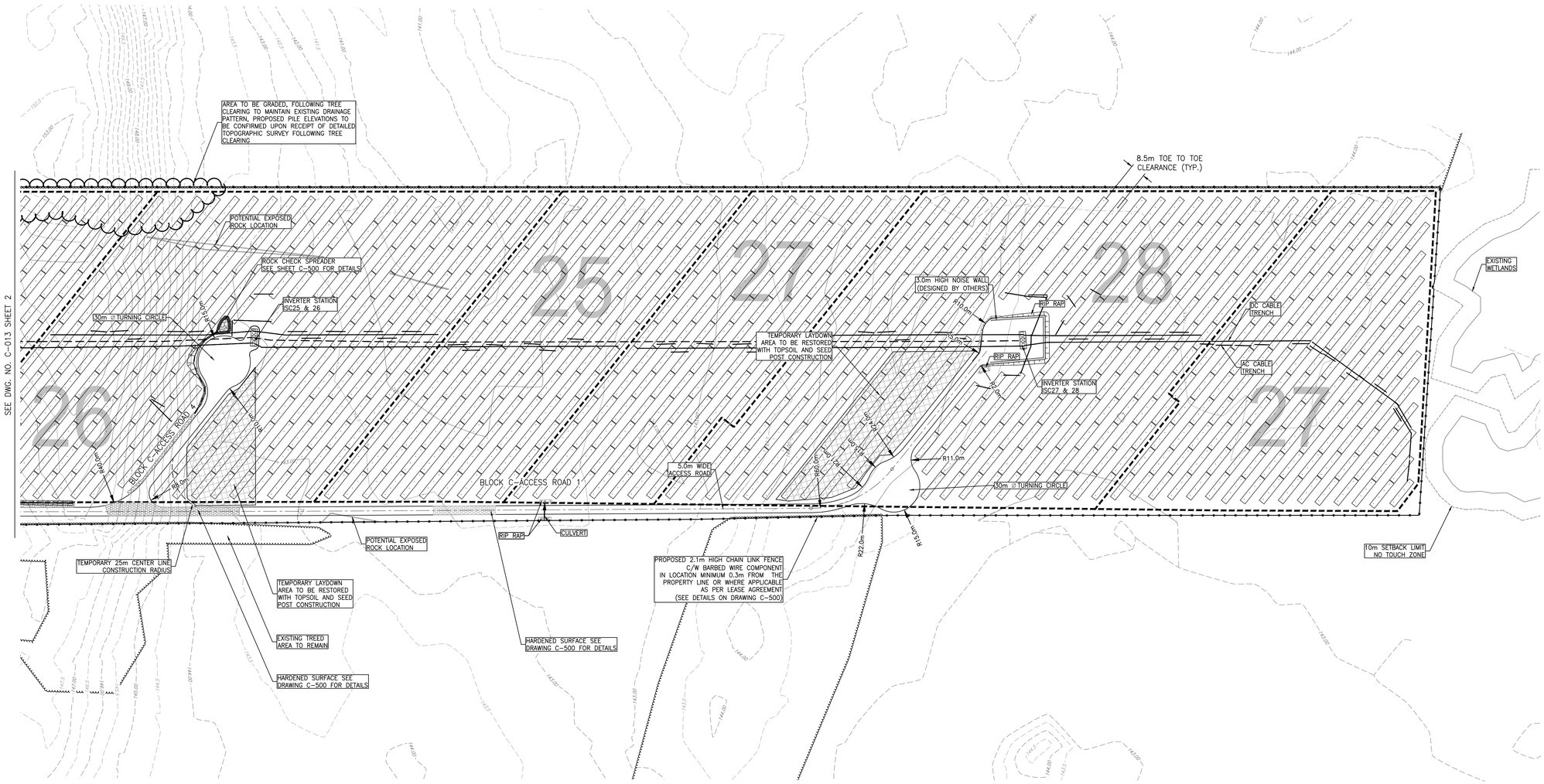
20
BLOCK NUMBER

NOTE:
LIDAR HAS BEEN USED TO SUPPLEMENT THE TOPOGRAPHIC INFORMATION TO ILLUSTRATE EXTERNAL SITE DRAINAGE PATTERNS. CONTRACTOR IS RESPONSIBLE TO REVIEW ELEVATIONS PRIOR TO COMMENCEMENT OF ANY WORK AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER OF RECORD.

NOISE WALL CAN BE TEMPORARILY REMOVED FOR POST CONSTRUCTION ACCESS TO INVERTER STATIONS







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Legend

PROPOSED	EXISTING
TOPOGRAPHIC SURVEY CONTOUR	184.5
LIDAR CONTOUR	184.5
FENCE	
CULVERT	
SOLAR ARRAY BLOCK DELINEATOR	
INVERTER STATION	
SOLAR PANEL TABLE	
HARDENED SURFACE REFER TO C-500 FOR DETAILS	
AC CABLE TRENCH	
DC CABLE TRENCH	
SWALE	
POTENTIAL EXPOSED ROCK LOCATIONS	
TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
TREE/VEGETATION LINE	
RIP RAP	
FILL AREA	
ROCK CHECK SPREADER	
CUT AREA	
10m SETBACK LIMIT NO TOUCH ZONE	
AREA TO BE CLEARED OF TREES, GRADED AND SURVEYED TO CONFIRM PROPOSED PILE ELEVATIONS	

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Revision	By	Appd.	YY.MM.DD
B ISSUED FOR TENDER	DRR	DS	18.01.16
A ISSUED FOR CLIENT REVIEW	DRR	DS	17.12.20

File Name: 133560220_C-SP-BLOCK_D.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	DRR	DS	DRR	17.11.07

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

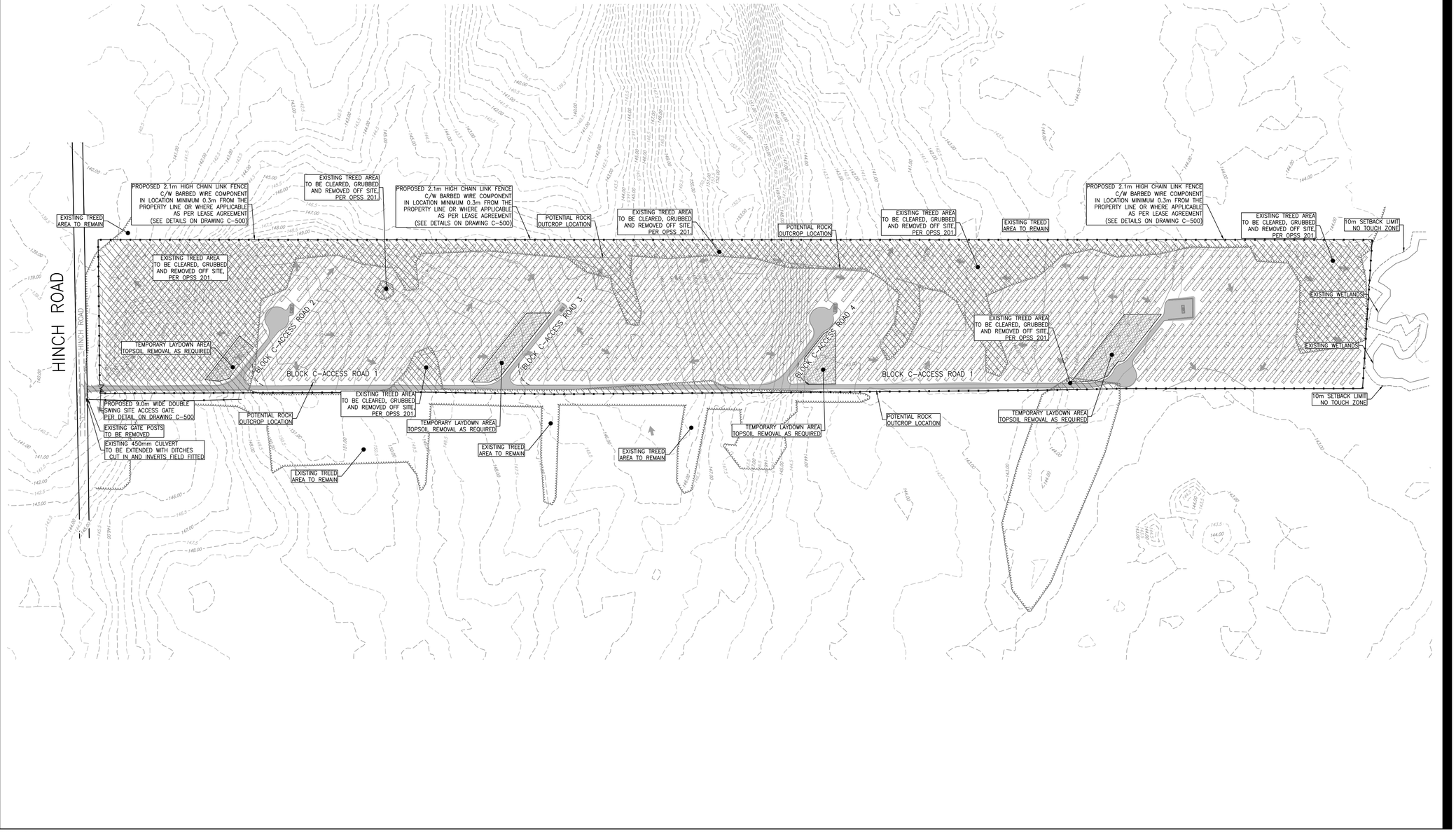
County of Lennox and Addington, Ontario

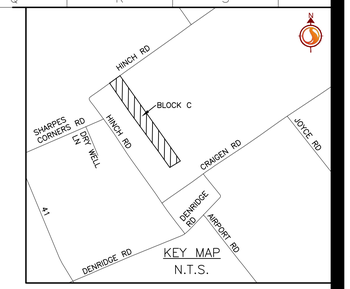
Title
BLOCK C
SITE PLAN

Project No.	Scale	Drawing No.	Sheet	Revision
133560220	1:1250 (0, 12.5, 37.5, 62.5m)	C-013	3 of 3	B

\\cd1004-f01\work_group\v0164\active\133560220\design\drawing_04\civil_block_D\sheet_files\133560220_C-SP-BLOCK_D.dwg
2018/01/16 5:31 PM By: Alice Demick

ORIGINAL SHEET - ARCH D





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Legend

PROPOSED	EXISTING
FENCE	
	TOPOGRAPHIC SURVEY CONTOUR
	LIDAR CONTOUR
EXISTING TREES TO BE CLEARED	
POTENTIAL ROCK OUTCROP LOCATION	
TOPSOIL CLEARING LIMITS	
	TREE/VEGETATION LINE
OVERLAND FLOW DIRECTION	

B	ISSUED FOR TENDER	DRR	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	DRR	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-DP-BLOCK_D.dwg		DRR	DS	DRR	17.11.06
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title

BLOCK C OVERALL
EXISTING CONDITIONS, CLEARING, GRUBBING AND FENCING PLAN

Project No.	Scale	Drawing No.	Sheet	Revision
133560220	1:2500 (0, 25, 75, 125m)	C-053	1 of 3	B

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2018/01/16 5:41 PM By: Rice, Derrick

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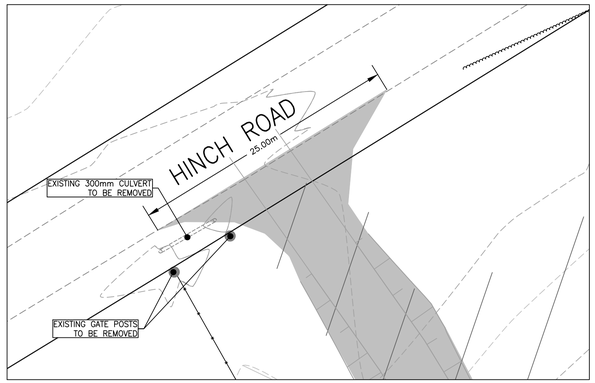
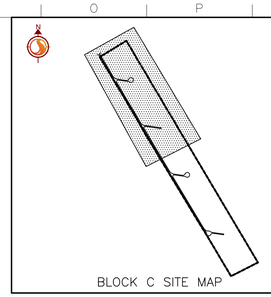
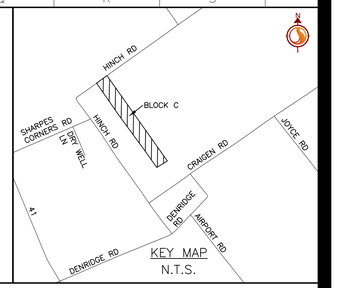


ENTRANCE OFF OF HINCH ROAD
N.T.S.





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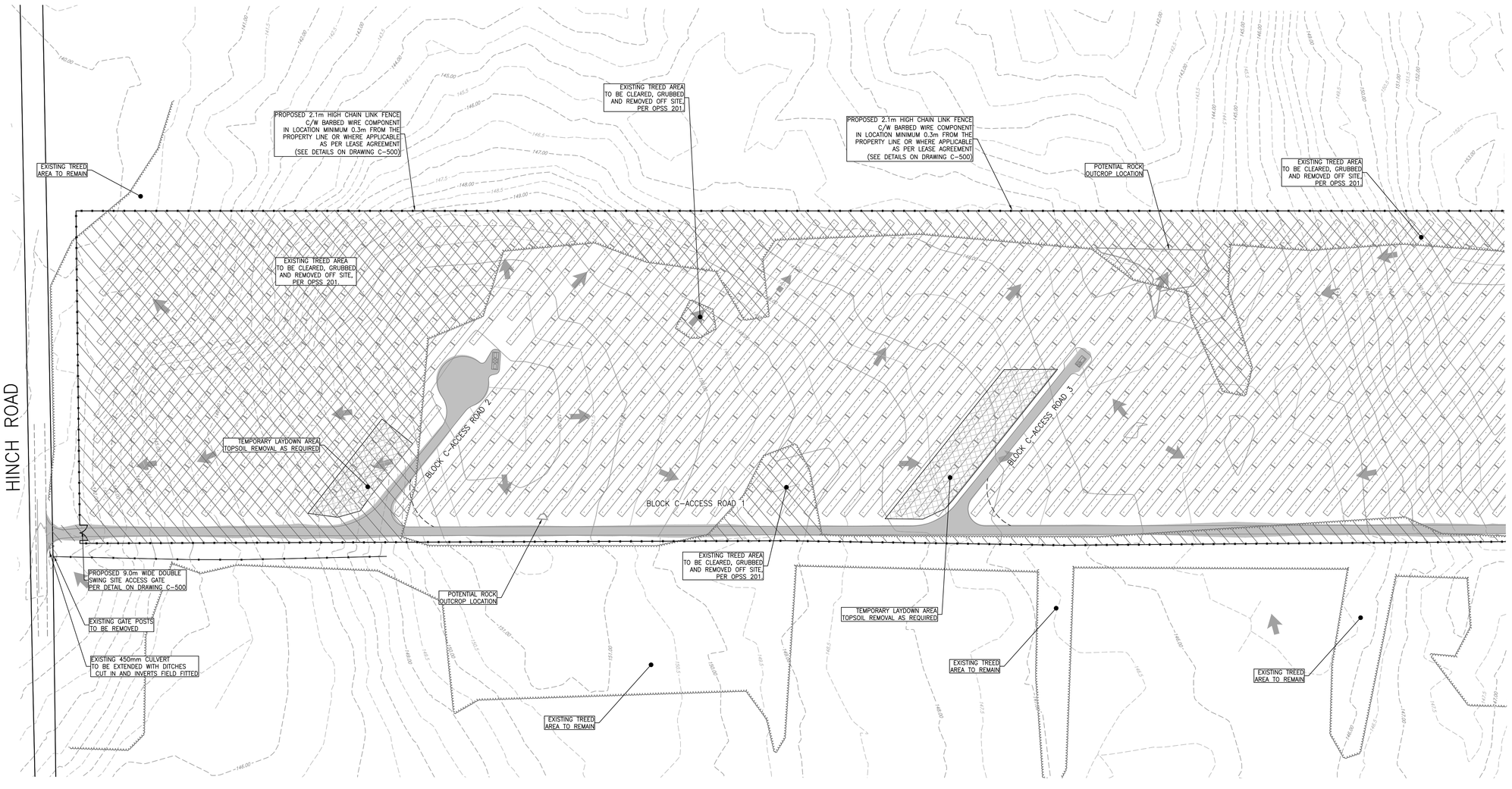

Legend

PROPOSED	EXISTING
FENCE	
	TOPOGRAPHIC SURVEY CONTOUR 295.5
	LIDAR CONTOUR 295.5
EXISTING TREES TO BE CLEARED	
POTENTIAL ROCK OUTCROP LOCATION	
TOPSOIL CLEARING LIMITS	
TREE/VEGETATION LINE	
OVERLAND FLOW DIRECTION	

B	ISSSUED FOR TENDER	DRR	DS	18.01.16
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Revision		By	Appd.	YY.MM.DD
File Name: 133560220_C-DP-BLOCK_D.dwg		DRR	DS	DRR	17.11.06
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK C
EXISTING CONDITIONS, CLEARING, GRUBBING AND FENCING PLAN

Project No. 133560220
Scale 1:2000 (0, 20, 60, 100m)
Drawing No. C-053
Sheet 2 of 3
Revision B

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16. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

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2018/01/17 6:47 PM By: Rice, Derrick

ORIGINAL SHEET - ARCH D

NOTE:

LIDAR HAS BEEN USED TO SUPPLEMENT THE TOPOGRAPHICAL AND ILLUSTRATE EXTERNAL SITE DRAINAGE PATTERNS. CONTRACTOR IS RESPONSIBLE TO REVIEW ONSITE ELEVATIONS PRIOR TO COMMENCEMENT OF ANY WORK AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER OF RECORD.

Stantec

Stantec Consulting Ltd.
300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

PCL CONSTRUCTION LEADERS

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16. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED	EXISTING
FENCE	
TOPOGRAPHIC SURVEY CONTOUR	295.5
LIDAR CONTOUR	295.5
EXISTING TREES TO BE CLEARED	
POTENTIAL ROCK OUTCROP LOCATION	
TOPSOIL CLEARING LIMITS	
TREE/VEGETATION LINE	
OVERLAND FLOW DIRECTION	

B	ISSUED FOR TENDER	DRR	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	DRR	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-DP-BLOCK_D.dwg	DRR	DS	DRR	17.11.06
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title

BLOCK C
EXISTING CONDITIONS, CLEARING, GRUBBING AND FENCING PLAN

Project No.	Scale	
133560220	1:1250	0 12.5 37.5 62.5m
Drawing No.	Sheet	Revision
C-053	3 of 3	B

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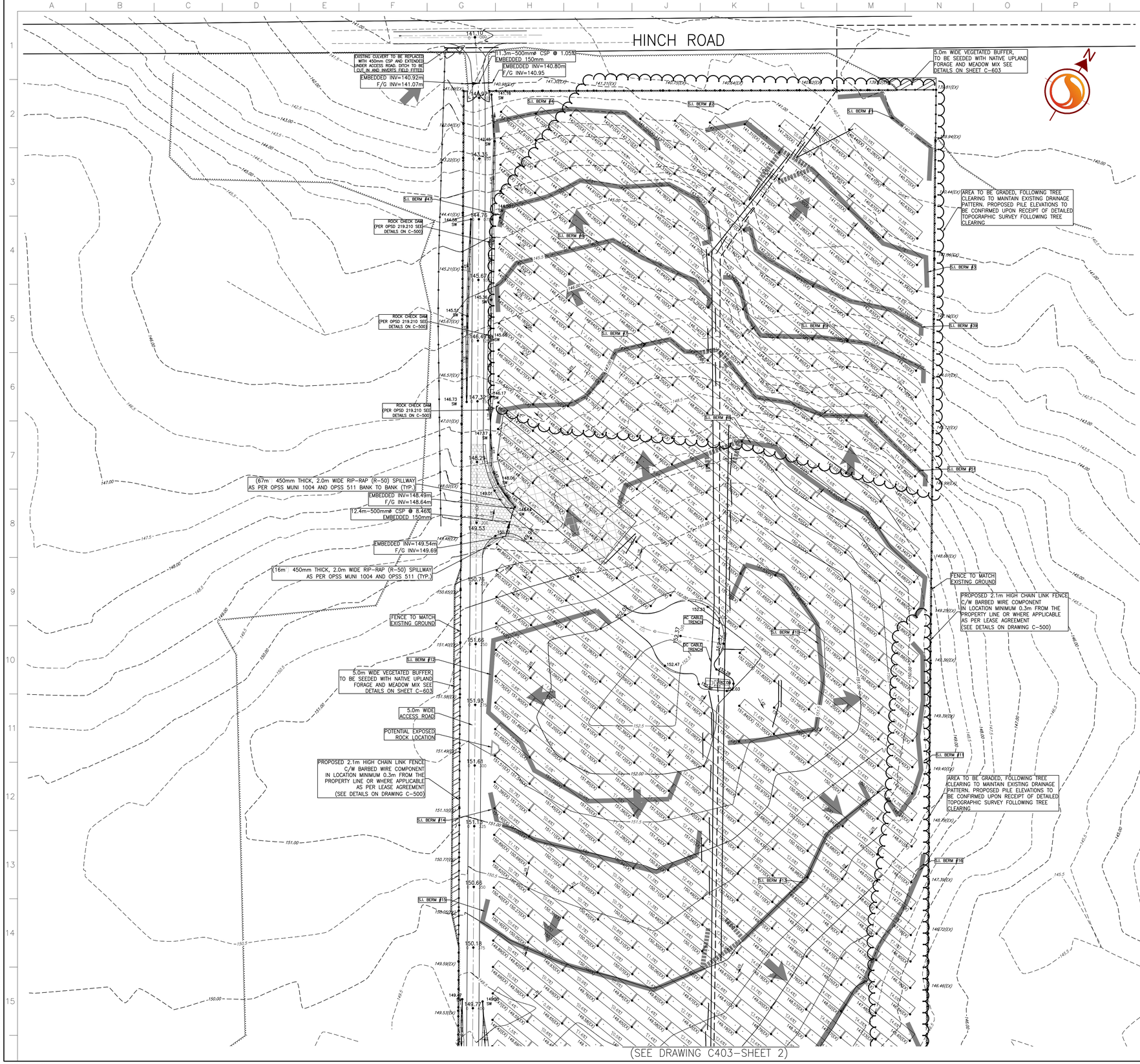
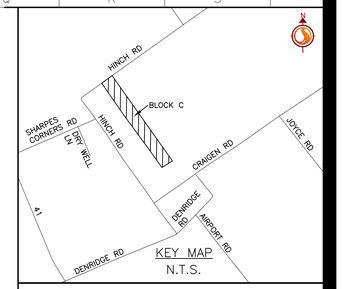
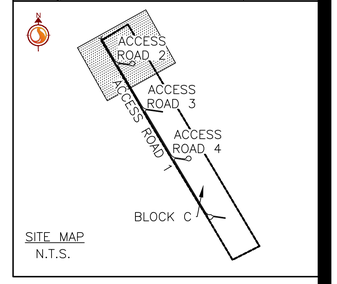
2018/01/16 3:42 PM By: Rice, Derrick

ORIGINAL SHEET - ARCH D







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THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE STORM WATER MANAGEMENT PLAN DATED JANUARY 16, 2018.

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS NOT POSSIBLE, DURING THE VARIOUS STAGES OF CONSTRUCTION, CONSTRUCTION TRAFFIC TO TAKE CARE OF VEGETATION BY SLOWER MOVING VEHICLES. MAINTENANCE OF GRASSED WATERWAYS REQUIRED TO MITIGATE ADDITIONAL SEDIMENT MIGRATION FROM SITE.

GRADING NOTE:
FOR SLOPE INTERRUPTION BERMS SEE GRADING TABLE ON THIS PAGE AND DETAILS ON SHEET C-500 FOR GRADING & CONSTRUCTION DETAILS

REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS OF TRENCHING

EXISTING EXPOSED BEDROCK FRACTURE INFILLING TO BE MINIMIZED IF REQUIRED, FILL TO BE OF COARSE GRANULAR MATERIAL, REFER TO HYDROGEOLOGICAL ASSESSMENT (2017, HARDEN ENVIRONMENTAL SERVICES LTD.)

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	39.1	140.3	140.3
2	52.0	141.7	141.7
3	88.4	141.5	141.5
4	70.5	142.3	142.3
5	96.2	144.2	144.2
6	100.2	145.8	145.8
7	209.5	147.3	147.3
8	160.7	149.8	149.8
9	105.8	146.1	146.1
10	105.9	151.8	151.8
11	69.3	149.9	149.9
12	163.9	152.0	152.0
13	45.6	145.8	145.8
14	86.8	151.3	151.3
15	197.8	150.3	150.3
16	263.5	148.3	148.3
17	185.6	146.8	146.8
18	66.4	146.3	146.3
19	128.6	145.4	145.4
20	61.6	145.3	145.3
21	84.4	145.9	145.9
22	77.0	146.3	146.3
23	182.1	148.3	148.3
24	80.0	149.9	149.9
25	82.1	148.8	148.8
26	77.3	149.3	149.3
27	162.8	147.3	147.3
28	82.2	142.7	142.7
29	38.6	144.8	144.8
30	74.1	143.8	143.8
31	81.1	143.1	143.1
32	160.4	142.3	142.3
33	85.3	143.1	143.1
34	81.6	141.7	141.7
35	66.3	141.8	141.8
36	115.0	142.3	142.3
37	186.5	142.8	142.8
38	166.9	143.0	143.0
39	85.1	142.8	142.8
40	93.2	143.7	143.7
41	69.8	143.5	143.5
42	85.0	144.3	144.3
43	70.6	144.2	144.2
44	107.0	143.3	143.3
45	98.7	143.6	143.6
46	91.7	143.8	143.8
47	102.3	144.7	144.7
48	241.7	143.6	143.6

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16. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED		EXISTING
• 185.19	ELEVATION	• 185.19(EX)
	SWALE	
	TOPOGRAPHIC SURVEY CONTOUR	184.5
	LIDAR CONTOUR	184.5
	FENCE	
	OVERLAND FLOW DIRECTION	
2.0%	GRADE	
	SLOPE (3:1 UNLESS NOTED OTHERWISE)	
	HARDENED SURFACE	
	CULVERT	
	5.0M WIDE VEGETATIVE BUFFER	
	AC CABLE TRENCH	
	DC CABLE TRENCH	
	POTENTIAL ROCK OUTCROP LOCATIONS	
	TEMPORARILY REMOVED S.I. BERM (SEE NOTE ON C-603 DRAWING FOR DETAILS)	
	SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET C-500 FOR DETAILS)	
	TEMPORARY LAYDOWN AREA TO BE RESTORED WITH TOPSOIL AND SEEDED	
	ROCK CHECK DAMS (PER OPSD 219.210 SEE DETAILS ON C-500)	
	PROPOSED FILL AREA	
	PROPOSED CUT AREA	
	GRASSED WATERWAY (SEE DETAIL ON SHEET C-500 FOR DETAILS)	
	ROLLED EROSION CONTROL PRODUCT (RECP)	
	RIP RAP	

B	ISSUED FOR TENDER	DRR	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	DRR	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-GP-BLOCK_D.dwg	DRR	DS	DRR	17.11.06
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT
54MW GROUND-MOUNT SOLAR FARM
County of Lennox and Addington, Ontario

Title
BLOCK C
GRADING PLAN

Project No. 133560220
Scale 1:750 (0, 7.5, 22.5, 37.5m)
Drawing No. C-403
Sheet 1 of 4
Revision B

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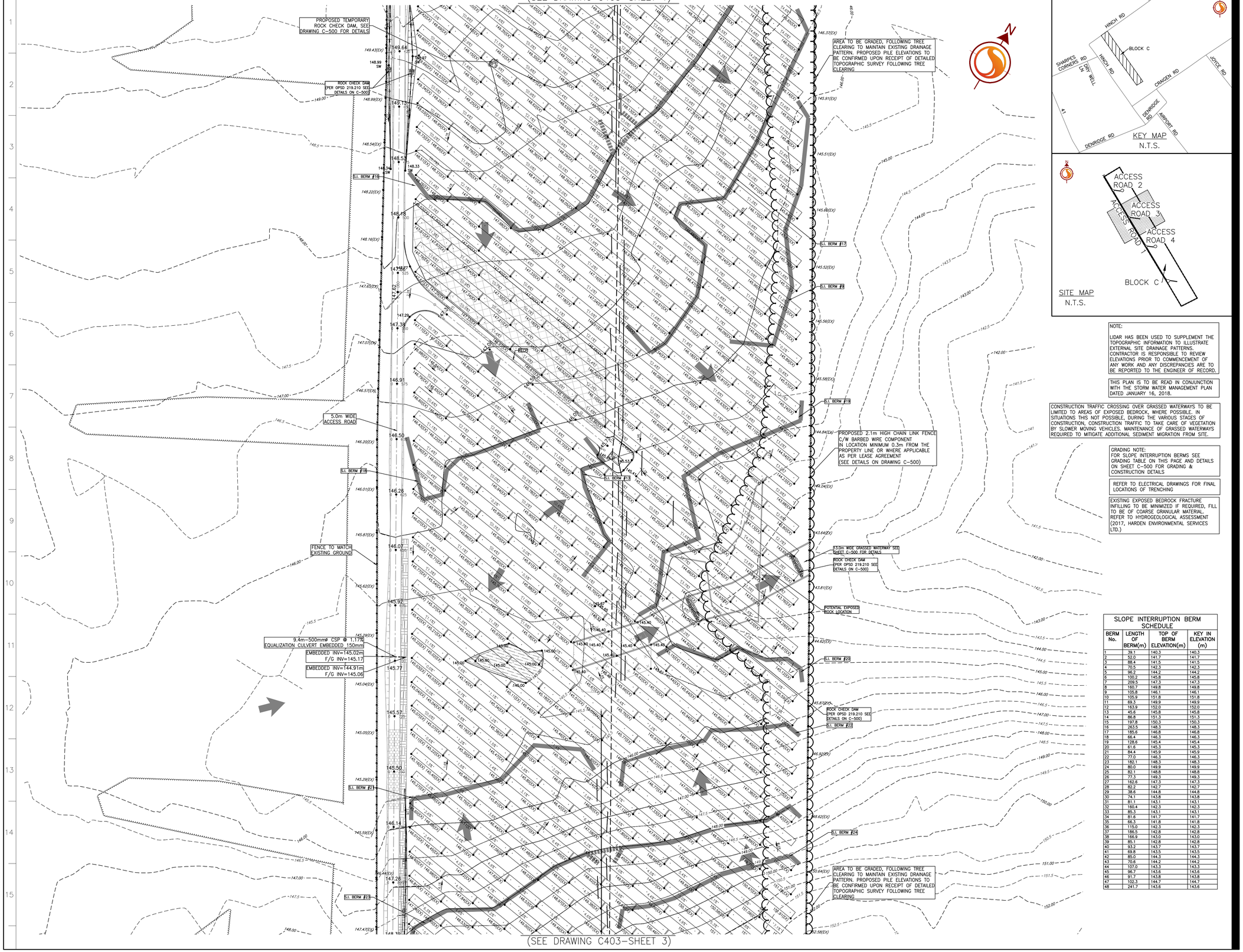
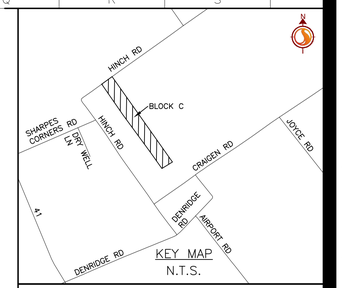
2018/01/16 2:34 PM Ryan Reed, Stantec

ORIGINAL SHEET - ARCH D

(SEE DRAWING C403-SHEET 1)



(SEE DRAWING C403-SHEET 3)



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6	100.2	145.8	145.8
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35	66.3	141.8	141.8
36	115.0	142.3	142.3
37	186.5	142.8	142.8
38	166.9	143.0	143.0
39	85.1	142.8	142.8
40	93.2	143.7	143.7
41	69.8	143.5	143.5
42	85.0	144.3	144.3
43	70.6	144.2	144.2
44	107.0	143.3	143.3
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46	91.7	143.8	143.8
47	102.3	144.7	144.7
48	241.7	143.6	143.6

Legend

PROPOSED		EXISTING
• 185.19	ELEVATION	• 185.19(EX)
	SWALE	
	TOPOGRAPHIC SURVEY CONTOUR	184.5
	LIDAR CONTOUR	184.5
	FENCE	
	OVERLAND FLOW DIRECTION	
2.0%	GRADE	
	SLOPE (3:1 UNLESS NOTED OTHERWISE)	
	HARDENED SURFACE	
	CULVERT	
	5.0M WIDE VEGETATIVE BUFFER	
	AC CABLE TRENCH	
	DC CABLE TRENCH	
	POTENTIAL ROCK OUTCROP LOCATIONS	
	TEMPORARILY REMOVED S.I. BERM (SEE NOTE ON C-603 DRAWING FOR DETAILS)	
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	TEMPORARY LAYDOWN AREA TO BE RESTORED WITH TOPSOIL AND SEEDED	
	ROCK CHECK DAMS (PER OPSD 219.210 SEE DETAILS ON C-500)	
	PROPOSED FILL AREA	
	PROPOSED CUT AREA	
	GRASSED WATERWAY (SEE DETAIL ON SHEET C-500 FOR DETAILS)	
	ROLLED EROSION CONTROL PRODUCT (RECP)	
	RIP RAP	

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15. ALL SEEDING TO BE COMPLETE IN ACCORDANCE WITH OPSS 804.
16. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Revision	By	Appd.	YY.MM.DD
B ISSUED FOR TENDER	DRR	DS	18.01.16
A ISSUED FOR CLIENT REVIEW	DRR	DS	17.12.21

File Name: 133560220_C-GP-BLOCK_D.dwg	DRR	DS	DRR	17.11.06
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK C
GRADING PLAN

Project No.	Scale
133560220	1:750 (0, 7.5, 22.5, 37.5m)
Drawing No.	Sheet / Revision
C-403	2 of 4 / B

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2018/01/16 3:53 PM by Mark Daniels

ORIGINAL SHEET - ARCH D

(SEE DRAWING C403–SHEET 2)

(SEE DRAWING C403–SHEET 4)

AREA TO BE GRADED, FOLLOWING TREE CLEARING TO MAINTAIN EXISTING DRAINAGE PATTERN. PROPOSED PILE ELEVATIONS TO BE CONFIRMED UPON RECEIPT OF DETAILED TOPOGRAPHIC SURVEY FOLLOWING TREE CLEARING

PROPOSED 2.1m HIGH CHAIN LINK FENCE C/W BARBED WIRE COMPONENT IN LOCATION MINIMUM 0.3m FROM THE PROPERTY LINE OR WHERE APPLICABLE AS PER LEASE AGREEMENT (SEE DETAILS ON DRAWING C-500)

ROCK CHECK DAM (PER OPSD 219.210 SEE DETAILS ON C-500)

S.I. BERM #25
S.I. BERM #27
S.I. BERM #29
S.I. BERM #30
S.I. BERM #33
S.I. BERM #31
S.I. BERM #28
S.I. BERM #32
S.I. BERM #34
S.I. BERM #35
S.I. BERM #36
S.I. BERM #37
S.I. BERM #38
S.I. BERM #40
S.I. BERM #41

5.0m WIDE ACCESS ROAD

POTENTIAL EXPOSED ROCK LOCATION

ROCK CHECK SPREADER TOP ELEVATION=143.09 SEE SHEET C-500 FOR DETAILS

FENCE TO MATCH EXISTING GROUND

4.0m WIDE GRASSED WATERWAY SEE SHEET C-500 FOR DETAILS

5.0m WIDE VEGETATED BUFFER, TO BE SEEDED WITH NATIVE UPLAND FORAGE AND MEADOW MIX SEE DETAILS ON SHEET C-603

RIP RAP

9.5m–500mmø CSP @ 0.74% EMBEDDED 150mm
EMBEDDED INV=142.23m
F/G INV=142.38
EMBEDDED INV=142.16m
F/G INV=142.31

NOTE:
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GRADING NOTE:
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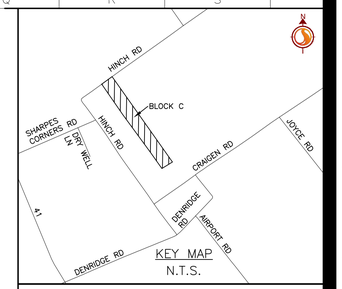
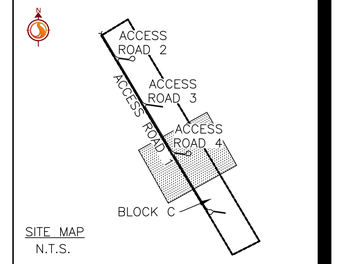
SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	39.1	140.3	140.3
2	52.0	141.7	141.7
3	88.4	141.5	141.5
4	70.5	142.3	142.3
5	96.2	144.2	144.2
6	100.2	145.8	145.8
7	209.5	147.3	147.3
8	160.7	149.8	149.8
9	105.8	146.1	146.1
10	105.9	151.8	151.8
11	69.3	149.9	149.9
12	163.9	152.0	152.0
13	45.6	145.8	145.8
14	86.8	151.3	151.3
15	197.8	150.3	150.3
16	263.5	148.3	148.3
17	185.6	146.8	146.8
18	66.4	146.3	146.3
19	128.6	145.4	145.4
20	61.6	145.3	145.3
21	84.4	145.9	145.9
22	77.0	146.3	146.3
23	182.1	148.3	148.3
24	80.0	149.9	149.9
25	82.1	148.8	148.8
26	77.3	149.3	149.3
27	162.6	147.3	147.3
28	82.2	142.7	142.7
29	38.6	144.8	144.8
30	74.1	143.8	143.8
31	81.1	143.1	143.1
32	160.4	142.3	142.3
33	85.3	143.1	143.1
34	81.6	141.7	141.7
35	66.3	141.8	141.8
36	115.0	142.3	142.3
37	186.5	142.8	142.8
38	166.9	143.0	143.0
39	85.1	142.8	142.8
40	93.2	143.7	143.7
41	69.8	143.5	143.5
42	85.0	144.3	144.3
43	70.6	144.2	144.2
44	107.0	143.3	143.3
45	96.7	143.6	143.6
46	91.7	143.8	143.8
47	102.3	144.7	144.7
48	241.7	143.6	143.6



KEY MAP
N.T.S.



SITE MAP
N.T.S.

Legend

PROPOSED		EXISTING
• 185.19	ELEVATION	• 185.19(EX)
	SWALE	
	TOPOGRAPHIC SURVEY CONTOUR	184.5
	LIDAR CONTOUR	184.5
	FENCE	
	OVERLAND FLOW DIRECTION	
2.0%	GRADE	
	SLOPE (3:1 UNLESS NOTED OTHERWISE)	
	HARDENED SURFACE	
	CULVERT	
	5.0M WIDE VEGETATIVE BUFFER	
	AC CABLE TRENCH	
	DC CABLE TRENCH	
	POTENTIAL ROCK OUTCROP LOCATIONS	
	TEMPORARILY REMOVED S.I. BERM (SEE NOTE ON C-603 DRAWING FOR DETAILS)	
	SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET C-500 FOR DETAILS)	
	TEMPORARY LAYDOWN AREA TO BE RESTORED WITH TOPSOIL AND SEEDED	
	ROCK CHECK DAMS (PER OPSD 219.210 SEE DETAILS ON C-500)	
	PROPOSED FILL AREA	
	PROPOSED CUT AREA	
	GRASSED WATERWAY (SEE DETAIL ON SHEET C-500 FOR DETAILS)	
	ROLLED EROSION CONTROL PRODUCT (RECP)	
	RIP RAP	

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Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK C
GRADING PLAN

Project No.	Scale	Sheet	Revision
133560220	1:750 (0, 7.5, 22.5, 37.5m)		
Drawing No.			
C-403		3 of 4	B

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2018/01/16 3:57 PM By Reid, Derrick

ORIGINAL SHEET - ARCH D

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Legend

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• 185.19	ELEVATION	• 185.19(EX)
	SWALE	
	TOPOGRAPHIC SURVEY CONTOUR	184.5
	LIDAR CONTOUR	184.5
	FENCE	
	OVERLAND FLOW DIRECTION	
2.0%	GRADE	
	SLOPE (3:1 UNLESS NOTED OTHERWISE)	
	HARDENED SURFACE	
	CULVERT	
	5.0M WIDE VEGETATIVE BUFFER	
	AC CABLE TRENCH	
	DC CABLE TRENCH	
	POTENTIAL ROCK OUTCROP LOCATIONS	
	TEMPORARILY REMOVED S.I. BERM (SEE NOTE ON C–603 DRAWING FOR DETAILS)	
	SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET C–500 FOR DETAILS)	
	TEMPORARY LAYDOWN AREA TO BE RESTORED WITH TOPSOIL AND SEEDED	
	ROCK CHECK DAMS (PER OPSD 219.210 SEE DETAILS ON C–500)	
	PROPOSED FILL AREA	
	PROPOSED CUT AREA	
	GRASSED WATERWAY (SEE DETAIL ON SHEET C–500 FOR DETAILS)	
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File Name: 133560220_C-GP-BLOCK_D.dwg	DRR	DS	DRR	17.11.06
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

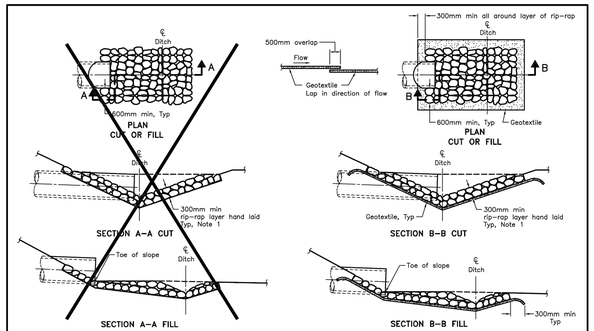
54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK C
GRADING PLAN

Project No.	Scale	Sheet	Revision
133560220	1:750 (0 7.5 22.5 37.5m)		
Drawing No.			
C-403		4 of 4	B

\\cd1004-001\work_group\01.61414\active\133560220\design\drawing_04\civil_plotsct_D\sheet_files\133560220_C-GP-BLOCK_D.dwg
2018/01/16 2:45:31 PM By: Rice, Derrick
ORIGINAL SHEET - ARCH D



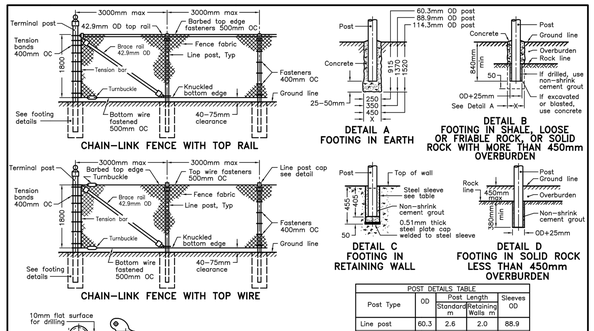
TYPE A – WITHOUT GEOTEXTILE

TYPE B – WITH GEOTEXTILE

NOTES:
1 The thickness of the rip-rap layer shall be at least 1.5 times the rip-rap mean diameter.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 2
GENERAL RIP-RAP LAYOUT FOR SEWER AND CULVERT OUTLETS		
		OPSD 810.010

RIP-RAP TO BE PLACED:
–3 x THE CULVERT DIAMETER WIDE
–4 x THE CULVERT DIAMETER LONG
–FOR MULTIPLE CULVERTS THE WIDTH AND LENGTH ARE TO BE MULTIPLIED BY THE NUMBER OF CULVERTS. FOR THE WIDTH 0.5m BETWEEN CULVERTS IS TO BE ADDED



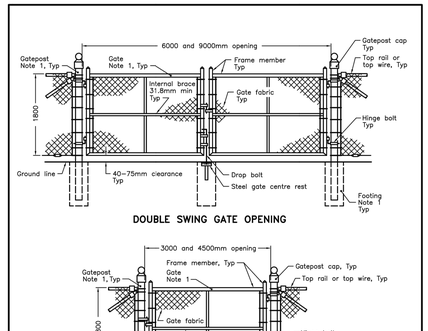
NOTE:
A Fence as viewed from the roadway.
B All dimensions are in millimetres unless otherwise shown.

POST DETAILS TABLE

Post Type	OD	Post Length Standard m	Post Length Retaining Walls m	Sleeves OD
Line post	60.3	2.6	2.0	88.9
Terminal post	88.9	2.9	2.3	114.3

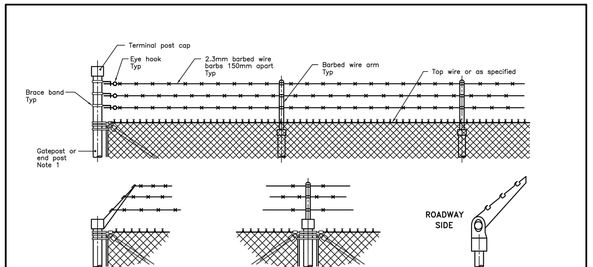
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2005	Rev 1
FENCE, CHAIN–LINK INSTALLATION – ROADWAY		
		OPSD – 972.130

* NOTE: PERIMETER FENCE FABRIC IS TO BE BURIED A MINIMUM OF 100mm–200mm IN THE GROUND, WHERE SOIL DEPTHS ALLOW, TO PREVENT WILDLIFE FROM BURROWING UNDER AND ENTERING THE FACILITY. WHERE THE FENCE FABRIC IS INSTALLED OVER BEDROCK, THE BOTTOM OF THE FENCE FABRIC IS TO BE FLUSH WITH GROUND SURFACE AND ADDITIONAL MEASURES ARE TO BE INSTALLED TO PREVENT WILDLIFE ACCESS UNDER THE FENCE FABRIC. ADDITIONAL MEASURES CAN BE FOUND ON PERIMETER SILT FENCE DETAIL ON DRAWING C–650



NOTES:
1 For footing details and Gate and Gatepost Details Table refer to OPSD 972.132.
A Gates as viewed from the roadway.
B All dimensions are in millimetres unless otherwise shown.

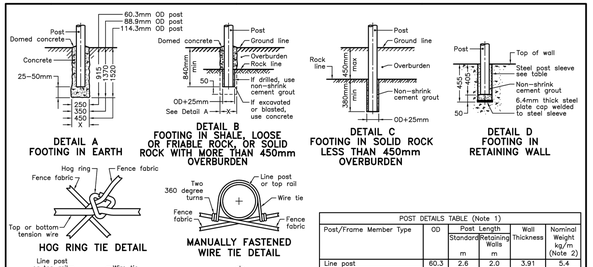
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 2
FENCE, CHAIN–LINK COMPONENT – GATE		
		OPSD 972.102



NOTES:
1 Terminal post shall be lengthened when barbed wire is specified, except when barbed wire arms are used.
A Installation as viewed from the roadway.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 2
FENCE, CHAIN–LINK COMPONENT – BARBED WIRE		
		OPSD 972.101

NOTE:
THE PERIMETER FENCE IS TO HAVE CONTACT WITH THE GROUND SURFACE TO PREVENT ENTRY OF WILDLIFE. WHERE IT IS NOT FEASIBLE FOR THE FENCE TO DIRECTLY CONTACT THE GROUND, OTHER MEASURES WILL BE INSTALLED TO PREVENT WILDLIFE ACCESS UNDER THE FENCE. REFER TO PERIMETER SILT FENCE DETAIL ON DRAWING C–650 FOR SILT FENCE KEY–IN DEPTH TO PRVENT WILDLIFE ACCESS.

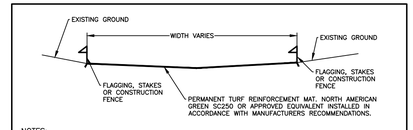


POST DETAILS TABLE (Note 1)

Post/Frame Member Type		OD	Post Length Standard m	Post Length Retaining Walls m	Wall Thickness	Nominal Weight kg/m (Note 2)
Line post		60.3	2.6	2.0	3.91	5.4
Terminal Post		88.9	2.9	2.3	5.49	11.3
Gates (Single 3.0m, Double 6.0m)	Gatepost	88.9	2.6	n/a	5.49	11.3
	Frame Members	42.2	n/a	n/a	3.56	3.4
Gates (Single 4.5m, Double 9.0m)	Gatepost	114.3	2.9	n/a	6.02	16.1
	Frame Members	48.3	n/a	n/a	3.68	4.0
Post Sleeves	Line Post	88.9	n/a	0.455	5.49	11.3
	Terminal Post	114.3	n/a	0.455	6.02	16.1

NOTES:
1 All posts and frame members are Schedule 40, Regular Grade, steel pipe.
2 The actual weight shall not vary by more than 10% of the nominal weight.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 0
FENCE, CHAIN–LINK DETAILS AND TABLE		
		OPSD 972.132



NOTES:
–LIMITS OF GRASSED WATERWAY TO BE DELINEATED DURING CONSTRUCTION WITH FLAGGING, STAKES OR CONSTRUCTION FENCE.
–GRASSED WATERWAY TO BE HYDROSEEDED.
–GRASSED WATERWAY TO BE MAINTAINED THROUGHOUT CONSTRUCTION.
–NO SOIL, TURF REINFORCEMENT MAT OR HYDROSEED TO BE INSTALLED ON EXISTING BEDROCK OUTCROPPINGS.

GRASSED WATERWAY DETAIL
N.T.S.

Stantec
Stantec Consulting Ltd.
300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

PCL CONSTRUCTION LEADERS

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Notes
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THIS SET PREPARED BY STANTEC CONSULTING LTD.
2. THE CONTRACTOR MUST CHECK AND VERIFY DIMENSIONS; OBTAIN ALL UTILITY LOCATES AND OBTAIN ALL REQUIRED PERMITS/LICENSES AND VERIFY ELEVATIONS OF EXISTING SERVICES BEFORE PROCEEDING WITH ANY WORK.
3. ALL CONSTRUCTION WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS (LATEST EDITION).
4. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR HIS/HER REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, HE/SHE MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO STANTEC, PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNERS OWN RISK.
5. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY.
6. THE CONTRACTOR IS TO BE RESPONSIBLE FOR ALL DRAINAGE AND MEASURES TO CONTROL WATER. THE SITE IS TO BE FINE GRADED/LEVELED LEAVING THE SITE IN A NEAT APPEARANCE SUCH THAT POSITIVE DRAINAGE IS ACHIEVED EVERYWHERE PRIOR TO THE INSTALLATION OF SOLAR PANELS.
7. CONSTRUCTION TURNING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
8. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
9. ALL AREAS WITHIN THE PROPOSED WORKS ARE TO BE RE-VEGETATED USING NATIVE TOPSOIL AND SEED. MIX AND APPLICATION RATE/METHOD TO BE SUBMITTED AND APPROVED BY OWNER PRIOR TO IMPLEMENTATION.
10. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
11. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
12. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
13. RIPRAP SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
14. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

G.	REVISED NOTES AND DETAILS	MALM	DS	18.01.16
F.	REVISED NOTES AND DETAILS	DRR	DS	17.12.21
E.	REVISED NOTES AND DETAILS	MALM	DS	17.12.15
D.	REVISED NOTES AND DETAILS	DRR	DS	17.11.30
C.	REVISED NOTES AND DETAILS	KDB	DS	17.11.23
B.	ISSUED FOR TENDER	DRR	DS	17.11.23
A.	ISSUED FOR CLIENT REVIEW	MALM	DS	17.10.31
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-DT.dwg	DRR	DS	DRR	17.10.18
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

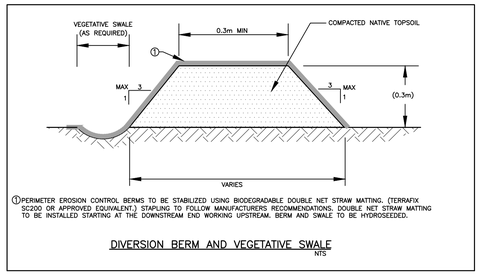
54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
GENERAL DETAILS AND NOTES

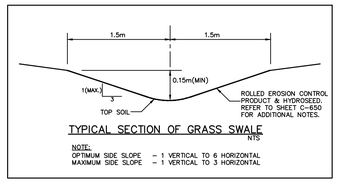
Project No.	Scale	
133560220	AS NOTED	
Drawing No.	Sheet	Revision
C-500	1 of 2	G

ORIGINAL SHEET - ARCH D



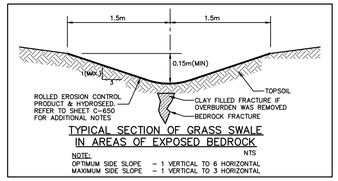
①PERIMETER EROSION CONTROL BERMS TO BE STABILIZED USING BIODEGRADABLE DOUBLE NET STRAW MATTING. (TERRAFIX SC200 OR APPROVED EQUIVALENT.) STAPLING TO FOLLOW MANUFACTURERS RECOMMENDATIONS. DOUBLE NET STRAW MATTING TO BE INSTALLED STARTING AT THE DOWNSTREAM END WORKING UPSTREAM. BERM AND SWALE TO BE HYDROSEEDED.

DIVERSION BERM AND VEGETATIVE SWALE
NTS



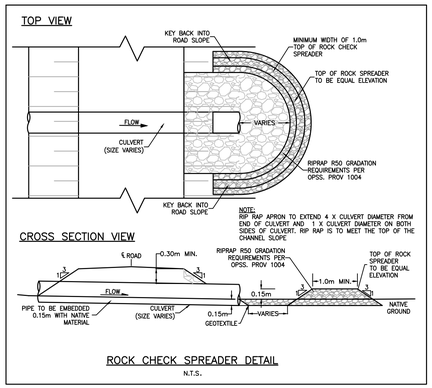
TYPICAL SECTION OF GRASS SWALE
NTS

NOTE:
OPTIMUM SIDE SLOPE – 1 VERTICAL TO 6 HORIZONTAL
MAXIMUM SIDE SLOPE – 1 VERTICAL TO 3 HORIZONTAL

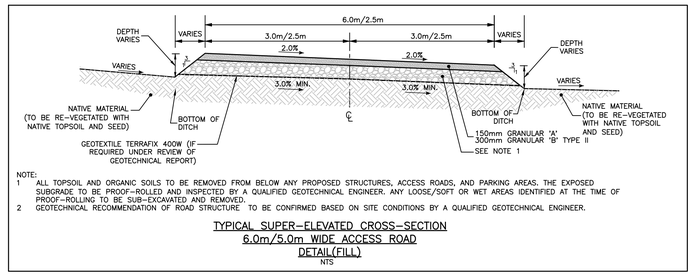


TYPICAL SECTION OF GRASS SWALE IN AREAS OF EXPOSED BEDROCK
NTS

NOTE:
OPTIMUM SIDE SLOPE – 1 VERTICAL TO 6 HORIZONTAL
MAXIMUM SIDE SLOPE – 1 VERTICAL TO 3 HORIZONTAL

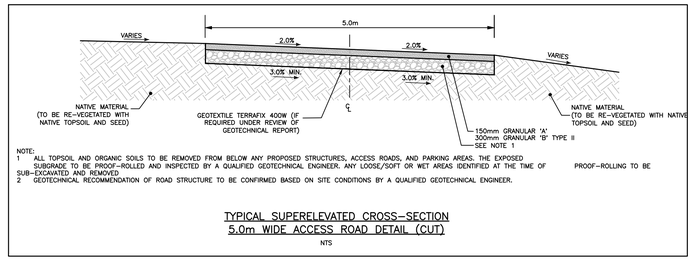


ROCK CHECK SPREADER DETAIL
N.T.S.



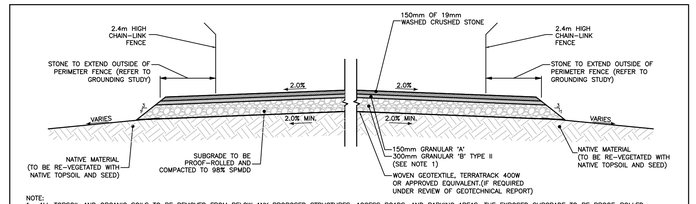
NOTE:
1 ALL TOPSOIL AND ORGANIC SOILS TO BE REMOVED FROM BELOW ANY PROPOSED STRUCTURES, ACCESS ROADS, AND PARKING AREAS. THE EXPOSED SUBGRADE TO BE PROOF-ROLLED AND INSPECTED BY A QUALIFIED GEOTECHNICAL ENGINEER. ANY LOOSE/SOFT OR WET AREAS IDENTIFIED AT THE TIME OF PROOF-ROLLING TO BE SUB-EXCAVATED AND REMOVED.
2 GEOTECHNICAL RECOMMENDATION OF ROAD STRUCTURE TO BE CONFIRMED BASED ON SITE CONDITIONS BY A QUALIFIED GEOTECHNICAL ENGINEER.

TYPICAL SUPER-ELEVATED CROSS-SECTION 6.0m/5.0m WIDE ACCESS ROAD DETAIL(FILL)
NTS



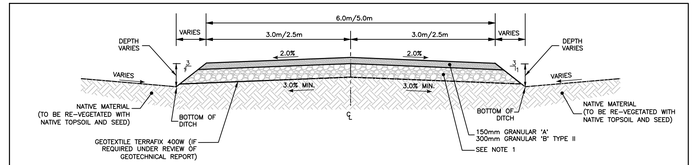
NOTE:
1 ALL TOPSOIL AND ORGANIC SOILS TO BE REMOVED FROM BELOW ANY PROPOSED STRUCTURES, ACCESS ROADS, AND PARKING AREAS. THE EXPOSED SUBGRADE TO BE PROOF-ROLLED AND INSPECTED BY A QUALIFIED GEOTECHNICAL ENGINEER. ANY LOOSE/SOFT OR WET AREAS IDENTIFIED AT THE TIME OF PROOF-ROLLING TO BE SUB-EXCAVATED AND REMOVED
2 GEOTECHNICAL RECOMMENDATION OF ROAD STRUCTURE TO BE CONFIRMED BASED ON SITE CONDITIONS BY A QUALIFIED GEOTECHNICAL ENGINEER.

TYPICAL SUPERELEVATED CROSS-SECTION 5.0m WIDE ACCESS ROAD DETAIL (CUT)
NTS



NOTE:
1. ALL TOPSOIL AND ORGANIC SOILS TO BE REMOVED FROM BELOW ANY PROPOSED STRUCTURES, ACCESS ROADS, AND PARKING AREAS. THE EXPOSED SUBGRADE TO BE PROOF-ROLLED, COMPACTED TO 98% SPMDD, AND INSPECTED BY A QUALIFIED GEOTECHNICAL ENGINEER. ANY LOOSE/SOFT OR WET AREAS IDENTIFIED AT THE TIME OF PROOF-ROLLING TO BE SUB-EXCAVATED AND REMOVED.

COLLECTOR SUBSTATION TYPICAL CROSS-SECTION
NTS



NOTE:
1 ALL TOPSOIL AND ORGANIC SOILS TO BE REMOVED FROM BELOW ANY PROPOSED STRUCTURES, ACCESS ROADS, AND PARKING AREAS. THE EXPOSED SUBGRADE TO BE PROOF-ROLLED AND INSPECTED BY A QUALIFIED GEOTECHNICAL ENGINEER. ANY LOOSE/SOFT OR WET AREAS IDENTIFIED AT THE TIME OF PROOF-ROLLING TO BE SUB-EXCAVATED AND REMOVED.
2 GEOTECHNICAL RECOMMENDATION OF ROAD STRUCTURE TO BE CONFIRMED BASED ON SITE CONDITIONS BY A QUALIFIED GEOTECHNICAL ENGINEER.

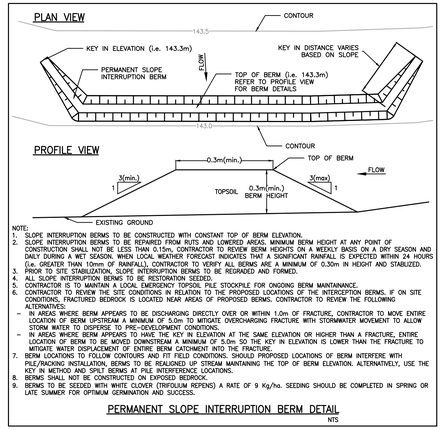
TYPICAL CROSS-SECTION 6.0m/5.0m WIDE ACCESS ROAD DETAIL (FILL)
NTS

ROAD CONSTRUCTION NOTES

1. THE FOREGOING DESIGN ASSUMES THAT CONSTRUCTION IS CARRIED OUT DURING DRY PERIODS AND THE SUB-GRADE IS STABLE UNDER THE LOAD OF CONSTRUCTION EQUIPMENT. IF CONSTRUCTION IS CARRIED OUT DURING WET WEATHER AND HEAVING OR ROLLING OF THE SUB-GRADE IS EXPERIENCED, ADDITIONAL THICKNESS OF GRANULAR ROAD BASE MAY BE REQUIRED AND INSPECTED BY A QUALIFIED GEOTECHNICAL ENGINEER.
2. THE LONG-TERM PERFORMANCE OF THE ROAD BASE STRUCTURE IS HIGHLY DEPENDENT UPON THE SUB-GRADE SUPPORT CONDITIONS. STRINGENT CONSTRUCTION CONTROL PROCEDURES SHALL BE MAINTAINED TO ENSURE THAT UNIFORM SUB-GRADE MOISTURE AND DENSITY CONDITIONS ARE ACHIEVED. IF, DURING THE EXCAVATION PROCESS, NATIVE MATERIAL APPEARS SUITABLE TO BE USED AS ROAD SUB-BASE A GRAIN SIZE ANALYSIS MUST BE COMPLETED TO DETERMINE IF THE MATERIAL CAN BE LEFT IN PLACE AND WHETHER A REDUCTION IN DEPTH OF THE GRANULAR ROAD STRUCTURE IS WARRANTED. THE UNDERLYING SUB-GRADE SHALL BE FREE OF DEPRESSIONS AND IS TO BE SLOPED TO PROVIDE POSITIVE SURFACE DRAINAGE. SURFACE WATER SHALL NOT BE PERMITTED TO POND ADJACENT TO THE OUTSIDE EDGES.
3. AS PART OF THE SUB-GRADE PREPARATION, PROPOSED ROADWAYS SHALL BE STRIPPED OF TOPSOIL AND OBVIOUSLY UNSUITABLE MATERIAL. FILL REQUIRED TO RAISE THE SUB-GRADE TO DESIGN ELEVATIONS SHALL BE ORGANIC-FREE AND SHALL HAVE A MOISTURE CONTENT WHICH WILL PERMIT COMPACTION TO THE DENSITIES INDICATED. THE SUB-GRADE SHALL BE SHAPED, CROWNED AND THEN PROOF-ROLLED IN THE PRESENCE OF A GEOTECHNICAL CONSULTANT. SOFT OR SPONGY SUB-GRADE AREAS SHALL BE SUB-EXCAVATED AND REPLACED WITH SUITABLE APPROVED BACKFILL COMPACTED TO 98 PERCENT SPMDD.
4. ACCESS ROAD CONSTRUCTION FROM MUNICIPAL ROAD TO SITE PERIMETER FENCING TO BE CONSTRUCTED WITH HARDENING COMPOUND (i.e. CALCIUM CHLORIDE) TO DISCOURAGE TURTLE NESTING. HARDENING COMPOUND USED MUST HAVE NO POTENTIAL TO CONTAMINATE GROUNDWATER OR DOMESTIC WELLS.

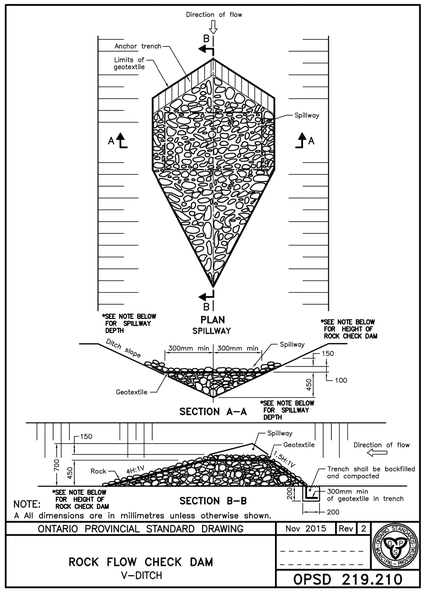
AREA GRADING NOTES

1. TOPSOIL IS TO BE STRIPPED ONLY IN AREAS REQUIRING EARTHWORKS AND PLACED IN TEMPORARY STOCKPILES, REFER TO ADDITIONAL NOTES ON C-650 REGARDING TOPSOIL STOCK PILING.
2. ALL TEMPORARY TOPSOIL STOCKPILES TO BE LOCATED IN CONSTRUCTION LAY DOWN AREAS AS SHOWN ON PLANS. SHOULD NO STOCKPILES LOCATIONS BE PROVIDED ON THE GRADING PLANS, LOCATIONS TO BE CONFIRMED WITH CONTRACT ADMINISTRATOR.
3. ROADWAYS AND STONE BASE LAY DOWN AREAS ARE TO BE PLACED ON NATIVE GROUND AFTER TOPSOIL HAS BEEN STRIPPED.
4. ALL ADDITIONAL TOPSOIL IS TO BE SPREAD IN DESIGNATED FILL AREAS IDENTIFIED ON THE GRADING PLANS (INCREASE IF ADDITIONAL TOPSOIL IS AVAILABLE).
5. INFILLING OF BEDROCK SURFACE FRACTURES SHALL BE MINIMIZED AND WHERE FILLING IS REQUIRED, COARSE GRANULAR FILL SHALL BE USED.
6. SCARIFICATION TO BE PREFORMED AT THE END OF CONSTRUCTION, BEFORE RESTORATION SEEDING.



NOTE:
1. SLOPE INTERRUPTION BERMS TO BE CONSTRUCTED WITH CONSTANT TOP OF BERM ELEVATION.
2. SLOPE INTERRUPTION BERMS TO BE REPAIRED FROM RUTS AND LOWERED AREAS. MINIMUM BERM HEIGHT AT ANY POINT OF CONSTRUCTION SHALL NOT BE LESS THAN 0.15m, CONTRACTOR TO REVIEW BERM HEIGHTS ON A WEEKLY BASIS ON A DRY SEASON AND DAILY DURING A WET SEASON. WHEN LOCAL WEATHER FORECAST INDICATES THAT A SIGNIFICANT RAINFALL IS EXPECTED WITHIN 24 HOURS (i.e. GREATER THAN 10mm OF RAINFALL), CONTRACTOR TO VERIFY ALL BERMS ARE A MINIMUM OF 0.30m IN HEIGHT AND STABILIZED.
3. PRIOR TO SITE STABILIZATION, SLOPE INTERRUPTION BERMS TO BE REGRADED AND FORMED.
4. ALL SLOPE INTERRUPTION BERMS TO BE RESTORATION SEEDED.
5. CONTRACTOR IS TO MAINTAIN A LOCAL EMERGENCY TOPSOIL PILE STOCKPILE FOR ONGOING BERM MAINTANANCE.
6. CONTRACTOR TO REVIEW THE SITE CONDITIONS IN RELATION TO THE PROPOSED LOCATIONS OF THE INTERCEPTION BERMS. IF ON SITE CONDITIONS, FRACTURED BEDROCK IS LOCATED NEAR AREAS OF PROPOSED BERMS, CONTRACTOR TO REVIEW THE FOLLOWING ALTERNATIVES:
   – IN AREAS WHERE BERM APPEARS TO BE DISCHARGING DIRECTLY OVER OR WITHIN 1.0m OF FRACTURE, CONTRACTOR TO MOVE ENTIRE LOCATION OF BERM UPSTREAM A MINIMUM OF 5.0m TO MITIGATE OVERCHARGING FRACTURE WITH STORMWATER MOVEMENT TO ALLOW STORM WATER TO DISPERSE TO PRE-DEVELOPMENT CONDITIONS.
   – IN AREAS WHERE BERM APPEARS TO HAVE THE KEY IN ELEVATION AT THE SAME ELEVATION OR HIGHER THAN A FRACTURE, ENTIRE LOCATION OF BERM TO BE MOVED DOWNSTREAM A MINIMUM OF 5.0m SO THE KEY IN ELEVATION IS LOWER THAN THE FRACTURE TO MITIGATE WATER DISPLACEMENT OF ENTIRE BERM CATCHMENT INTO THE FRACTURE.
7. BERM LOCATIONS TO FOLLOW CONTOURS AND FIT FIELD CONDITIONS. SHOULD PROPOSED LOCATIONS OF BERM INTERFERE WITH PILE/RACKING INSTALLATION, BERMS TO BE REALIGNED UP STREAM MAINTAINING THE TOP OF BERM ELEVATION. ALTERNATIVELY, USE THE KEY IN METHOD AND SPLIT BERMS AT PILE INTERFERENCE LOCATIONS.
8. BERMS SHALL NOT BE CONSTRUCTED ON EXPOSED BEDROCK.
9. BERMS TO BE SEEDED WITH WHITE CLOVER (TRIFOLIUM REPENS) A RATE OF 9 Kg/ha. SEEDING SHOULD BE COMPLETED IN SPRING OR LATE SUMMER FOR OPTIMUM GERMINATION AND SUCCESS.

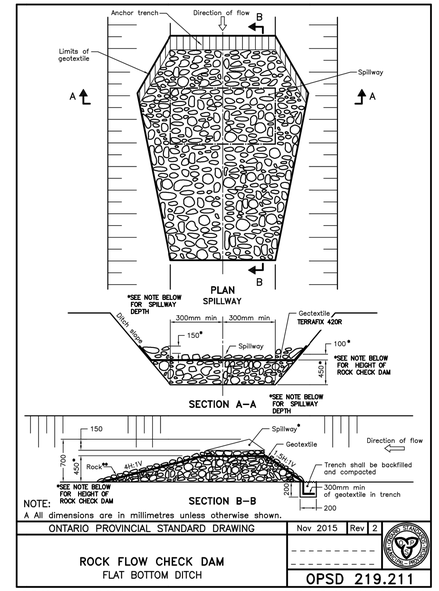
PERMANENT SLOPE INTERRUPTION BERM DETAIL
NTS



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
ROCK FLOW CHECK DAM V-DITCH			OPSD 219.210

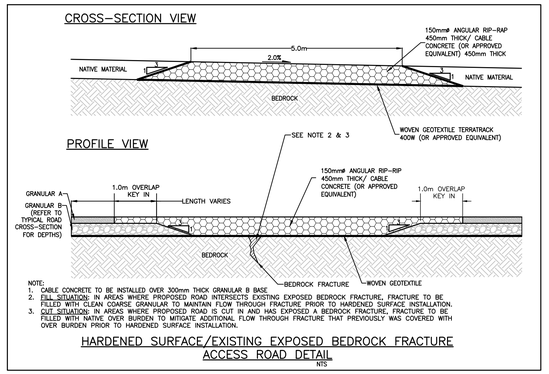
*THE 550mm HEIGHT OF ROCK CHECK DAM TO VARY PER SITE AND TO SUIT LOCAL CONDITIONS. THIS VARIANCE IS NOTED ON ENGINEER DRAWINGS AS HEIGHT OF DAM. SPILLWAY DEPTH ALSO NOTED ON THE ENGINEER DRAWINGS.
**RIP RAP TO BE IN ACCORDANCE WITH OPSS 1004
RIP RAP R50 GRADATION



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
ROCK FLOW CHECK DAM FLAT BOTTOM DITCH			OPSD 219.211

*THE 550mm HEIGHT OF ROCK CHECK DAM TO VARY PER SITE AND TO SUIT LOCAL CONDITIONS. THIS VARIANCE IS NOTED ON ENGINEER DRAWINGS AS HEIGHT OF DAM. SPILLWAY DEPTH ALSO NOTED ON THE ENGINEER DRAWINGS.
**RIP RAP TO BE IN ACCORDANCE WITH OPSS 1004
RIP RAP R50 GRADATION



NOTE:
1. CABLE CONCRETE TO BE INSTALLED OVER 300mm THICK GRANULAR B BASE.
2. FILL SITUATION: IN AREAS WHERE PROPOSED ROAD INTERSECTS EXISTING EXPOSED BEDROCK FRACTURE, FRACTURE TO BE FILLED WITH CLEAN COARSE GRANULAR TO MAINTAIN FLOW THROUGH FRACTURE PRIOR TO HARDENED SURFACE INSTALLATION.
3. CUT SITUATION: IN AREAS WHERE PROPOSED ROAD IS CUT IN AND HAS EXPOSED A BEDROCK FRACTURE, FRACTURE TO BE FILLED WITH NATIVE OVER BURDEN TO MITIGATE ADDITIONAL FLOW THROUGH FRACTURE THAT PREVIOUSLY WAS COVERED WITH OVER BURDEN PRIOR TO HARDENED SURFACE INSTALLATION.

HARDENED SURFACE/EXISTING EXPOSED BEDROCK FRACTURE ACCESS ROAD DETAIL
NTS

Stantec
Stantec Consulting Ltd.
300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

PCL CONSTRUCTION LEADERS

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Notes

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THIS SET PREPARED BY STANTEC CONSULTING LTD.
2. THE CONTRACTOR MUST CHECK AND VERIFY DIMENSIONS; OBTAIN ALL UTILITY LOCATES AND OBTAIN ALL REQUIRED PERMITS/LICENSES AND VERIFY ELEVATIONS OF EXISTING SERVICES BEFORE PROCEEDING WITH ANY WORK.
3. ALL CONSTRUCTION WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS (LATEST EDITION).
4. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR HIS/HER REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, HE/SHE MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO STANTEC, PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNERS OWN RISK.
5. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY.
6. THE CONTRACTOR IS TO BE RESPONSIBLE FOR ALL DRAINAGE AND MEASURES TO CONTROL WATER. THE SITE IS TO BE FINE GRADED/LEVELED LEAVING THE SITE IN A NEAT APPEARANCE SUCH THAT POSITIVE DRAINAGE IS ACHIEVED EVERYWHERE PRIOR TO THE INSTALLATION OF SOLAR PANELS.
7. CONSTRUCTION TURNING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
8. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
9. ALL AREAS WITHIN THE PROPOSED WORKS ARE TO BE RE-VEGETATED USING NATIVE TOPSOIL AND SEED. MIX AND APPLICATION RATE/METHOD TO BE SUBMITTED AND APPROVED BY OWNER PRIOR TO IMPLEMENTATION.
10. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
11. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
12. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
13. RIPRAP SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
14. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Revision	By	Appd.	YY.MM.DD
G. REVISED NOTES AND DETAILS	MALM	DS	18.01.16
F. REVISED NOTES AND DETAILS	DRR	DS	17.12.21
E. REVISED NOTES AND DETAILS	MALM	DS	17.12.15
D. REVISED NOTES AND DETAILS	DRR	DS	17.11.30
C. REVISED NOTES AND DETAILS	KDB	DS	17.11.23
B. ISSUED FOR TENDER	DRR	DS	17.11.23
A. ISSUED FOR CLIENT REVIEW	MALM	DS	17.10.31

File Name: 133560220_C-DT.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	DRR	DS	DRR	17.10.18

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

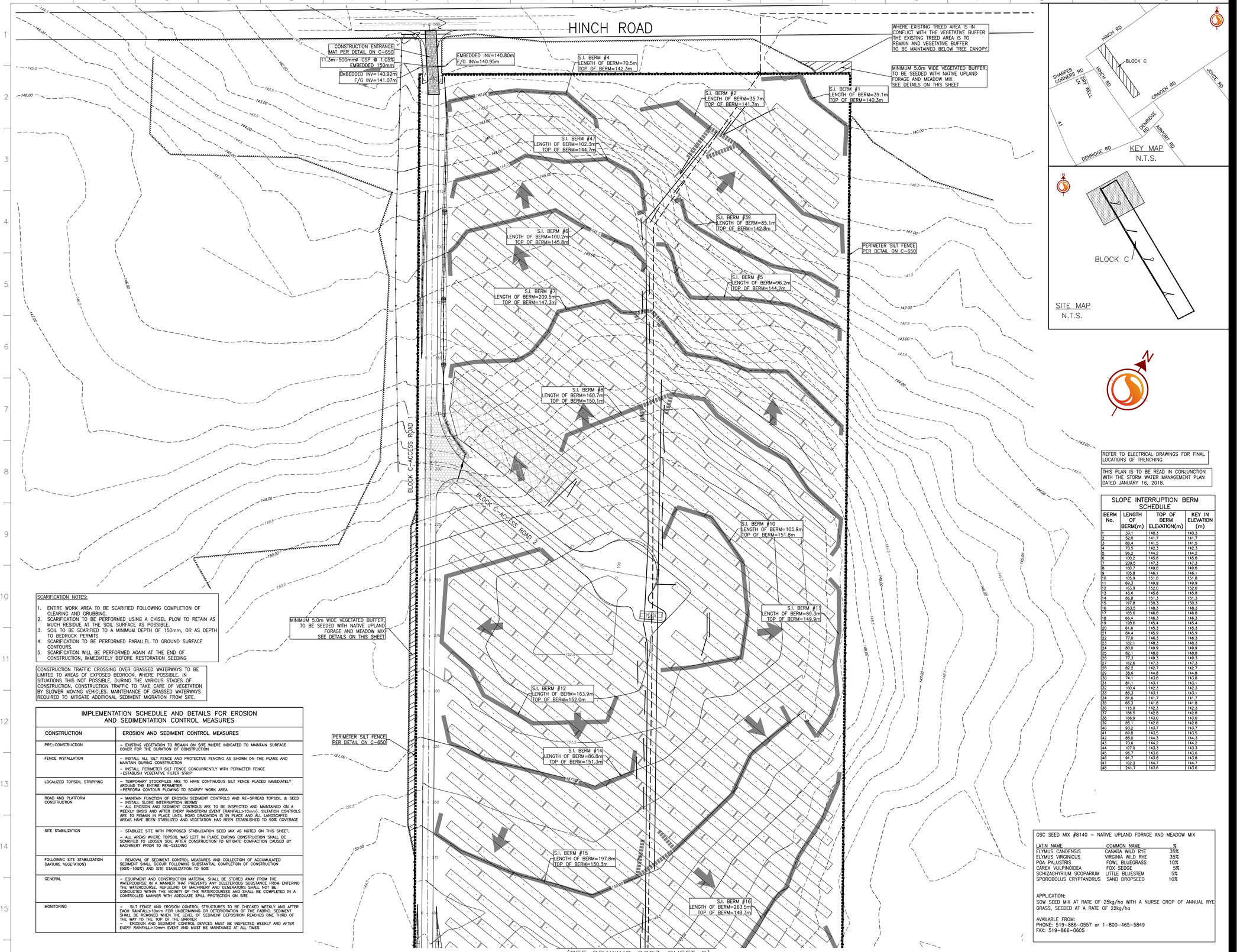
54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
GENERAL DETAILS AND NOTES

Project No.	Scale	
133560220	AS NOTED	
Drawing No.	Sheet	Revision
C-500	2 of 2	G

ORIGINAL SHEET - ARCH D



REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS OF TRENCHING

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE STORM WATER MANAGEMENT PLAN DATED JANUARY 16, 2018.

SCARIFICATION NOTES:

1. ENTIRE WORK AREA TO BE SCARIFIED FOLLOWING COMPLETION OF CLEARING AND GRUBBING.
2. SCARIFICATION TO BE PERFORMED USING A CHISEL PLOW TO RETAIN AS MUCH RESIDUE AT THE SOIL SURFACE AS POSSIBLE.
3. SOIL TO BE SCARIFIED TO A MINIMUM DEPTH OF 150mm, OR AS DEPTH TO BEDROCK PERMITS.
4. SCARIFICATION TO BE PERFORMED PARALLEL TO GROUND SURFACE CONTOURS.
5. SCARIFICATION WILL BE PERFORMED AGAIN AT THE END OF CONSTRUCTION, IMMEDIATELY BEFORE RESTORATION SEEDING

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS NOT POSSIBLE, DURING THE VARIOUS STAGES OF CONSTRUCTION, CONSTRUCTION TRAFFIC TO TAKE CARE OF VEGETATION BY SLOWER MOVING VEHICLES. MAINTENANCE OF GRASSED WATERWAYS REQUIRED TO MITIGATE ADDITIONAL SEDIMENT MIGRATION FROM SITE.

IMPLEMENTATION SCHEDULE AND DETAILS FOR EROSION AND SEDIMENTATION CONTROL MEASURES

CONSTRUCTION	EROSION AND SEDIMENT CONTROL MEASURES
PRE-CONSTRUCTION	– EXISTING VEGETATION TO REMAIN ON SITE WHERE INDICATED TO MAINTAIN SURFACE COVER FOR THE DURATION OF CONSTRUCTION
FENCE INSTALLATION	– INSTALL ALL SILT FENCE AND PROTECTIVE FENCING AS SHOWN ON THE PLANS AND MAINTAIN DURING CONSTRUCTION – INSTALL PERIMETER SILT FENCE CONCURRENTLY WITH PERIMETER FENCE –ESTABLISH VEGETATIVE FILTER STRIP
LOCALIZED TOPSOIL STRIPPING	– TEMPORARY STOCKPILES ARE TO HAVE CONTINUOUS SILT FENCE PLACED IMMEDIATELY AROUND THE ENTIRE PERIMETER –PERFORM CONTOUR PLOWING TO SCARIFY WORK AREA
ROAD AND PLATFORM CONSTRUCTION	– MAINTAIN FUNCTION OF EROSION SEDIMENT CONTROLS AND RE-SPREAD TOPSOIL & SEED – INSTALL SLOPE INTERRUPTION BERMS – ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSPECTED AND MAINTAINED ON A WEEKLY BASIS AND AFTER EVERY RAINSTORM EVENT (RAINFALL>10mm). SILTATION CONTROLS ARE TO REMAIN IN PLACE UNTIL ROAD GRADATION IS IN PLACE AND ALL LANDSCAPED AREAS HAVE BEEN STABILIZED AND VEGETATION HAS BEEN ESTABLISHED TO 90% COVERAGE
SITE STABILIZATION	– STABILIZE SITE WITH PROPOSED STABILIZATION SEED MIX AS NOTED ON THIS SHEET. – ALL AREAS WHERE TOPSOIL WAS LEFT IN PLACE DURING CONSTRUCTION SHALL BE SCARIFIED TO LOOSEN SOIL AFTER CONSTRUCTION TO MITIGATE COMPACTION CAUSED BY MACHINERY PRIOR TO RE-SEEDING
FOLLOWING SITE STABILIZATION (MATURE VEGETATION)	– REMOVAL OF SEDIMENT CONTROL MEASURES AND COLLECTION OF ACCUMULATED SEDIMENT SHALL OCCUR FOLLOWING SUBSTANTIAL COMPLETION OF CONSTRUCTION (90%-100%) AND SITE STABILIZATION TO 90%
GENERAL	– EQUIPMENT AND CONSTRUCTION MATERIAL SHALL BE STORED AWAY FROM THE WATERCOURSE IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THE WATERCOURSE. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN THE VICINITY OF THE WATERCOURSES AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE
MONITORING	– SILT FENCE AND EROSION CONTROL STRUCTURES TO BE CHECKED WEEKLY AND AFTER EACH RAINFALL>10mm FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES ONE THIRD OF THE WAY TO THE TOP OF THE BARRIER – EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSPECTED WEEKLY AND AFTER EVERY RAINFALL>10mm EVENT AND MUST BE MAINTAINED AT ALL TIMES

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	39.1	140.3	140.3
2	52.0	141.7	141.7
3	88.4	141.5	141.5
4	70.5	142.3	142.3
5	96.2	144.2	144.2
6	100.2	145.8	145.8
7	209.5	147.3	147.3
8	160.7	149.8	149.8
9	105.8	146.1	146.1
10	105.9	151.8	151.8
11	69.3	149.9	149.9
12	163.9	152.0	152.0
13	45.6	145.8	145.8
14	86.8	151.3	151.3
15	197.8	150.3	150.3
16	263.5	148.3	148.3
17	185.6	146.8	146.8
18	66.4	146.3	146.3
19	128.6	145.4	145.4
20	61.6	145.3	145.3
21	84.4	145.9	145.9
22	77.0	146.3	146.3
23	182.1	148.3	148.3
24	80.0	149.9	149.9
25	82.1	148.8	148.8
26	77.3	149.3	149.3
27	162.6	147.3	147.3
28	82.2	142.7	142.7
29	38.6	144.8	144.8
30	74.1	143.8	143.8
31	81.1	143.1	143.1
32	160.4	142.3	142.3
33	85.3	143.1	143.1
34	81.6	141.7	141.7
35	66.3	141.8	141.8
36	115.0	142.3	142.3
37	186.5	142.8	142.8
38	166.9	143.0	143.0
39	85.1	142.8	142.8
40	93.2	143.7	143.7
41	69.8	143.5	143.5
42	85.0	144.3	144.3
43	70.6	144.2	144.2
44	107.0	143.3	143.3
45	96.7	143.6	143.6
46	91.7	143.8	143.8
47	102.3	144.7	144.7
48	241.7	143.6	143.6

OSC SEED MIX #8140 – NATIVE UPLAND FORAGE AND MEADOW MIX

LATIN NAME	COMMON NAME	%
ELYMUS CANDENSIS	CANADA WILD RYE	35%
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	35%
POA PALUSTRIS	FOWL BLUEGRASS	10%
CAREX VULPINOIDEA	FOX SEDGE	5%
SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	5%
SPOROBOLUS CRYPTANDRUS	SAND DROPSEED	10%

APPLICATION:
SOW SEED MIX AT RATE OF 25kg/ha WITH A NURSE CROP OF ANNUAL RYE GRASS, SEEDED AT A RATE OF 22kg/ha

AVAILABLE FROM:
PHONE: 519-886-0557 or 1-800-465-5849
FAX: 519-866-0605

Stantec

Stantec Consulting Ltd.
300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

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Notes

1. TOPOGRAPHIC INFORMATION CONDUCTED BY LESLIE M. HIGGINSON SURVEYING Ltd. RECEIVED OCTOBER 25, 2017. TOPOGRAPHIC SURVEY IS UTM 18. LIDAR INFORMATION CONDUCTED BY TULLOCH ENGINEERING ON JUNE 27, 2016. LIDAR SURVEY IS UTM 18. BEDROCK SURVEY INFORMATION PROVIDED BY PCL CONSTRUCTORS LTD. RECEIVED ON OCTOBER 31, 2017.EXISTING VEGETATION INFORMATION IS APPROXIMATE, PROVIDED FROM AERIAL IMAGERY, CONTRACTOR TO CONFIRM ALL TREE & SHRUB LOCATIONS ON SITE.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THIS SET PREPARED BY STANTEC CONSULTING LTD.
3. THE CONTRACTOR MUST CHECK AND VERIFY DIMENSIONS; OBTAIN ALL UTILITY LOCATES AND OBTAIN ALL REQUIRED PERMITS/LICENSES AND VERIFY ELEVATIONS OF EXISTING SERVICES BEFORE PROCEEDING WITH ANY WORK.
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5. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR HIS/HER REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, HE/SHE MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO THE OWNER AND CONTRACTOR AND A COPY IS TO BE KEPT ON FILE ON SITE PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNERS OWN RISK.
6. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY.
7. THE CONTRACTOR IS TO BE RESPONSIBLE FOR ALL DRAINAGE AND MEASURES TO CONTROL WATER. THE SITE IS TO BE FINE GRADED/LEVELED LEAVING THE SITE IN A NEAT APPEARANCE SUCH THAT POSITIVE DRAINAGE IS ACHIEVED EVERYWHERE PRIOR TO THE INSTALLATION OF SOLAR PANELS.
8. CONSTRUCTION TURNING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
9. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
10. ALL AREAS WITHIN THE PROPOSED WORKS ARE TO BE RE-VEGETATED USING NATIVE TOPSOIL AND SEED. MIX AND APPLICATION RATE/METHOD TO BE SUBMITTED AND APPROVED BY OWNER PRIOR TO IMPLEMENTATION.
11. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
12. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
13. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
14. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
15. ALL SEEDING TO BE COMPLETE IN ACCORDANCE WITH OPSS 804.
16. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED	EXISTING
PROPERTY LINE	
FENCE	
TOPOGRAPHIC SURVEY CONTOUR	295.5
LIDAR CONTOUR	295.5

PERIMETER FENCE SILT FENCE (SEE DETAILS ON SHEET C-650)
TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK
CULVERT
ROCK CHECK DAMS (SEE DETAILS ON SHEET C-650)
OVERLAND FLOW DIRECTION
SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET 1 C-604)
5.0M WIDE VEGETATIVE BUFFER
AC CABLE TRENCH
DC CABLE TRENCH
POTENTIAL ROCK OUTCROP LOCATIONS
10m SETBACK LIMIT NO TOUCH ZONE
HARDENED SURFACE
GRASSED WATERWAY (SEE DETAILS ON SHEET C-500 FOR DETAILS)

B	ISSUED FOR TENDER	DRR	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	DRR	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-EC-BLOCK_D.dwg	DRR	DS	DRR	17.11.08
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK C
SEDIMENTATION AND EROSION CONTROL PLAN

Project No.	Scale
133560220	1:750 (0, 7.5, 22.5, 37.5m)
Drawing No.	Sheet / Revision
C-603	1 of 4 / B

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2018/01/16 4:23 PM By: Ricle, Dennis

ORIGINAL SHEET - ARCH D

(SEE DRAWING C603–SHEET 1)

IMPLEMENTATION SCHEDULE AND DETAILS FOR EROSION AND SEDIMENTATION CONTROL MEASURES

CONSTRUCTION	EROSION AND SEDIMENT CONTROL MEASURES
PRE–CONSTRUCTION	– EXISTING VEGETATION TO REMAIN ON SITE WHERE INDICATED TO MAINTAIN SURFACE COVER FOR THE DURATION OF CONSTRUCTION
FENCE INSTALLATION	– INSTALL ALL SILT FENCE AND PROTECTIVE FENCING AS SHOWN ON THE PLANS AND MAINTAIN DURING CONSTRUCTION – INSTALL PERIMETER SILT FENCE CONCURRENTLY WITH PERIMETER FENCE –ESTABLISH VEGETATIVE FILTER STRIP
LOCALIZED TOPSOIL STRIPPING	– TEMPORARY STOCKPILES ARE TO HAVE CONTINUOUS SILT FENCE PLACED IMMEDIATELY AROUND THE ENTIRE PERIMETER –PERFORM CONTOUR PLOWING TO SCARIFY WORK AREA
ROAD AND PLATFORM CONSTRUCTION	– MAINTAIN FUNCTION OF EROSION SEDIMENT CONTROLS AND RE–SPREAD TOPSOIL & SEED – INSTALL SLOPE INTERRUPTION BERMS – ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSPECTED AND MAINTAINED ON A WEEKLY BASIS AND AFTER EVERY RAINSTORM EVENT (RAINFALL>10mm). SILTATION CONTROLS ARE TO REMAIN IN PLACE UNTIL ROAD GRADATION IS IN PLACE AND ALL LANDSCAPED AREAS HAVE BEEN STABILIZED AND VEGETATION HAS BEEN ESTABLISHED TO 90% COVERAGE
SITE STABILIZATION	– STABILIZE SITE WITH PROPOSED STABILIZATION SEED MIX AS NOTED ON THIS SHEET. – ALL AREAS WHERE TOPSOIL WAS LEFT IN PLACE DURING CONSTRUCTION SHALL BE SCARIFIED TO LOOSEN SOIL AFTER CONSTRUCTION TO MITIGATE COMPACTION CAUSED BY MACHINERY PRIOR TO RE–SEEDING
FOLLOWING SITE STABILIZATION (MATURE VEGETATION)	– REMOVAL OF SEDIMENT CONTROL MEASURES AND COLLECTION OF ACCUMULATED SEDIMENT SHALL OCCUR FOLLOWING SUBSTANTIAL COMPLETION OF CONSTRUCTION (90%–100%) AND SITE STABILIZATION TO 90%
GENERAL	– EQUIPMENT AND CONSTRUCTION MATERIAL SHALL BE STORED AWAY FROM THE WATERCOURSE IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THE WATERCOURSE. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN THE VICINITY OF THE WATERCOURSES AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE.
MONITORING	– SILT FENCE AND EROSION CONTROL STRUCTURES TO BE CHECKED WEEKLY AND AFTER EACH RAINFALL>10mm FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES ONE THIRD OF THE WAY TO THE TOP OF THE BARRIER – EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSPECTED WEEKLY AND AFTER EVERY RAINFALL>10mm EVENT AND MUST BE MAINTAINED AT ALL TIMES

BLOCK C–ACCESS ROAD 1

BLOCK C–ACCESS ROAD 3

S.I. BERM #9
LENGTH OF BERM=105.8m
TOP OF BERM=146.1m

S.I. BERM #17
LENGTH OF BERM=185.6m
TOP OF BERM=146.8m

S.I. BERM #18
LENGTH OF BERM=66.4m
TOP OF BERM=146.3m

S.I. BERM #19
LENGTH OF BERM=128.6m
TOP OF BERM=145.4m

S.I. BERM #13
LENGTH OF BERM=45.6m
TOP OF BERM=145.8m

S.I. BERM #20
LENGTH OF BERM=61.6m
TOP OF BERM=145.3m

S.I. BERM #22
LENGTH OF BERM=77.0m
TOP OF BERM=146.3m

S.I. BERM #21
LENGTH OF BERM=84.4m
TOP OF BERM=145.9m

S.I. BERM #23
LENGTH OF BERM=182.1m
TOP OF BERM=146.3m

S.I. BERM #24
LENGTH OF BERM=80.0m
TOP OF BERM=149.9m

POTENTIAL EXPOSED ROCK LOCATION

GRASSED WATERWAY SEE SHEET C–500 FOR DETAILS

PERIMETER SILT FENCE PER DETAIL ON C–650

EMBEDDED INV=145.02m
F/G INV=145.17m

9.4m–500mmø CSP @ 1.17%
EMBEDDED 150mm

EMBEDDED INV=144.91m
F/G INV=145.06

SCARIFICATION NOTES:

1. ENTIRE WORK AREA TO BE SCARIFIED FOLLOWING COMPLETION OF CLEARING AND GRUBBING.
2. SCARIFICATION TO BE PERFORMED USING A CHISEL PLOW TO RETAIN AS MUCH RESIDUE AT THE SOIL SURFACE AS POSSIBLE.
3. SOIL TO BE SCARIFIED TO A MINIMUM DEPTH OF 150mm, OR AS DEPTH TO BEDROCK PERMITS.
4. SCARIFICATION TO BE PERFORMED PARALLEL TO GROUND SURFACE CONTOURS.
5. SCARIFICATION WILL BE PERFORMED AGAIN AT THE END OF CONSTRUCTION, IMMEDIATELY BEFORE RESTORATION SEEDING

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE STORM WATER MANAGEMENT PLAN DATED JANUARY 16, 2018.

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	39.1	140.3	140.3
2	52.0	141.7	141.7
3	88.4	141.5	141.5
4	70.5	142.3	142.3
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7	209.5	147.3	147.3
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9	105.8	146.1	146.1
10	105.9	151.8	151.8
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12	163.9	152.0	152.0
13	45.6	145.8	145.8
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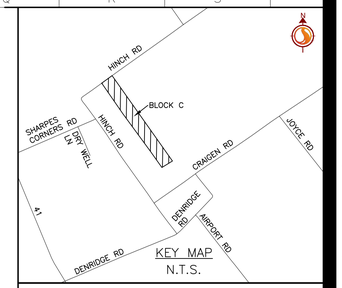
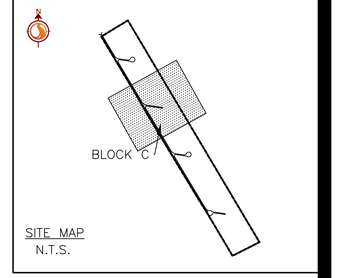
15	197.8	150.3	150.3
16	263.5	148.3	148.3
17	185.6	146.8	146.8
18	66.4	146.3	146.3
19	128.6	145.4	145.4
20	61.6	145.3	145.3
21	84.4	145.9	145.9
22	77.0	146.3	146.3
23	182.1	148.3	148.3
24	80.0	149.9	149.9
25	82.1	148.8	148.8
26	77.3	149.3	149.3
27	160.6	147.3	147.3
28	82.2	142.7	142.7
29	38.6	144.8	144.8
30	74.1	143.8	143.8
31	81.1	143.1	143.1
32	160.4	142.3	142.3
33	85.3	143.1	143.1
34	81.6	141.7	141.7
35	66.3	141.8	141.8
36	115.0	142.3	142.3
37	186.5	142.8	142.8
38	166.9	143.0	143.0
39	85.1	142.8	142.8
40	93.2	143.7	143.7
41	69.8	143.5	143.5
42	85.0	144.3	144.3
43	70.6	144.2	144.2
44	107.0	143.3	143.3
45	96.7	143.6	143.6
46	91.7	143.8	143.8
47	102.3	144.7	144.7
48	241.7	143.6	143.6

(SEE DRAWING C603–SHEET 3)



KEY MAP
N.T.S.



SITE MAP
N.T.S.

REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS OF TRENCHING

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS NOT POSSIBLE, DURING THE VARIOUS STAGES OF CONSTRUCTION, CONSTRUCTION TRAFFIC TO TAKE CARE OF VEGETATION BY SLOWER MOVING VEHICLES. MAINTENANCE OF GRASSED WATERWAYS REQUIRED TO MITIGATE ADDITIONAL SEDIMENT MIGRATION FROM SITE.

OSC SEED MIX #8140 – NATIVE UPLAND FORAGE AND MEADOW MIX

LATIN NAME	COMMON NAME	%
ELYMUS CANDENSIS	CANADA WILD RYE	35%
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	35%
POA PALUSTRIS	FOWL BLUEGRASS	10%
CAREX VULPINOIDEA	FOX SEDGE	5%
SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	5%
SPOROBOLUS CRYPTANDRUS	SAND DROPSEED	10%

APPLICATION:
SOW SEED MIX AT RATE OF 25kg/ha WITH A NURSE CROP OF ANNUAL RYE GRASS, SEEDED AT A RATE OF 22kg/ha

AVAILABLE FROM:
PHONE: 519–886–0557 or 1–800–465–5849
FAX: 519–866–0605

Stantec

Stantec Consulting Ltd.
300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

PCL
CONSTRUCTION LEADERS

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Notes

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2. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THIS SET PREPARED BY STANTEC CONSULTING LTD.
3. THE CONTRACTOR MUST CHECK AND VERIFY DIMENSIONS; OBTAIN ALL UTILITY LOCATES AND OBTAIN ALL REQUIRED PERMITS/LICENSES AND VERIFY ELEVATIONS OF EXISTING SERVICES BEFORE PROCEEDING WITH ANY WORK.
4. ALL CONSTRUCTION WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS (LATEST EDITION).
5. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR HIS/HER REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, HE/SHE MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO THE OWNER AND CONTRACTOR AND A COPY IS TO BE KEPT ON FILE ON SITE PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNERS OWN RISK.
6. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT–OF–WAY.
7. THE CONTRACTOR IS TO BE RESPONSIBLE FOR ALL DRAINAGE AND MEASURES TO CONTROL WATER. THE SITE IS TO BE FINE GRADED/LEVELED LEAVING THE SITE IN A NEAT APPEARANCE SUCH THAT POSITIVE DRAINAGE IS ACHIEVED EVERYWHERE PRIOR TO THE INSTALLATION OF SOLAR PANELS.
8. CONSTRUCTION TURNING RADIUS LIMITS ENTRY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
9. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
10. ALL AREAS WITHIN THE PROPOSED WORKS ARE TO BE RE–VEGETATED USING NATIVE TOPSOIL AND SEED. MIX AND APPLICATION RATE/METHOD TO BE SUBMITTED AND APPROVED BY OWNER PRIOR TO IMPLEMENTATION.
11. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
12. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
13. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
14. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B–B.
15. ALL SEEDING TO BE COMPLETE IN ACCORDANCE WITH OPSS 804.
16. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED	EXISTING
PROPERTY LINE	
FENCE	
TOPOGRAPHIC SURVEY CONTOUR	295.5
LIDAR CONTOUR	295.5
PERIMETER FENCE SILT FENCE (SEE DETAILS ON SHEET C–650)	
TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK	
CULVERT	
ROCK CHECK DAMS (SEE DETAILS ON SHEET C–650)	
OVERLAND FLOW DIRECTION	
SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET 1 C–604)	
5.0M WIDE VEGETATIVE BUFFER	
AC CABLE TRENCH	
DC CABLE TRENCH	
POTENTIAL ROCK OUTCROP LOCATIONS	
10m SETBACK LIMIT NO TOUCH ZONE	
HARDENED SURFACE	
GRASSED WATERWAY (SEE DETAILS ON SHEET C–500 FOR DETAILS)	

B	ISSUED FOR TENDER	DRR	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	DRR	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-EC-BLOCK_D.dwg	DRR	DS	DRR	17.11.08
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK C
SEDIMENTATION AND EROSION CONTROL PLAN

Project No.	Scale	Drawing No.	Sheet	Revision
133560220	1:750 (0 7.5 22.5 37.5m)	C-603	2 of 4	B

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2018/01/16 4:28 PM By: Rob.Semick

ORIGINAL SHEET - ARCH D

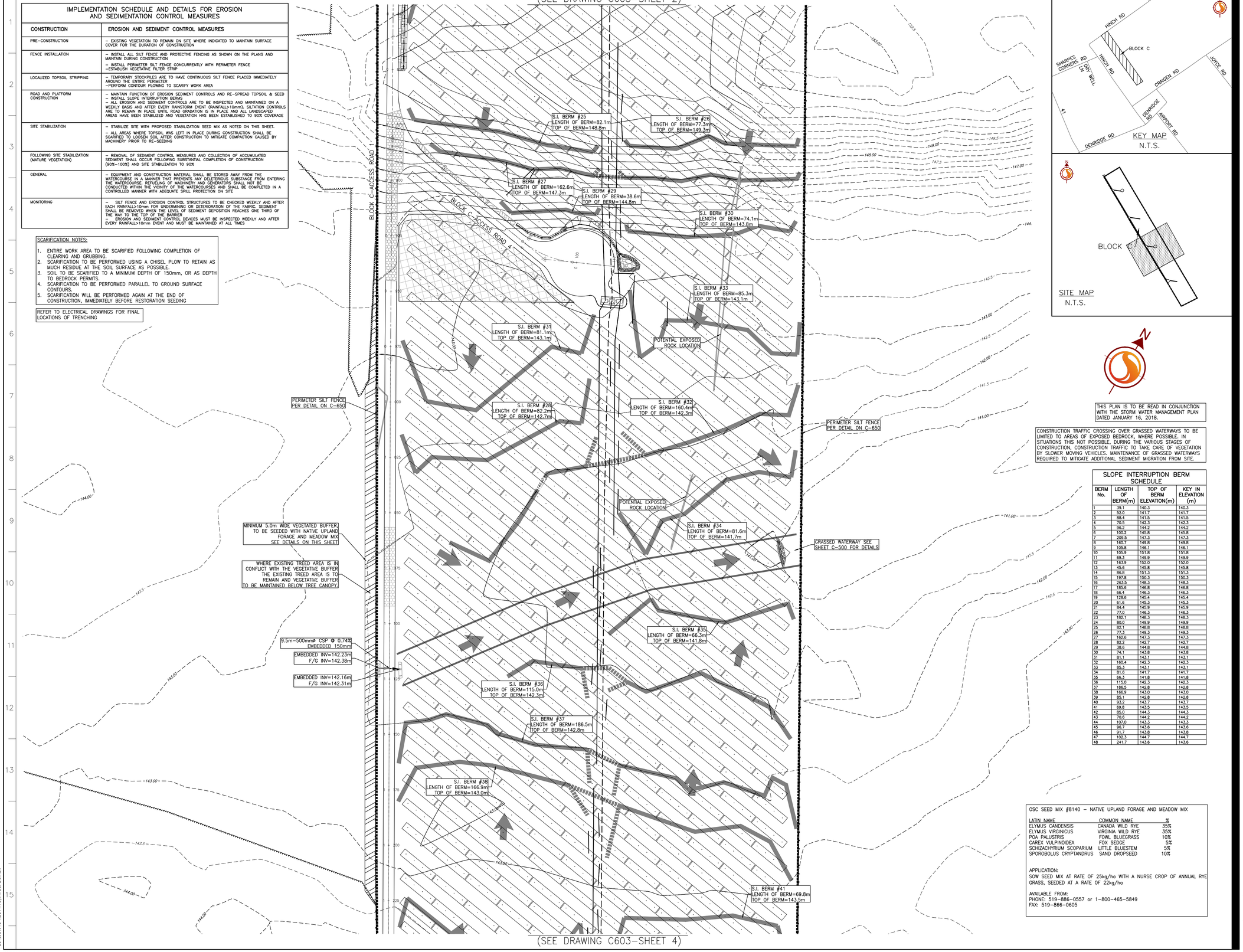
IMPLEMENTATION SCHEDULE AND DETAILS FOR EROSION AND SEDIMENTATION CONTROL MEASURES

CONSTRUCTION	EROSION AND SEDIMENT CONTROL MEASURES
PRE-CONSTRUCTION	– EXISTING VEGETATION TO REMAIN ON SITE WHERE INDICATED TO MAINTAIN SURFACE COVER FOR THE DURATION OF CONSTRUCTION
FENCE INSTALLATION	– INSTALL ALL SILT FENCE AND PROTECTIVE FENCING AS SHOWN ON THE PLANS AND MAINTAIN DURING CONSTRUCTION – INSTALL PERIMETER SILT FENCE CONCURRENTLY WITH PERIMETER FENCE –ESTABLISH VEGETATIVE FILTER STRIP
LOCALIZED TOPSOIL STRIPPING	– TEMPORARY STOCKPILES ARE TO HAVE CONTINUOUS SILT FENCE PLACED IMMEDIATELY AROUND THE ENTIRE PERIMETER –PERFORM CONTOUR PLOWING TO SCARIFY WORK AREA
ROAD AND PLATFORM CONSTRUCTION	– MAINTAIN FUNCTION OF EROSION SEDIMENT CONTROLS AND RE-SPREAD TOPSOIL & SEED – INSTALL SLOPE INTERRUPTION BERMS – ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSPECTED AND MAINTAINED ON A WEEKLY BASIS AND AFTER EVERY RAINSTORM EVENT (RAINFALL>10mm). SILTATION CONTROLS ARE TO REMAIN IN PLACE UNTIL ROAD GRADATION IS IN PLACE AND ALL LANDSCAPED AREAS HAVE BEEN STABILIZED AND VEGETATION HAS BEEN ESTABLISHED TO 90% COVERAGE
SITE STABILIZATION	– STABILIZE SITE WITH PROPOSED STABILIZATION SEED MIX AS NOTED ON THIS SHEET. – ALL AREAS WHERE TOPSOIL WAS LEFT IN PLACE DURING CONSTRUCTION SHALL BE SCARIFIED TO LOOSEN SOIL AFTER CONSTRUCTION TO MITIGATE COMPACTION CAUSED BY MACHINERY PRIOR TO RE-SEEDING
FOLLOWING SITE STABILIZATION (MATURE VEGETATION)	– REMOVAL OF SEDIMENT CONTROL MEASURES AND COLLECTION OF ACCUMULATED SEDIMENT SHALL OCCUR FOLLOWING SUBSTANTIAL COMPLETION OF CONSTRUCTION (90%-100%) AND SITE STABILIZATION TO 90%
GENERAL	– EQUIPMENT AND CONSTRUCTION MATERIAL SHALL BE STORED AWAY FROM THE WATERCOURSE IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THE WATERCOURSE. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN THE VICINITY OF THE WATERCOURSES AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE
MONITORING	– SILT FENCE AND EROSION CONTROL STRUCTURES TO BE CHECKED WEEKLY AND AFTER EACH RAINFALL>10mm FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES ONE THIRD OF THE WAY TO THE TOP OF THE BARRIER – EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSPECTED WEEKLY AND AFTER EVERY RAINFALL>10mm EVENT AND MUST BE MAINTAINED AT ALL TIMES

SCARIFICATION NOTES:

1. ENTIRE WORK AREA TO BE SCARIFIED FOLLOWING COMPLETION OF CLEARING AND GRUBBING.
2. SCARIFICATION TO BE PERFORMED USING A CHISEL PLOW TO RETAIN AS MUCH RESIDUE AT THE SOIL SURFACE AS POSSIBLE.
3. SOIL TO BE SCARIFIED TO A MINIMUM DEPTH OF 150mm, OR AS DEPTH TO BEDROCK PERMITS.
4. SCARIFICATION TO BE PERFORMED PARALLEL TO GROUND SURFACE CONTOURS.
5. SCARIFICATION WILL BE PERFORMED AGAIN AT THE END OF CONSTRUCTION, IMMEDIATELY BEFORE RESTORATION SEEDING

REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS OF TRENCHING



THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE STORM WATER MANAGEMENT PLAN DATED JANUARY 16, 2018.

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS NOT POSSIBLE, DURING THE VARIOUS STAGES OF CONSTRUCTION, CONSTRUCTION TRAFFIC TO TAKE CARE OF VEGETATION BY SLOWER MOVING VEHICLES. MAINTENANCE OF GRASSED WATERWAYS REQUIRED TO MITIGATE ADDITIONAL SEDIMENT MIGRATION FROM SITE.

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	39.1	140.3	140.3
2	52.0	141.7	141.7
3	88.4	141.5	141.5
4	70.5	142.3	142.3
5	96.2	144.2	144.2
6	100.2	145.8	145.8
7	209.5	147.3	147.3
8	160.7	149.8	149.8
9	105.8	146.1	146.1
10	105.9	151.8	151.8
11	69.3	149.9	149.9
12	163.9	152.0	152.0
13	45.6	145.8	145.8
14	86.8	151.3	151.3
15	197.8	150.3	150.3
16	263.5	148.3	148.3
17	185.6	146.8	146.8
18	66.4	146.3	146.3
19	128.6	145.4	145.4
20	61.6	145.3	145.3
21	84.4	145.9	145.9
22	77.0	146.3	146.3
23	182.1	148.3	148.3
24	80.0	149.9	149.9
25	82.1	148.8	148.8
26	77.3	149.3	149.3
27	162.6	147.3	147.3
28	82.2	142.7	142.7
29	38.6	144.8	144.8
30	74.1	143.8	143.8
31	81.1	143.1	143.1
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35	66.3	141.8	141.8
36	115.0	142.3	142.3
37	186.5	142.8	142.8
38	166.9	143.0	143.0
39	85.1	142.8	142.8
40	93.2	143.7	143.7
41	69.8	143.5	143.5
42	85.0	144.3	144.3
43	70.6	144.2	144.2
44	107.0	143.3	143.3
45	96.7	143.6	143.6
46	91.7	143.8	143.8
47	102.3	144.7	144.7
48	241.7	143.6	143.6

OSC SEED MIX #8140 – NATIVE UPLAND FORAGE AND MEADOW MIX

LATIN NAME	COMMON NAME	%
ELYMUS CANDENSIS	CANADA WILD RYE	35%
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	35%
POA PALUSTRIS	FOWL BLUEGRASS	10%
CAREX VULPINOIDEA	FOX SEDGE	5%
SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	5%
SPOROBOLUS CRYPTANDRUS	SAND DROPSEED	10%

APPLICATION:
SOW SEED MIX AT RATE OF 25kg/ha WITH A NURSE CROP OF ANNUAL RYE GRASS, SEEDED AT A RATE OF 22kg/ha

AVAILABLE FROM:
PHONE: 519-886-0557 or 1-800-465-5849
FAX: 519-866-0605

Stantec

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7. THE CONTRACTOR IS TO BE RESPONSIBLE FOR ALL DRAINAGE AND MEASURES TO CONTROL WATER. THE SITE IS TO BE FINE GRADED/LEVELED LEAVING THE SITE IN A NEAT APPEARANCE SUCH THAT POSITIVE DRAINAGE IS ACHIEVED EVERYWHERE PRIOR TO THE INSTALLATION OF SOLAR PANELS.
8. CONSTRUCTION TURNING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
9. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
10. ALL AREAS WITHIN THE PROPOSED WORKS ARE TO BE RE-VEGETATED USING NATIVE TOPSOIL AND SEED. MIX AND APPLICATION RATE/METHOD TO BE SUBMITTED AND APPROVED BY OWNER PRIOR TO IMPLEMENTATION.
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13. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
14. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
15. ALL SEEDING TO BE COMPLETE IN ACCORDANCE WITH OPSS 804.
16. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED	EXISTING
PROPERTY LINE	
FENCE	
TOPOGRAPHIC SURVEY CONTOUR	295.5
LIDAR CONTOUR	295.5

- PERIMETER FENCE SILT FENCE (SEE DETAILS ON SHEET C-650)
- TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK
- CULVERT
- ROCK CHECK DAMS (SEE DETAILS ON SHEET C-650)
- OVERLAND FLOW DIRECTION
- SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET 1 C-604)
- 5.0M WIDE VEGETATIVE BUFFER
- AC CABLE TRENCH
- DC CABLE TRENCH
- POTENTIAL ROCK OUTCROP LOCATIONS
- 10m SETBACK LIMIT NO TOUCH ZONE
- HARDENED SURFACE
- GRASSED WATERWAY (SEE DETAILS ON SHEET C-500 FOR DETAILS)

B	ISSUED FOR TENDER	DRR	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	DRR	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-EC-BLOCK_D.dwg	DRR	DS	DRR	17.11.08
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK C
SEDIMENTATION AND EROSION CONTROL PLAN

Project No.	Scale	Drawing No.	Sheet	Revision
133560220	1:750 (0, 7.5, 22.5, 37.5m)	C-603	3 of 4	B

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2018/01/16 4:26 PM By: Reid, Derrick

ORIGINAL SHEET - ARCH D

(SEE DRAWING C603-SHEET 3)

BLOCK C-ACCESS ROAD 1

S.I. BERM #40
LENGTH OF BERM=93.2m
TOP OF BERM=143.7m

S.I. BERM #42
LENGTH OF BERM=85.0m
TOP OF BERM=144.3m

S.I. BERM #43
LENGTH OF BERM=70.6m
TOP OF BERM=144.2m

S.I. BERM #44
LENGTH OF BERM=107.0m
TOP OF BERM=143.3m

S.I. BERM #45
LENGTH OF BERM=96.7m
TOP OF BERM=143.6m

S.I. BERM #46
LENGTH OF BERM=91.7m
TOP OF BERM=143.8m

S.I. BERM #48
LENGTH OF BERM=241.7m
TOP OF BERM=143.6m

PERIMETER SILT FENCE PER DETAIL ON C-650

PERIMETER SILT FENCE PER DETAIL ON C-650

WHERE EXISTING TREED AREA IS IN CONFLICT WITH THE VEGETATIVE BUFFER THE EXISTING TREED AREA IS TO REMAIN AND VEGETATIVE BUFFER TO BE MAINTAINED BELOW TREE CANOPY.

MINIMUM 5.0m WIDE VEGETATED BUFFER, TO BE SEEDED WITH NATIVE UPLAND FORAGE AND MEADOW MIX SEE DETAILS ON THIS SHEET

10m WETLAND LIMIT NO TOUCH ZONE

WETLANDS LIMIT

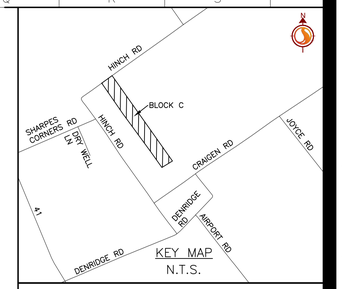
REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS OF TRENCHING

SCARIFICATION NOTES:

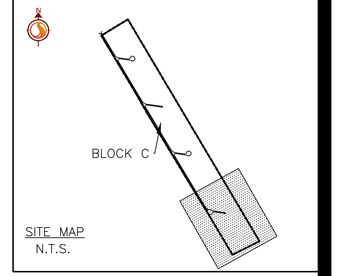
1. ENTIRE WORK AREA TO BE SCARIFIED FOLLOWING COMPLETION OF CLEARING AND GRUBBING.
2. SCARIFICATION TO BE PERFORMED USING A CHISEL PLOW TO RETAIN AS MUCH RESIDUE AT THE SOIL SURFACE AS POSSIBLE.
3. SOIL TO BE SCARIFIED TO A MINIMUM DEPTH OF 150mm, OR AS DEPTH TO BEDROCK PERMITS.
4. SCARIFICATION TO BE PERFORMED PARALLEL TO GROUND SURFACE CONTOURS.
5. SCARIFICATION WILL BE PERFORMED AGAIN AT THE END OF CONSTRUCTION, IMMEDIATELY BEFORE RESTORATION SEEDING

IMPLEMENTATION SCHEDULE AND DETAILS FOR EROSION AND SEDIMENTATION CONTROL MEASURES

CONSTRUCTION	EROSION AND SEDIMENT CONTROL MEASURES
PRE-CONSTRUCTION	– EXISTING VEGETATION TO REMAIN ON SITE WHERE INDICATED TO MAINTAIN SURFACE COVER FOR THE DURATION OF CONSTRUCTION
FENCE INSTALLATION	– INSTALL ALL SILT FENCE AND PROTECTIVE FENCING AS SHOWN ON THE PLANS AND MAINTAIN DURING CONSTRUCTION – INSTALL PERIMETER SILT FENCE CONCURRENTLY WITH PERIMETER FENCE –ESTABLISH VEGETATIVE FILTER STRIP
LOCALIZED TOPSOIL STRIPPING	– TEMPORARY STOCKPILES ARE TO HAVE CONTINUOUS SILT FENCE PLACED IMMEDIATELY AROUND THE ENTIRE PERIMETER –PERFORM CONTOUR PLOWING TO SCARIFY WORK AREA
ROAD AND PLATFORM CONSTRUCTION	– MAINTAIN FUNCTION OF EROSION SEDIMENT CONTROLS AND RE-SPREAD TOPSOIL & SEED – INSTALL SLOPE INTERRUPTION BERMS – ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSPECTED AND MAINTAINED ON A WEEKLY BASIS AND AFTER EVERY RAINSTORM EVENT (RAINFALL>10mm). SILTATION CONTROLS ARE TO REMAIN IN PLACE UNTIL ROAD GRADATION IS IN PLACE AND ALL LANDSCAPED AREAS HAVE BEEN STABILIZED AND VEGETATION HAS BEEN ESTABLISHED TO 90% COVERAGE
SITE STABILIZATION	– STABILIZE SITE WITH PROPOSED STABILIZATION SEED MIX AS NOTED ON THIS SHEET. – ALL AREAS WHERE TOPSOIL WAS LEFT IN PLACE DURING CONSTRUCTION SHALL BE SCARIFIED TO LOOSEN SOIL AFTER CONSTRUCTION TO MITIGATE COMPACTION CAUSED BY MACHINERY PRIOR TO RE-SEEDING
FOLLOWING SITE STABILIZATION (MATURE VEGETATION)	– REMOVAL OF SEDIMENT CONTROL MEASURES AND COLLECTION OF ACCUMULATED SEDIMENT SHALL OCCUR FOLLOWING SUBSTANTIAL COMPLETION OF CONSTRUCTION (90%-100%) AND SITE STABILIZATION TO 90%
GENERAL	– EQUIPMENT AND CONSTRUCTION MATERIAL SHALL BE STORED AWAY FROM THE WATERCOURSE IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THE WATERCOURSE. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN THE VICINITY OF THE WATERCOURSES AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE
MONITORING	– SILT FENCE AND EROSION CONTROL STRUCTURES TO BE CHECKED WEEKLY AND AFTER EACH RAINFALL>10mm FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES ONE THIRD OF THE WAY TO THE TOP OF THE BARRIER – EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSPECTED WEEKLY AND AFTER EVERY RAINFALL>10mm EVENT AND MUST BE MAINTAINED AT ALL TIMES



KEY MAP
N.T.S.



SITE MAP
N.T.S.

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE STORM WATER MANAGEMENT PLAN DATED JANUARY 16, 2018.

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS NOT POSSIBLE, DURING THE VARIOUS STAGES OF CONSTRUCTION, CONSTRUCTION TRAFFIC TO TAKE CARE OF VEGETATION BY SLOWER MOVING VEHICLES. MAINTENANCE OF GRASSED WATERWAYS REQUIRED TO MITIGATE ADDITIONAL SEDIMENT MIGRATION FROM SITE.

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	39.1	140.3	140.3
2	52.0	141.7	141.7
3	88.4	141.5	141.5
4	70.5	142.3	142.3
5	96.2	144.2	144.2
6	100.2	145.8	145.8
7	209.5	147.3	147.3
8	160.7	149.8	149.8
9	105.8	146.1	146.1
10	105.9	151.8	151.8
11	69.3	149.9	149.9
12	163.9	152.0	152.0
13	45.6	145.8	145.8
14	86.8	151.3	151.3
15	197.8	150.3	150.3
16	263.5	148.3	148.3
17	185.6	146.8	146.8
18	66.4	146.3	146.3
19	128.6	145.4	145.4
20	61.6	145.3	145.3
21	84.4	145.9	145.9
22	77.0	146.3	146.3
23	182.1	148.3	148.3
24	80.0	149.9	149.9
25	82.1	148.8	148.8
26	77.3	149.3	149.3
27	162.6	147.3	147.3
28	82.2	142.7	142.7
29	38.6	144.8	144.8
30	74.1	143.8	143.8
31	81.1	143.1	143.1
32	160.4	142.3	142.3
33	85.3	143.1	143.1
34	81.6	141.7	141.7
35	66.3	141.8	141.8
36	115.0	142.3	142.3
37	186.5	142.8	142.8
38	166.9	143.0	143.0
39	85.1	142.8	142.8
40	93.2	143.7	143.7
41	69.8	143.5	143.5
42	85.0	144.3	144.3
43	70.6	144.2	144.2
44	107.0	143.3	143.3
45	96.7	143.6	143.6
46	91.7	143.8	143.8
47	102.3	144.7	144.7
48	241.7	143.6	143.6

OSC SEED MIX #8140 – NATIVE UPLAND FORAGE AND MEADOW MIX

LATIN NAME	COMMON NAME	%
ELYMUS CANDENSIS	CANADA WILD RYE	35%
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	35%
POA PALUSTRIS	FOWL BLUEGRASS	10%
CAREX VULPINOIDEA	FOX SEDGE	5%
SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	5%
SPOROBOLUS CRYPTANDRUS	SAND DROPSEED	10%

APPLICATION:
SOW SEED MIX AT RATE OF 25kg/ha WITH A NURSE CROP OF ANNUAL RYE GRASS, SEEDED AT A RATE OF 22kg/ha

AVAILABLE FROM:
PHONE: 519-886-0557 or 1-800-465-5849
FAX: 519-886-0605

Stantec

Stantec Consulting Ltd.
300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

PCL CONSTRUCTION LEADERS

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Notes

1. TOPOGRAPHIC INFORMATION CONDUCTED BY LESLIE M. HIGGINSON SURVEYING Ltd. RECEIVED OCTOBER 25, 2017. TOPOGRAPHIC SURVEY IS UTM 18. LIDAR INFORMATION CONDUCTED BY TULLOCH ENGINEERING ON JUNE 27, 2016. LIDAR SURVEY IS UTM 18. BEDROCK SURVEY INFORMATION PROVIDED BY PCL CONSTRUCTORS LTD. RECEIVED ON OCTOBER 31, 2017.EXISTING VEGETATION INFORMATION IS APPROXIMATE, PROVIDED FROM AERIAL IMAGERY, CONTRACTOR TO CONFIRM ALL TREE & SHRUB LOCATIONS ON SITE.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THIS SET PREPARED BY STANTEC CONSULTING LTD.
3. THE CONTRACTOR MUST CHECK AND VERIFY DIMENSIONS; OBTAIN ALL UTILITY LOCATES AND OBTAIN ALL REQUIRED PERMITS/LICENSES AND VERIFY ELEVATIONS OF EXISTING SERVICES BEFORE PROCEEDING WITH ANY WORK.
4. ALL CONSTRUCTION WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS (LATEST EDITION).
5. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR HIS/HER REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, HE/SHE MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO THE OWNER AND CONTRACTOR AND A COPY IS TO BE KEPT ON FILE ON SITE PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNERS OWN RISK.
6. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY.
7. THE CONTRACTOR IS TO BE RESPONSIBLE FOR ALL DRAINAGE AND MEASURES TO CONTROL WATER. THE SITE IS TO BE FINE GRADED/LEVELED LEAVING THE SITE IN A NEAT APPEARANCE SUCH THAT POSITIVE DRAINAGE IS ACHIEVED EVERYWHERE PRIOR TO THE INSTALLATION OF SOLAR PANELS.
8. CONSTRUCTION TURNING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
9. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
10. ALL AREAS WITHIN THE PROPOSED WORKS ARE TO BE RE-VEGETATED USING NATIVE TOPSOIL AND SEED. MIX AND APPLICATION RATE/METHOD TO BE SUBMITTED AND APPROVED BY OWNER PRIOR TO IMPLEMENTATION.
11. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
12. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
13. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
14. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
15. ALL SEEDING TO BE COMPLETE IN ACCORDANCE WITH OPSS 804.
16. ROCK SPOIL FROM PILE INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED	EXISTING
PROPERTY LINE	
FENCE	
TOPOGRAPHIC SURVEY CONTOUR	295.5
LIDAR CONTOUR	295.5
PERIMETER FENCE SILT FENCE (SEE DETAILS ON SHEET C-650)	
TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK	
CULVERT	
ROCK CHECK DAMS (SEE DETAILS ON SHEET C-650)	
OVERLAND FLOW DIRECTION	
SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET 1 C-604)	
5.0M WIDE VEGETATIVE BUFFER	
AC CABLE TRENCH	
DC CABLE TRENCH	
POTENTIAL ROCK OUTCROP LOCATIONS	
10m SETBACK LIMIT NO TOUCH ZONE	
HARDENED SURFACE	
GRASSED WATERWAY (SEE DETAILS ON SHEET C-500 FOR DETAILS)	

Revision	By	Appd.	YY.MM.DD
B ISSUED FOR TENDER	DRR	DS	18.01.16
A ISSUED FOR REVIEW	DRR	DS	17.12.21

File Name: 133560220_C-EC-BLOCK_D.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	DRR	DS	DRR	17.11.08

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK C
SEDIMENTATION AND EROSION CONTROL PLAN

Project No. 133560220

Scale 1:750 (0, 7.5, 22.5, 37.5m)

Drawing No. C-603

Sheet 4 of 4

Revision B

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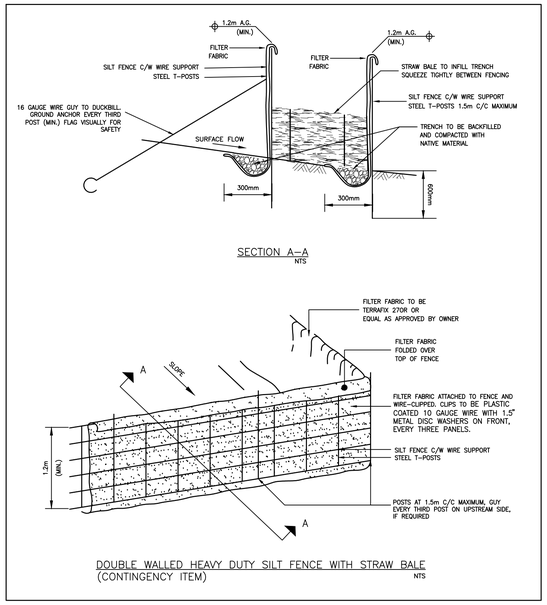
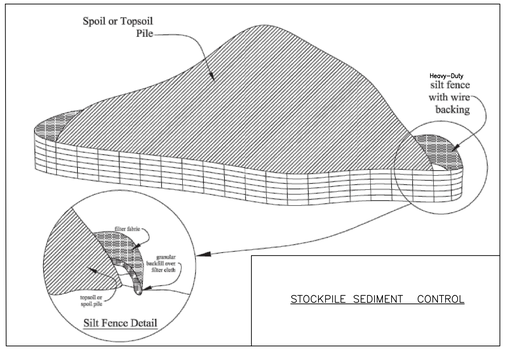
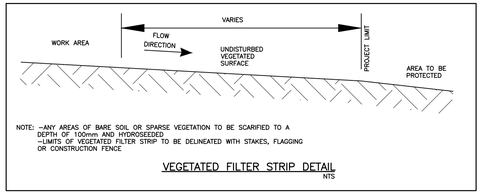
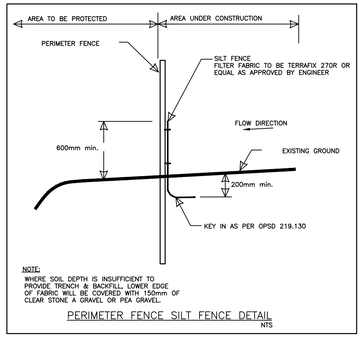
2018/01/16 4:28 PM By: Rob Sennick

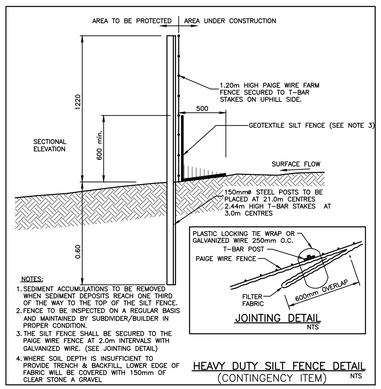
ORIGINAL SHEET - ARCH D

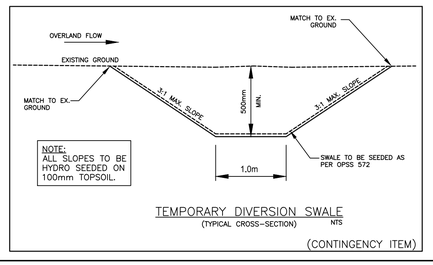


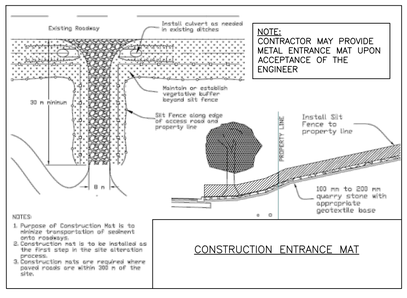












EROSION AND SEDIMENT CONTROL NOTES:
(SEE DETAILS THIS SHEET)

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT AND DURATION OF EXPOSED SOIL AND INSTALLING SILT FENCES AND OTHER SEDIMENT TRAPS/FILTERS SIMILAR TO THOSE ILLUSTRATED HEREIN.
2. EROSION AND SEDIMENT CONTROL WORKS SHALL BE INSTALLED AND IN WORKING CONDITION PRIOR TO COMMENCEMENT OF CONSTRUCTION RELATED ACITVITIES.
3. SEDIMENT CONTROL MEASURES ADJACENT TO CONSTRUCTION AREAS MAY REQUIRE REMOVAL / RELOCATION IN ORDER TO COMPLETE SPECIFIC CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL ENSURE THAT ADEQUATE SEDIMENT CONTROL MEASURES ARE IN PLACE AT ALL TIMES.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN AND BOLSTER EROSION AND SEDIMENT CONTROL MEASURES AS NECESSARY TO KEEP THEM EFFECTIVE AND MINIMIZE THE POTENTIAL FOR EROSION AND MIGRATION OF SEDIMENT TO THE DOWNSTREAM NATURAL ENVIRONMENT
5. AT THE DISCRETION OF THE OWNER OR OWNER'S CONSULTANT, ADDITIONAL SILT CONTROL DEVICES SHALL BE INSTALLED AT DESIGNATED LOCATIONS.
6. STOCKPILED MATERIAL IS TO BE STORED AWAY FROM WATER BODIES, WETLANDS AND OTHER SENSITIVE RECEIVERS IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THAT FEATURE AND BE SURROUNDED BY EROSION CONTROL MEASURE WHERE MATERIAL IS TO BE LEFT IN PLACE IN EXCESS OF 10 DAYS OR PRIOR TO A RAIN EVENT, WHICHEVER OCCURS SOONER.
7. SEDIMENT THAT IS ACCUMULATED BY THE TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED IN A MANNER THAT AVOIDS ESCAPE OF THE SEDIMENT TO THE DOWNSTREAM SIDE OF THE CONTROL MEASURE AND AVOIDS DAMAGE TO THE CONTROL MEASURE. ALL SEDIMENT SHALL BE REMOVED AND TOPSOIL WITH SEED TO BE ADDED IF NECESSARY.
8. ACCUMULATED SEDIMENT IS TO BE REMOVED AND DISPOSED OF AS PER OPSS 180, PRIOR TO THE REMOVAL OF ANY CONTROL MEASURE.
9. SILT FENCE AND EROSION CONTROL STRUCTURES TO BE CHECKED DAILY AND AFTER EACH RAINFALL (>10mm) BY A QUALIFIED INSPECTOR FOR DEFICIENCIES. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES ONE THIRD OF THE WAY TO THE TOP OF THE BARRIER.
10. STOCKPILED MATERIAL IS TO BE STORED A SUFFICIENT DISTANCE FROM WATERCOURSES, TO PRECLUDE SEDIMENT INPUTS DUE TO EROSION OF STORED SOIL MATERIALS. WHERE STOCKPILED EXCAVATED NATIVE MATERIALS AND IMPORTED MATERIALS WITH A D50 LESS THAN 4.75mm ARE TO BE LEFT IN PLACE UNDISTURBED IN EXCESS OF 30 DAYS, STOCKPILES ARE TO BE COVERED WITH A ROLLED EROSION CONTROL PRODUCT (RECP) SUCH AS A TARP, SINGLE NET STRAW MAT OR DOUBLE NET STRAW MAT. IMPORTED MATERIALS WITH A D50 OF 4.75mm OR GREATER CAN REMAIN UNCOVERED. GRANULAR A AND B (TYPE II) GRADATION REQUIREMENTS ALLOW UP TO 55% PERCENT PASSING A 4.75mm SIEVE (#4 SIEVE), AND MAY BE STOCKPILED WITHOUT COVERING WITH AN RECP.
11. EROSION AND SEDIMENT CONTROL MONITORING RECORDS SHALL BE KEPT AND MADE AVAILABLE TO THE MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE AND QUINTE CONSERVATION UPON REQUEST.
12. IN THE EVENT OF INCLEMENT WEATHER OR UNFAVOURABLE TERRAIN FOR CONSTRUCTION, CONSTRUCTION BEST PRACTICES, SUCH AS TEMPORARY RIP-MATS MAY BE USED TO PREVENT DISRUPTION OF SURFACE SOILS AND VEGETATIVE COVER BY CONSTRUCTION VEHICLES AND EQUIPMENT.
13. EQUIPMENT AND CONSTRUCTION MATERIAL SHALL BE STORED AWAY FROM WATER BODIES IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THE WATER, REFUELLING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN 30m OF A WATER BODY OR WETLAND AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE.
14. ADDITIONAL CONTROLS MAY BE REQUIRED DUE TO UNFORESEEN CIRCUMSTANCES, CHANGING SITE CONDITIONS OR IF THE PROPOSED CONTROLS DO NOT ACHIEVE THEIR ANTICIPATED RESULT. IN THESE CIRCUMSTANCES, ADDITIONAL CONTROLS WILL BE INSTALLED CONSISTENT WITH THE EROSION AND SEDIMENT CONTROL GUIDELINE FOR URBAN CONSTRUCTION (GREATER GOLDEN HORSESHOE CONSERVATION AUTHORITIES, DECEMBER, 2006). THE LOCATIONS AND APPLICATION OF THE CONTROLS WILL BE APPROVED BY THE INSPECTOR PRIOR TO THEIR INSTALLATION.
15. PUBLIC ROADS TO BE CLEANED DAILY OF ACCUMULATED SEDIMENT CAUSED BY CONSTRUCTION.
16. IN ADDITION TO BEING RESPONSIBLE FOR ENSURING THAT THE PRESCRIBED MEASURES ARE INSTITUTED AND FUNCTIONING AS INTENDED, THE CONTRACTOR IS ALSO RESPONSIBLE FOR IMPLEMENTING ANY INTERIM OR EMERGENCY MEASURES REQUIRED, TO ENSURE THAT NO SEDIMENT IS DISCHARGED TO THE NATURAL ENVIRONMENT. THE FOLLOWING EXTRA EQUIPMENT/MATERIALS ARE TO BE KEPT ON SITE AS A CONTINGENCY, IN CASE THE PROPOSED CONTROL MEASURES ARE BREACHED.
    - SILT FENCE
    - FILTER CLOTH
    - PUMPS
    - CLEAN RIP-RAP (FREE OF FINES) FOR ROCK CHECK DAMS
    - SAND BAGS
    - ANY ADDITIONAL MATERIAL DEEMED NECESSARY TO REPAIR/ CONSTRUCT PROPOSED MEASURES OR TO ADEQUATELY DEAL WITH UNEXPECTED HIGH FLOWS

DURING AREA GRADING :

1. TOPSOIL IS TO BE STRIPPED ONLY IN AREAS REQUIRING EARTHWORKS AND PLACED IN STOCKPILES AT THE LOCATIONS SHOWN ON THE PLANS OR AS APPROVED BY THE QUALIFIED ENVIRONMENTAL SITE INSPECTOR.
2. ROADWAYS AND LAY DOWN YARDS ARE TO BE PLACED ON NATIVE GROUND AFTER TOPSOIL HAS BEEN STRIPPED
3. ALL TOPSOIL IS TO BE RE-SPREAD ON CONSTRUCTION IMPACTED AREAS TO A MINIMUM DEPTH OF 150mm AFTER FINAL GRADING IS COMPLETION.
4. NO TOPSOIL MAY BE EXPORTED FROM THE SITE.
5. INFILLING OF BEDROCK FRACTURES SHALL BE MINIMIZED AND IF NECESSARY, COARSE GRANULAR FILL SHALL BE USED.

SEEDING MAINTENANCE NOTES:

1. CONTRACTOR SHALL REPAIR AND RESEED DEAD OR BARE SPOTS PRIOR TO SUBSTANTIAL COMPLETION.
2. SEEDING SHALL BE WATERED AS REQUIRED TO ESTABLISH WEED-FREE, HEALTHY ESTABLISHMENT OF SEED MIX.
3. CONTROL NOXIOUS AND INVASIVE WEED GROWTH DURING (2) YEAR MAINTENANCE PERIOD. NATIVE SPECIES THAT HAVE GERMINATED NATURALLY SHALL BE RETAINED (i.e. GOLDENRODS, ASTERS etc.) REFER TO OMAFRA's NOXIOUS WEEDS IN ONTARIO FOR A LIST OF SPECIES TO BE REMOVED
http://www.omafra.gov.on.ca/english/crops/facts/noxious_weeds.htm
4. SEEDED AREAS SHALL BE UNIFORM, FREE OF RUTS EROSION AND/OR BARE AND DEAD SPOTS, FREE OF WEEDS, AND HAVE, MINIMUM 80% COVER OF GERMINATED PERENNIAL SEED FOR FINAL ACCEPTANCE.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO SEEDED AREAS AND SHALL RESTORE IT TO ORIGINAL CONDITION TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR.
6. THE CONTRACTOR SHALL REPAIR ANY RILLS FORMED BELOW THE LOWER EDGE OF THE SOLAR PANELS PRIOR TO SEEDING.

AFTER AREA GRADING :

1. ALL AREAS WHERE ACTIVE CONSTRUCTION IS NOT EXPECTED FOR 30 DAYS SHALL BE RE-SEEDED WITH NATIVE PLANT SPECIES PER LANDSCAPE PLAN
2. REMOVAL OF SEDIMENT CONTROL MEASURES AND COLLECTION OF ACCUMULATED SEDIMENT SHALL OCCUR FOLLOWING SUBSTANTIAL COMPLETION OF CONSTRUCTION (90%–100%) AND SITE STABILIZATION TO 90%

SILT FENCE NOTES (AS PER OPSD):

1. STAKES/POSTS ARE TO BE INSTALLED ON THE DOWNSTREAM SIDE OF THE BARRIER.
2. SILT FENCE FABRIC TO BE TERRAFIX 270R OR EQUIVALENT.
3. CONTRACTOR TO MONITOR SILT FENCE FOR UV DEGRADATION AND UNDERMINING
4. PAIGE WIRE TO BE 16 GAUGE OR HEAVIER

ROLLED EROSION CONTROL PRODUCT (RECP) NOTES:

1. EITHER ROLLED EROSION CONTROL PRODUCTS (RECP) OR MULCHMAX ULTRA AT 500KG/HA ARE TO BE USED ON 3:1 SLOPES OR GREATER.
2. RECP SHALL BE BIODEGRADABLE AND CONSIST OF STRAW, STRAW–COCONUT, OR COCONUT FIBER WHICH ARE HELD IN PLACE BY NETTING SEWN ON BOTH SIDES OF THE MATERIAL.
3. RECP MUST BE SECURED ON STOCKPILE BY STAPLING AT THE BOTTOM OF THE SLOPE AND UPHILL TRENCHES ON THE STOCKPILE/SLOPED SURFACE.
4. RECP PRODUCTS ARE TO BE INSTALLED PER MANUFACTURER SPECIFICATIONS. INSTALLATION TO BE INSPECTED AND REPAIRED AS NEEDED.
5. RECP ARE TO BE APPLIED AS SOON AS POSSIBLE FOLLOWING GRADING AND SEEDING OF SUBJECT AREAS.
6. SURFACES ARE TO BE SMOOTH AND FREE OF STONES AND DEBRIS OR OTHER WEED CLUMPS PRIOR TO RECP BEING INSTALLED.
7. CONTRACTOR TO ENSURE THAT RECP IS SECURED AT THE TOP OF THE SLOPE IN A TRENCH AND OVERLAP (SIDE TO SIDE AND BOTTOM TO TOP)
8. CONTRACTOR TO INSPECT THE SITE DAILY AND AFTER EVERY SIGNIFICANT RAINFALL EVENT (>10mm) AND IDENTIFY AREAS OF EROSION OR POTENTIAL EROSION. BEST MANAGEMENT PRACTICES ARE TO BE USED TO CONTROL THE EROSION. METHODS OF CONTROL MAY INCLUDE THE USE OF EROSION CONTROL BLANKETS C/W SEEDING, HYDRAULIC MULCH OR STRAW MULCH, OR SOIL BINDER. SOILS ARE TO BE STABILIZED AS SOON AS AREAS ARE IDENTIFIED TO PREVENT FURTHER EROSION.
9. CONTRACTORS TO ENSURE THAT RILLING/GULLYING RECTIFIED PRIOR TO RECP OR MULCHMAX ULTRA INSTALLATION OR CONTRACTOR TO MONITOR RUNOFF UNDER THE RECP FOLLOWING INSTALLATION.

HYDRAULIC MULCH NOTES:

1. COORDINATE/CONSULT WITH OWNER PRIOR TO UTILIZING ANY HYDRAULIC MULCH. TIMELINES AND SEEDING METHODS NEED TO BE CAREFULLY CONSIDERED PRIOR TO IMPLEMENTATION.
2. ENSURE THAT A TACKIFIER IS USED TO KEEP PRODUCT IN PLACE.
3. APPLY SEED MIX PRIOR TO MULCH WITH TACKIFIER.
4. HYDRAULIC MULCH IS TO BE APPLIED AS SOON AS GRADING AND SEEDING WORK IS COMPLETE TO ENSURE STABILIZATION OF SOILS.
5. RE–APPLY HYDRAULIC MULCH IF THE SUBJECT AREA IS DAMAGED OR ERODED BY WIND OR WATER, SURFACE COVERAGE MUST BE AT LEAST 80% AT ALL TIMES.

CULVERT NOTES:

1. CULVERT SLOPE TO MATCH EXISTING DITCH GRADE UNLESS OTHERWISE NOTED.
2. CULVERT TO BE EMBEDDED 10% OF PIPE DIAMETER BELOW DITCH INVERT OR AS NOTED.
3. CULVERTS TO BE CORRUGATED STEEL PIPE (CSP). PIPE MATERIAL TO BE GALVANIZED STEEL AND HAVE A 68mm x 13mm CORRUGATION WITH 1.6mm METAL THICKNESS.
4. CULVERT TO BE INSTALLED IN ACCORDANCE WITH OPSD 802.010.
5. CULVERT ELEVATIONS ARE APPROXIMATE AND ARE TO BE FINALIZED IN THE FIELD.

SCARIFICATION NOTES:

1. ENTIRE WORK AREA TO BE SCARIFIED FOLLOWING COMPLETION OF CLEARING AND GRUBBING.
2. SCARIFICATION TO BE PERFORMED USING A CHISEL PLOW TO RETAIN AS MUCH RESIDUE AT THE SOIL SURFACE AS POSSIBLE.
3. SOIL TO BE SCARIFIED TO A MINIMUM DEPTH OF 150mm, OR AS DEPTH TO BEDROCK PERMITS.
4. SCARIFICATION TO BE PERFORMED PARALLEL TO GROUND SURFACE CONTOURS.
5. SCARIFICATION TO BE PREFORMED AGAIN AT THE END OF CONSTRUCTION, IMMEDIATELY BEFORE RESTORATION SEEDING.

CONTINGENCY MEASURES WHERE FAILURE RISK IS HIGH:

1. WHERE MONITORING HAS IDENTIFIED A HIGH POTENTIAL FOR FAILURE, THE CONTRACTOR SHALL IMMEDIATELY TAKE STEPS TO REDUCE THE RISK. STEPS MAY INCLUDE REPAIRS TO EXISTING MEASURES, MODIFICATIONS TO EXISTING MEASURES, AND THE ADDITION OF NEW MEASURES.
2. WHEN THE LOCAL WEATHER FORECAST INDICATES THAT SIGNIFICANT (I.E >10mm) RAINFALL IS EXPECTED WITHIN 24 HOURS, THE CONTRACTOR SHALL VERIFY ALL EROSION AND SEDIMENT CONTROL MEASURES ARE SECURE.

CONTINGENCY MEASURES IN CASE OF FAILURE:

1. THE CONTRACTOR WILL CEASE CONSTRUCTION RELATED WORK AND FOCUS ON EROSION AND SEDIMENT CONTROL REPAIRS TO EFFECTIVELY STABILIZE THE SITE WHERE A FAILURE HAS OCCURRED OR IS IMMINENT.
2. ALL SPILLS SHALL BE REPORTED TO THE ENVIRONMENTAL MONITOR FOR ASSESSMENT AND DOCUMENTATION, AND TO ESTABLISH A REMEDIAL PLAN BASED ON THE PROJECT-SPECIFIC SPILL RESPONSE PLAN. BASED ON THE ASSESSMENT OF THE EXTENT OF THE IMPACT, THE ENVIRONMENTAL MONITOR SHALL DETERMINE IF THE MOECC SPILLS ACTION CENTRE SHOULD BE NOTIFIED. SHOULD THE INCIDENT REQUIRE THAT THE SPILLS ACTION CENTRE BE NOTIFIED, THIS NOTIFICATION WILL BE UNDERTAKEN AS QUICKLY AS POSSIBLE BY CALLING 1–800–268–6060.
3. IF SIGNIFICANT LONG-TERM DAMAGE TO DOWNSTREAM FISH HABITAT OR PROPERTY IS SUSPECTED, THE ENVIRONMENTAL MONITOR WILL IMMEDIATELY ASSESS AND DOCUMENT THE SITUATION AND REPORT THE INCIDENT TO THE MOECC SPILLS ACTION CENTRE. THE CONTRACTOR WILL DEVELOP A RESTORATION PLAN IN CONSULTATION WITH MOECC. DEVELOPMENT OF THE INITIAL RESTORATION PLAN WILL BEGIN WITHIN 24 HOURS OF THE DISCOVERY OF SEDIMENT DISCHARGE, AND WILL BE IMPLEMENTED AS SOON AS POSSIBLE, FOLLOWING CONSULTATION AND APPROVAL FROM THE MOECC, QC, DFO (IF NECESSARY) AND THE TOWNSHIP OF STONE MILLS
4. THE RESTORATION PLAN WILL ADDRESS:
    - REMOVAL AND DISPOSAL OF SEDIMENT FROM OUTSIDE THE WORK LIMITS,
    - RESTORATION OF THE AFFECTED AREA, AND
    - RESTORATION OF ANY AREAS DISTURBED THROUGH DEPOSITION OR REMOVAL.

Stantec

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PCL
CONSTRUCTION LEADERS

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Notes

Revision		By	Appd.	YY.MM.DD
G.	ISSUED FOR TENDER	DRR	DS	18.01.16
F.	REVISED NOTES AND DETAILS	DRR	DS	17.12.21
E.	UPDATED DETAILS	MALM	DS	17.12.15
D.	UPDATED ESC NOTES	DRR	DS	17.11.30
C.	UPDATED ESC NOTES	DRR	DS	17.11.23
B.	ISSUED FOR TENDER	DRR	DS	17.11.21
A.	ISSUED FOR CLIENT REVIEW	DRR	DS	17.10.30

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	DRR	DS	DRR	17.10.18

Permit-Seal

Client/Project

LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title

SEDIMENTATION AND EROSION CONTROLS DETAILS

Project No.	Scale	
133560220	AS NOTED	
Drawing No.	Sheet	Revision
C-650	1 of 1	G

ORIGINAL SHEET - ARCH D