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

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January 16, 2018

Revision	Description	Author		Quality Check		Independent Review	
1	Draft to Client	BW	12/20/2017	NE	12/21/17		
2	Final	BW	1/11/2018	NE	1/12/18	SB	1/16/18

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Table of Contents

1.0 INTRODUCTION 1.1
1.1 STUDY APPROACH 1.1
1.2 BACKGROUND INFORMATION 1.3
1.3 STORMWATER MANAGEMENT CRITERIA 1.4

2.0 EXISTING CONDITIONS 2.1
2.1 TOPOGRAPHY AND SURFACE DRAINAGE 2.1
2.2 GEOTECHNICAL INFORMATION 2.2
2.3 HYDROGEOLOGICAL INFORMATION 2.2

3.0 PROPOSED CONDITIONS 3.1

4.0 STORMWATER MANAGEMENT DESIGN 4.1
4.1 STORMWATER MANAGEMENT DURING CONSTRUCTION 4.1
4.1.1 Soil Management 4.1
4.1.2 Stormwater Detention 4.2
4.1.3 Vegetated Buffers 4.2
4.1.4 Grassed Waterways 4.3
4.2 STORMWATER MANAGEMENT POST-CONSTRUCTION 4.3
4.2.1 Permanent Slope Interruption Berms 4.4
4.2.2 Vegetated Buffers 4.4
4.2.3 Grassed Waterways 4.4
4.3 HYDROLOGIC ANALYSIS 4.5
4.3.1 Design Storms 4.5
4.3.2 Hydrologic Parameters 4.5
4.3.3 Hydrologic Analysis Results 4.5
4.3.4 Access Road Culverts 4.7
4.4 GROUNDWATER/SURFACE WATER INTERACTION 4.7
4.5 STORMWATER MANAGEMENT MONITORING AND MAINTENANCE 4.8

5.0 EROSION AND SEDIMENT CONTROL PLAN 5.1
5.1 SITE EROSION POTENTIAL 5.1
5.2 DURING CONSTRUCTION DEWATERING 5.1
5.3 EROSION AND SEDIMENT CONTROL MEASURES 5.2
5.4 CONTINGENCY PLAN 5.4
5.4.1 Contingency Measures in Case of Failure 5.4
5.4.2 Contingency Measures where there is a High Risk of Failure 5.5
5.5 EROSION AND SEDIMENT CONTROL MONITORING PROGRAM 5.5
5.6 LONG TERM EROSION AND SEDIMENT CONTROL 5.6

6.0 CONCLUSION AND RECOMMENDATIONS 6.1

LIST OF TABLES

Table 1: Peak Flows and Runoff Volumes – AMC II 4.6
Table 2: Peak Flows and Runoff Volumes – AMC III 4.7

LIST OF FIGURES

Figure 1: Site Location Plan 1.2
Figure 2: Pre-Development Catchment Plan 2.4
Figure 3: Post-Development Catchment Plan 3.3

LIST OF APPENDICES

Appendix A – Design Calculations
Appendix B - Existing Conditions
Appendix C - Interim Conditions
Appendix D - Proposed Conditions
Appendix E - Publications

LIST OF DRAWINGS

Drawing No. C-011 Block A Site Plan
Drawing No. C-051 Block A Existing Conditions, Clearing, Grubbing and Fencing Plan
Drawing No. C-201 Block A Access Road Plan and Profiles (7 sheets)
Drawing No. C-401 Block A Grading Plan (6 sheets)
Drawing No. C-500 General Details and Notes (2 sheets)
Drawing No. C-601 Block A Sedimentation and Erosion Control Plan (6 sheets)
Drawing No. C-650 Sedimentation and Erosion Control Details

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.

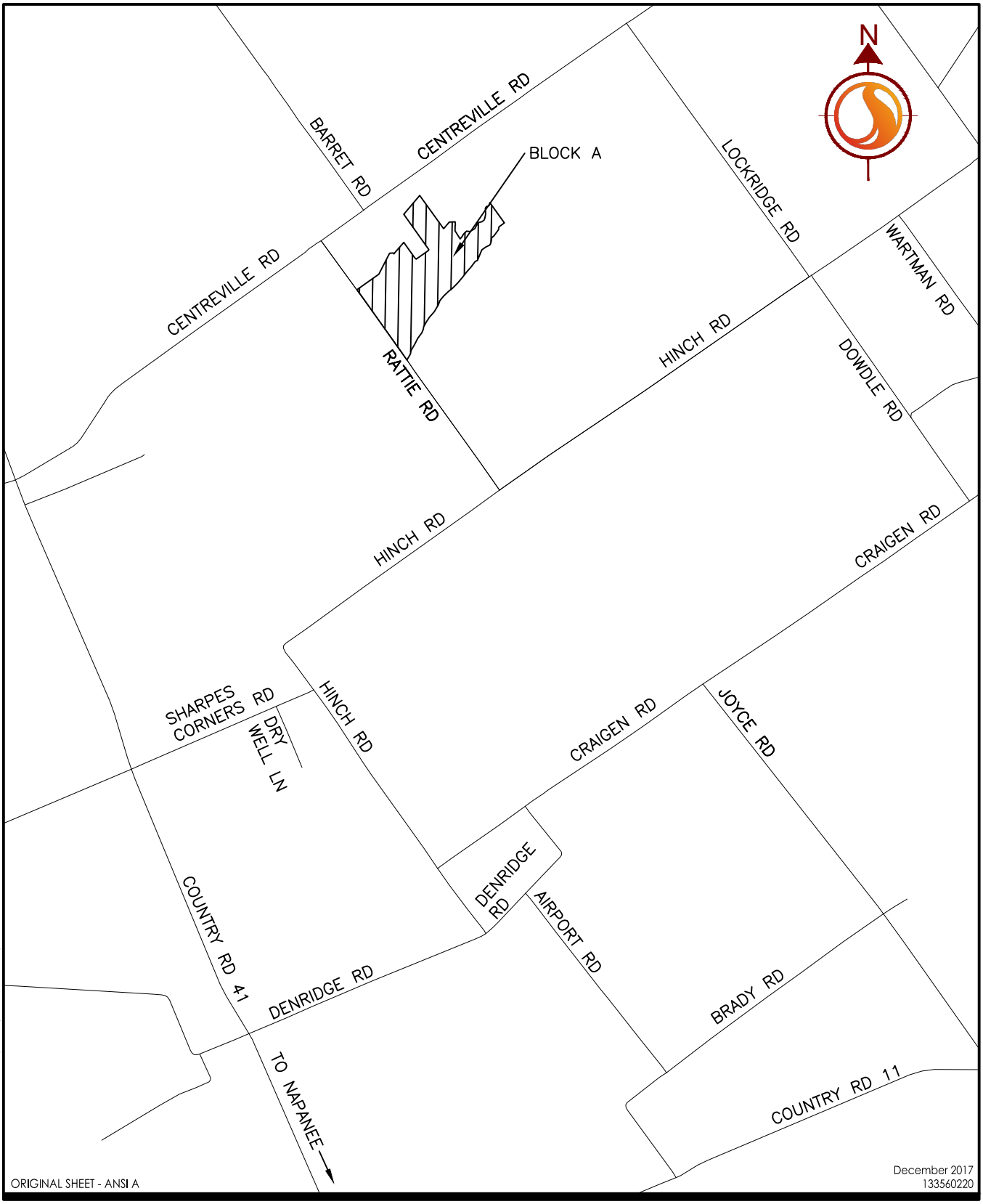
Generation Block A is the focus of this report and is located southeast of the intersection of Centreville Road and Rattie Road as shown on **Figure 1**. The site is bounded by Rattie Road to the west, existing agricultural/pasture land and forest to the north, forest to the east and Mud Creek and associated Provincially Significant Wetland (PSW) complex to the south.

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 water quality and/or water quantity discharged to the surface or sub-surface 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 qualitative assessment of existing hydrologic conditions of the 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 a 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 related to construction.



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Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT
County of Lennox and Addington, ON

Figure No.
FIG 1.0

Title
LOCATION PLAN
BLOCK 'A'

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 BlueEarth 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

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 Loyalist Solar 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 (70% Total Suspended Solids (TSS) removal) 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 A is currently a mix of agricultural and pasture lands with some forested area and pockets of bedrock outcrops draining as shallow overland flow, generally in a southeast direction. Ultimately, runoff from the site discharges to the Mud Creek PSW. The site topography is moderately sloping with elevations ranging from 153 m in the north portion of the site to 134 m near the southern site boundary. 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. The pre-development drainage catchments are shown on **Figure 2** and summarized as follows:

Catchment EXT A-1 – This external drainage area is comprised of active agricultural and pasture lands, the Centreville and Rattie Road right-of-ways, as well as sparsely forested areas. Runoff from this area travels southeast as shallow overland flow to the proposed site. This area includes drainage north of Centreville Road that crosses the roadway through an existing culvert.

Catchment EXT A-2 – This external drainage area is comprised of several residential dwellings, active agricultural and pasture lands, the Centreville Road right-of-way, as well as sparsely forested areas. Runoff from this area travels southeast as shallow overland flow to the proposed site. This area includes drainage north of Centreville Road that crosses the roadway through two existing culverts.

Catchment EXT A-3 – This external drainage area is comprised of a residential dwelling, active agricultural and pasture lands, as well as sparsely forested areas. Runoff from this area travels southeast as shallow overland flow to the proposed site.

Catchment EXT A-4 – This external drainage area is comprised of active agricultural and pasture lands, as well as forested areas. Runoff from this area travels southeast as shallow overland flow to the proposed site.

Catchment EXT A-5 – This external drainage area is comprised of mostly forested area with some residential dwellings, active agricultural and pasture lands as well as Centreville Road. Runoff from this area travels southeast as shallow overland flow to the proposed site. This area includes drainage north of Centreville Road that crosses the roadway through an existing culvert.

Catchment A-100 – Vegetation on this catchment consists mostly of forested coverage with areas of open pasture land and exposed bedrock. Runoff from this catchment travels southeast as shallow overland flow to the Mud Creek Wetland.

Catchment A-101 – Vegetation on this catchment consists mostly of a mix of forested area and open pasture land. Runoff from this catchment travels southeast as shallow overland flow to the Mud Creek Wetland.

Catchment A-102 – Vegetation on this catchment consists mostly of open pasture land with some forested coverage and exposed bedrock. Runoff from this catchment travels southeast as shallow overland flow to the Mud Creek Wetland.

Catchment A-103 – Vegetation on this catchment consists mostly of open pasture and agricultural land with some forested coverage. Runoff from this catchment travels southeast as shallow overland flow to the Mud Creek Wetland.

Catchment A-104 – Vegetation on this catchment consists primarily of a forested coverage. Runoff from this catchment travels southeast as shallow overland flow to the Mud Creek Wetland.

2.2 GEOTECHNICAL INFORMATION

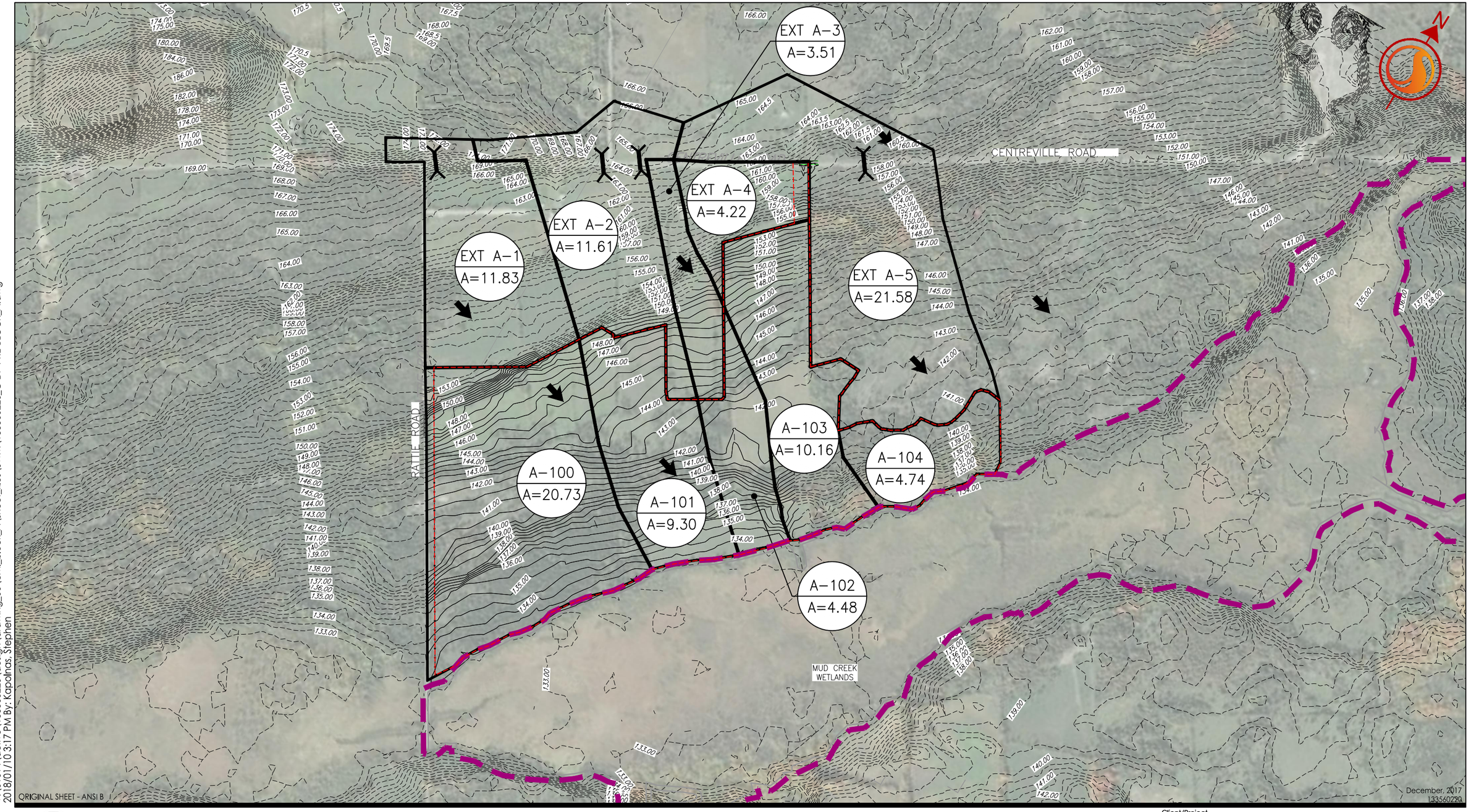
The Soil Map of Lennox and Addington County suggests that the site soils are characterized as Farmington loam, which is described as shallow till overlying bedrock. A detailed geotechnical investigation was completed by Tulloch Engineering Inc. (Tulloch) in 2015. The investigation concludes that site soils consist of topsoil overlaying sand to sandy silt and clay. Through examination of the borehole logs, bedrock was encountered in all of the boreholes across the site and at or within 0.5 m of the surface within Borehole (BH) 73 as well as Test Pits 69, 78 and 80. Further test pits completed in 2016 encountered bedrock at or within 0.5 m of the surface within 4 of the 13 test pits on site. In addition, areas of exposed bedrock were noted during the site visit and are visible from aerial imagery. No groundwater was encountered during the site investigation.

2.3 HYDROGEOLOGICAL INFORMATION

A hydrogeological investigation was completed by Harden Environmental Services Ltd. (Harden) in 2017. A monitoring well installed on site (BH1) during the hydrogeological investigation showed that water levels in the borehole respond to precipitation events that have more than 15 mm of rainfall. It is likely that precipitation events with more than 15 mm of rainfall generate runoff that is captured in the surface fractures connected to the borehole. In addition, water levels were slow to return to pre-precipitation event water levels, suggesting that the bedrock has a very low permeability. The groundwater level in BH1D was lower than BH1S and ranged between 2.5 m and 0.5 m below the ground surface, whereas BH1S remained within 0.5 m of the ground surface during the monitoring period.

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 the Mud Creek Wetland, 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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December, 2017
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Legend

A–100
A=9.64
AREA NUMBER
CONTRIBUTING AREA (ha)

OVERLAND FLOW ROUTE

DRAINAGE BOUNDARY

EXISTING CULVERT

WETLAND BOUNDARY

PROJECT LIMIT BOUNDARY

Scale
1:7500
0 75 225 375m

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

Figure No.
FIG 2

Title
PRE-DEVELOPMENT CATCHMENTS
BLOCK 'A'

3.0 PROPOSED CONDITIONS

The Loyalist Solar Project employs a low-impact approach to site development. The grading plans presented on **Drawing C-401** show that the 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 the panels and racking are in place, all accessible areas will be scarified to alleviate soil compaction prior to seeding. The site is proposed to be seeded with White Clover under post-development conditions and will hydrologically mimic a permanent lawn cover.

Generation Block A includes approximately 2 km of 5 m wide access roads, six inverter stations located on granular pads, an operation and maintenance building, and the ground mounted solar panels. Runoff from Generation Block A travels as shallow overland flow to the neighboring Mud Creek Provincially Significant Wetland. The proposed drainage catchments are shown on **Figure 3** and are described below:

Catchment EXT A-1 – This external drainage area is comprised of active agricultural and pasture lands, the Centreville and Rattie Road right-of-ways, as well as sparsely forested areas. Runoff from this area travels southeast as shallow overland flow to the proposed site. This area includes drainage north of Centreville Road that crosses the roadway through an existing culvert.

Catchment EXT A-2 – This external drainage area is comprised of several residential dwellings, active agricultural and pasture lands, the Centreville Road right-of-way, as well as sparsely forested areas. Runoff from this area travels southeast as shallow overland flow to the proposed site. This area includes drainage north of Centreville Road that crosses the roadway through two existing culverts.

Catchment EXT A-3 – This external drainage area is comprised of a residential dwelling, active agricultural and pasture lands, as well as sparsely forested areas. Runoff from this area travels southeast as shallow overland flow to the proposed site.

Catchment EXT A-4 – This external drainage area is comprised of active agricultural and pasture lands, as well as forested areas. Runoff from this area travels southeast as shallow overland flow to the proposed site.

Catchment EXT A-5 – This external drainage area is comprised of mostly forested area with some residential dwellings, active agricultural and pasture lands as well as Centreville Road. Runoff from this area travels southeast as shallow overland flow to the proposed site. This area includes drainage north of Centreville Road that crosses the roadway through an existing culvert.

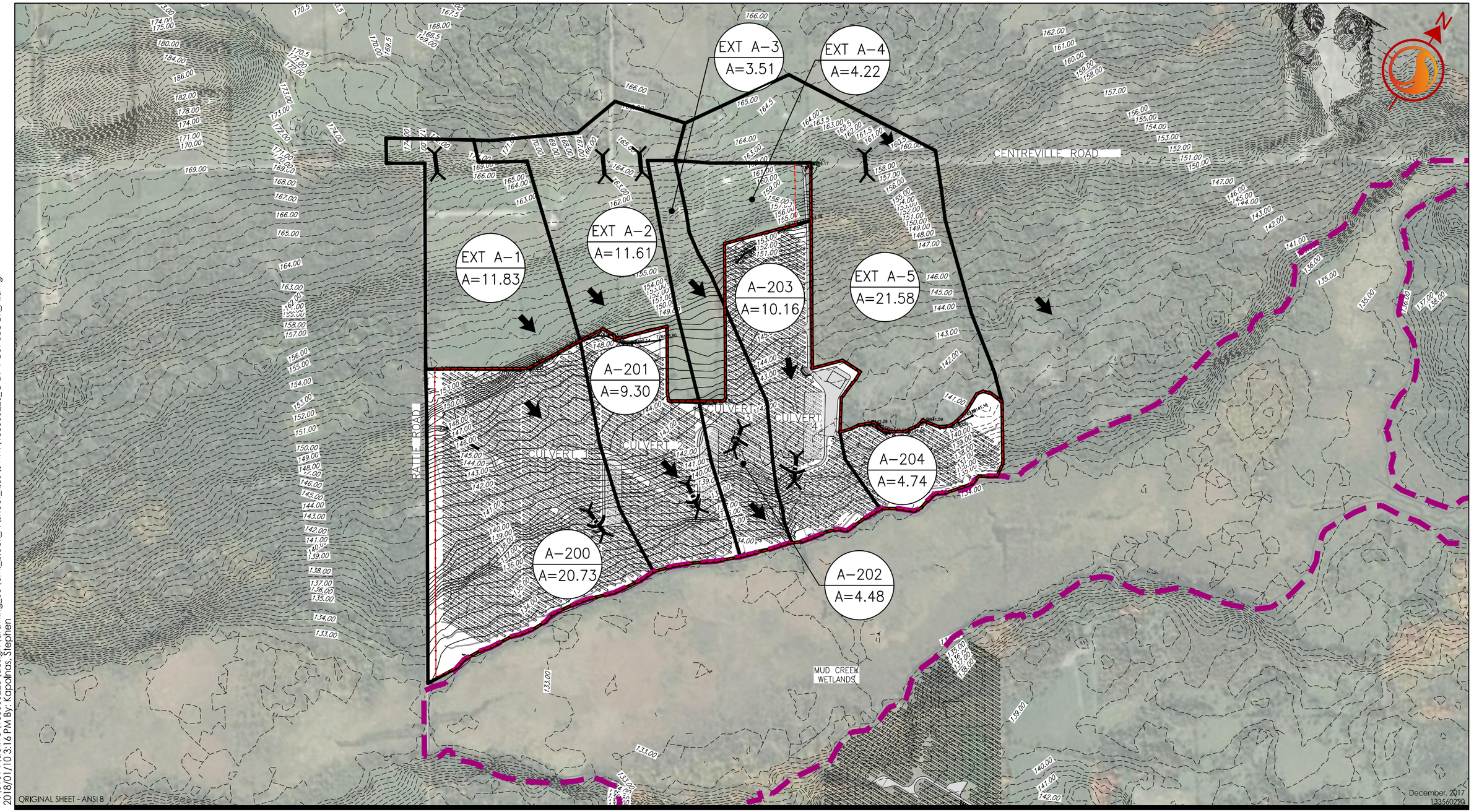
Catchment A-200 – The proposed development within this catchment includes ground mounted solar panels, access roads, and inverter stations. Similar to existing conditions, runoff from this catchment travels southeast as shallow overland flow to the Mud Creek Wetland. Stormwater is conveyed across the access road through a proposed culvert.

Catchment A-201 – The proposed development within this catchment includes ground mounted solar panels, access roads, and an inverter station. Similar to existing conditions, runoff from this catchment travels south-east as shallow overland flow to the Mud Creek Wetland. Stormwater is conveyed across the access road through a proposed culvert.

Catchment A-202 – The proposed development within this catchment includes ground mounted solar panels, access roads, and an inverter station. Similar to existing conditions, runoff from this catchment travels southeast as shallow overland flow to the Mud Creek Wetland. Stormwater is conveyed across the access road through a proposed culvert.

Catchment A-203 – The proposed development within this catchment includes ground mounted solar panels, access roads, an operation and maintenance facility and an inverter station. Similar to existing conditions, runoff from this catchment travels southeast as shallow overland flow to the Mud Creek Wetland. Stormwater is conveyed across the access road through a proposed culvert.

Catchment A-204 – The proposed development within this catchment includes ground mounted solar panels, access roads, and an inverter station. Similar to existing conditions, runoff from this catchment travels southeast as shallow overland flow to the Mud Creek Wetland.



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Legend

- A–100A / A=9.64 — AREA NUMBER / CONTRIBUTING AREA (ha)
- OVERLAND FLOW ROUTE
- DRAINAGE BOUNDARY
- EXISTING CULVERT
- PROPOSED CULVERT
- WETLAND BOUNDARY
- PROJECT LIMIT BOUNDARY
- TEMPORARY LAYDOWN AREA

Scale

1:7500 — 0 75 225 375m

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

Figure No.
FIG 3

Title
POST-DEVELOPMENT CATCHMENTS
BLOCK 'A'

4.0 STORMWATER MANAGEMENT DESIGN

In accordance with guidance provided by the MOECC, the Generation Block A 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 the Generation Block A project limits presents a significant design constraint for conventional SWM design, as it prevents excavation of detention areas or channels. 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 peak runoff discharges and volumes greater than those anticipated post-construction. Furthermore, several growing seasons may be required before the 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 external drainage through the project limits.

4.1.1 Soil Management

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

- Minimizing topsoil stripping; and
- Ground surface scarification.

Preserving the quantity and quality of the site topsoil is critical to preserve 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, inverter station and operations and maintenance building construction and for the creation of

temporary laydown areas (as required). The proposed stripping limits are identified on **Drawing C-051.** 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, which improves infiltration rates, reduces runoff peaks and volumes, and promotes sheet flow. Scarification generally perpendicular to the slopes will be performed on Generation Block A to achieve similar results.

Following clearing and grubbing, the Generation Block A work limits will be scarified to a minimum depth of 150 mm, where topsoil depth permits. 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-401**, stormwater detention is provided by a series of slope interruption berms that intercept the Generation Block A surface runoff to reduce the peak discharges and volumes. Collected stormwater is released via infiltration and evaporation.

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, and the proposed berms are spaced approximately 38 m apart to promote sheet flow, similar to the filter berm design guidance presented in the ESC Guideline (GGHCA, 2006). 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 the entire site perimeter provide additional water quality control for shallow overland runoff from Generation Block A. 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 the external drainage areas are directed to a series of grassed waterways by diversion berms placed at the upstream site boundary. The grassed waterways convey the external drainage through the site, bypassing the proposed slope interruption berms. 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 maximum depth of approximately 0.4 m. The locations where there are minimal topsoil depths and bedrock outcrops are present, these existing features are to be maintained. No seeding or additional topsoil placement is proposed in these areas.

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 Mud Creek Wetland, similar to existing conditions. The grassed waterway design calculations are presented in **Appendix A**. Rock check dams or spreaders are proposed within the grassed waterways at the downstream limits to reduce flow velocities and distribute flow along the site perimeter.

4.2 STORMWATER MANAGEMENT POST-CONSTRUCTION

The Loyalist Solar Project increases site impervious coverage to approximately 1.61 ha, or 3.3% of the total site area, mainly in the form of roadways, inverter platforms, and the operations and maintenance building. 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 farm development sites. Thus, once the site restoration vegetation is fully established, the Generation Block A 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 project 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 serve to 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 dry areas beneath the panels, reducing the percentage of the site surface available for infiltration. However, 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 wide vegetated buffers located along the site perimeter will continue to provide additional water quality control for shallow overland runoff from Generation Block A following construction.

4.2.3 Grassed Waterways

The proposed grassed waterways on site will continue to convey external drainage through the site to reduce the risk of erosion and frequent overtopping of the proposed slope interruption berms.

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 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**.

While the MTO Drainage Manual classifies Farmington loams as Hydrologic Soils Group (HSG) B, National Resources Conservation Service (NRCS) guidance states that soils less than 50 cm deep should be treated as HSG D. Using borehole information from the Geotechnical Investigation (Tullock, 2017) along with bedrock mapping from the Hydrogeological Investigation (Harden, 2017), areas where the soil coverage is less than 50 cm were assigned SCS curve numbers based on HSG D. Based on the borehole information, which showed some areas containing tighter soils than Farmington loam, areas where the soil coverage is greater than 50 cm were assigned SCS curve numbers based on HSG BC.

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	Condition[1]	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)								
Site Boundary at Mud Creek Wetland	Existing	0.98	1.13	0.80	1.76	1.28	3.95	2.97
	Interim	0.40	0.47	0.36	0.74	0.70	1.69	2.99
	Proposed	0.40	0.47	0.36	0.74	0.59	1.69	2.70
Runoff Volume (mm)								
Site Boundary at Mud Creek Wetland	Existing	4.9	3.9	12.7	6.1	20.6	13.7	46.6
	Interim	2.2	1.7	5.7	2.7	10.9	6.2	38.9
	Proposed	2.2	1.7	5.7	2.7	9.6	6.2	33.9

Notes:

[1] The interim condition calculations were performed using SCS curve numbers consistent with contour farming and crop residue 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 proposed condition peak flows are less than the existing conditions peak flows for all design storms, and the interim condition peak flows are less than the existing conditions for all design storms except for the 100-year 12-hour event. While the peak flow calculated for this event is slightly greater than the target, no downstream negative impacts are anticipated since:

1. The total runoff volume is reduced, compared to existing conditions,
2. The magnitude of the increase is small – 0.02 m^3/s,
3. The additional runoff is distributed as sheet flow.
4. The downstream receiver is the Mud Creek PSW, which at approximately 285 ha in total size (3400 ha contributing area), is unlikely to be affected by minor increases in peak discharge.

The AMC II proposed conditions results suggest that the proposed site SWM strategy captures all of the site runoff for the events less than the 100-year 12-hour storm and reduces the peak flows to less than existing conditions magnitudes for all of the evaluated storms.

Table 2: Peak Flows and Runoff Volumes – AMC III

Discharge Location	Condition[1]	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)								
Site Boundary at Mud Creek Wetland	Existing	1.92	2.17	1.39	3.23	2.12	6.56	4.35
	Interim	0.81	0.92	0.67	1.39	1.83	3.32	4.49
	Proposed	0.81	0.92	0.63	1.39	1.39	3.25	4.09
Runoff Volume (mm)								
Site Boundary at Mud Creek Wetland	Existing	9.3	7.5	21.5	11.2	32.6	23.0	65.9
	Interim	4.2	3.3	11.0	5.1	21.9	12.2	56.2
	Proposed	4.2	3.3	10.2	5.1	20.0	11.1	53.2

Notes:

[1] The interim condition calculations were performed using SCS curve numbers consistent with contour farming and crop residue 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 conditions calculation results are similar to the AMC II calculations results. The interim conditions peak flows are less than existing conditions peak flows for all design storms except for the 100-year 12-hour event. While the 12-hour 100-year event calculated peak discharge is slightly higher than the existing conditions 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 peak discharges from the 2-year storm event. 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 each 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 A 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 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 cause localized soil disturbance.

5.2 DURING CONSTRUCTION DEWATERING

No significant excavation is proposed within Generation Block A. 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, 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 A. 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 A 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 and 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-601 and C-650**), and include, but are not necessarily be 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. Since the shallow site topsoil depths will likely prevent installation of separate silt fence stakes, 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-601**. 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 detention.

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

- Centreville and Rattie Road will be cleaned daily of any sediment deposited by site construction traffic;

- Stabilize topsoil stockpiles expected to be left in place in excess of 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 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 in excess of 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 the purpose of 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 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;
- 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 A to control runoff both during the construction phase and for the project operation phase. The proposed stormwater management strategy focusses on retaining the site runoff at source to better 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 calculation results 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 A-200
Slope Interruption Berm Storage – Catchment A-201
Slope Interruption Berm Storage – Catchment A-202
Slope Interruption Berm Storage – Catchment A-203
Slope Interruption Berm Storage – Catchment A-204
Culvert Design Reports
Grassed Waterway Design Sheets

Subject: **SWMHYMO Parameters**
Project: **Loyalist Solar Project**
Site: **Block A**
Project No.: **1335-60220**
Client: **Loyalist Solar LP**
Date: **January 11, 2018**

Existing Conditions

Catchment Number	SWMHYMO Command	Area	CN (AMC II)	CN (AMC III)	Runoff Coefficient	Rise	Length	Catchment Slope	Tc	Tp
		(ha)				(m)	(m)	(%)	(hrs)	(hrs)
EXT A-1	DESIGN NASHYD	11.83	71	86	0.28	21.0	550	3.8	0.67	0.40
EXT A-2	DESIGN NASHYD	11.61	69	84	0.28	23.0	600	3.8	0.70	0.42
EXT A-3	DESIGN NASHYD	3.51	69	84	0.28	21.0	500	4.2	0.62	0.37
EXT A-4	DESIGN NASHYD	4.22	70	85	0.28	9.0	200	4.5	0.38	0.23
EXT A-5	DESIGN NASHYD	21.58	70	85	0.28	24.0	900	2.7	0.97	0.58
A-100	DESIGN NASHYD	20.73	78	90	0.28	16.0	500	3.2	0.68	0.41
A-101	DESIGN NASHYD	9.30	79	91	0.28	14.0	500	2.8	0.71	0.43
A-102	DESIGN NASHYD	4.48	80	91	0.28	13.0	500	2.6	0.73	0.44
A-103	DESIGN NASHYD	10.16	73	87	0.28	20.0	600	3.3	0.73	0.44
A-104	DESIGN NASHYD	4.74	79	91	0.28	6.5	150	4.3	0.34	0.20
		102.16								

Interim Conditions

Catchment Number	SWMHYMO Command	Area	CN (AMC II)	CN (AMC III)	Runoff Coefficient	Rise	Length	Catchment Slope	Tc	Tp
		(ha)				(m)	(m)	(%)	(hrs)	(hrs)
EXT A-1	DESIGN NASHYD	11.83	71	86	0.28	21.0	550	3.8	0.67	0.40
EXT A-2	DESIGN NASHYD	11.61	69	84	0.28	23.0	600	3.8	0.70	0.42
EXT A-3	DESIGN NASHYD	3.51	69	84	0.28	21.0	500	4.2	0.62	0.37
EXT A-4	DESIGN NASHYD	4.22	70	85	0.28	9.0	200	4.5	0.38	0.23
EXT A-5	DESIGN NASHYD	21.58	70	85	0.28	24.0	900	2.7	0.97	0.58
A-200	DESIGN NASHYD	20.73	86	94	0.35	16.0	500	3.2	0.62	0.37
A-201	DESIGN NASHYD	9.30	87	95	0.35	14.0	500	2.8	0.65	0.39
A-202	DESIGN NASHYD	4.48	87	95	0.35	13.0	500	2.6	0.66	0.40
A-203	DESIGN NASHYD	10.16	86	94	0.35	20.0	600	3.3	0.67	0.40
A-204	DESIGN NASHYD	4.74	87	95	0.35	6.5	150	4.3	0.31	0.18
		102.16								

Proposed Conditions

Catchment Number	SWMHYMO Command	Area	CN (AMC II)	CN (AMC III)	Runoff Coefficient	Rise	Length	Catchment Slope	Tc	Tp
		(ha)				(m)	(m)	(%)	(hrs)	(hrs)
EXT A-1	DESIGN NASHYD	11.83	71	86	0.28	21.0	550	3.8	0.67	0.40
EXT A-2	DESIGN NASHYD	11.61	69	84	0.28	23.0	600	3.8	0.70	0.42
EXT A-3	DESIGN NASHYD	3.51	69	84	0.28	21.0	500	4.2	0.62	0.37
EXT A-4	DESIGN NASHYD	4.22	70	85	0.28	9.0	200	4.5	0.38	0.23
EXT A-5	DESIGN NASHYD	21.58	70	85	0.28	24.0	900	2.7	0.97	0.58
A-200	DESIGN NASHYD	20.73	78	90	0.28	16.0	500	3.2	0.68	0.41
A-201	DESIGN NASHYD	9.30	78	90	0.28	14.0	500	2.8	0.71	0.43
A-202	DESIGN NASHYD	4.48	78	90	0.28	13.0	500	2.6	0.73	0.44
A-203	DESIGN NASHYD	10.16	73	87	0.28	20.0	600	3.3	0.73	0.44
A-204	DESIGN NASHYD	4.74	80	91	0.28	6.5	150	4.3	0.34	0.20
		102.16								

Notes:

Time of Concentration calculated using the Airport Metho$Tc = [3.26 (1.1-C) L^{0.5}] / S^{0.33}$ [min]
(For areas less than 100 ha) Where:

C = Runoff Coefficient
L = Length of Overland Flow (m)
S = Slope (%)

Time to Peak $Tp = 0.6Tc$

CN is a weighted average for DESIGN NASHYD

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block A
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 15, 2018

Catchment ID:	A-200
Berm Height (mm):	300
Total Berm Length (m):	3919
Surface Slope:	3.2%
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	0	0	0			0	0
0.01	0.3	0.00	7			1.4	1.4
0.02	0.7	0.01	27			1.4	2.9
0.03	1.0	0.02	60			1.4	4.3
0.04	1.4	0.03	107			1.4	5.7
0.05	1.7	0.04	168			1.4	7.1
0.06	2.1	0.06	242			1.4	8.6
0.07	2.4	0.08	329			1.4	10.0
0.08	2.7	0.11	430			1.4	11.4
0.09	3.1	0.14	544			1.4	12.9
0.1	3.4	0.17	671			1.4	14.3
0.11	3.8	0.21	812			1.4	15.7
0.12	4.1	0.25	966			1.4	17.1
0.13	4.5	0.29	1134			1.4	18.6
0.14	4.8	0.34	1315			1.4	20.0
0.15	5.1	0.39	1510			1.4	21.4
0.16	5.5	0.44	1718			1.4	22.9
0.17	5.8	0.49	1940			1.4	24.3
0.18	6.2	0.55	2174			1.4	25.7
0.19	6.5	0.62	2423			1.4	27.1
0.2	6.9	0.69	2685			1.4	28.6
0.21	7.2	0.76	2960			1.4	30.0
0.22	7.5	0.83	3248			1.4	31.4
0.23	7.9	0.91	3550			1.4	32.9
0.24	8.2	0.99	3866			1.4	34.3
0.25	8.6	1.07	4195			1.4	35.7
0.26	8.9	1.16	4537			1.4	37.1
0.27	9.2	1.25	4893			1.4	38.6
0.28	9.6	1.34	5262			1.4	40.0
0.29	9.9	1.44	5644			1.4	41.4
0.3	10.3	1.54	6040	0	0	1.4	42.9
0.31	10.6	1.65	6450	0.01	6	0.0	42.9
0.32	11.0	1.75	6872	0.02	17	0.0	42.9
0.33	11.3	1.86	7309	0.03	31	0.0	42.9
0.34	11.6	1.98	7758	0.04	47	0.0	42.9
0.35	12.0	2.10	8221	0.05	66	0.0	42.9

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block A
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 15, 2018

Catchment ID:	A-201
Berm Height (mm):	300
Total Berm Length (m):	1369
Surface Slope:	2.8%
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	3			1.4	1.4
0.02	0.8	0.01	11			1.4	2.9
0.03	1.2	0.02	24			1.4	4.3
0.04	1.5	0.03	42			1.4	5.7
0.05	1.9	0.05	66			1.4	7.1
0.06	2.3	0.07	95			1.4	8.6
0.07	2.7	0.09	130			1.4	10.0
0.08	3.1	0.12	170			1.4	11.4
0.09	3.5	0.16	215			1.4	12.9
0.1	3.9	0.19	265			1.4	14.3
0.11	4.3	0.23	321			1.4	15.7
0.12	4.6	0.28	382			1.4	17.1
0.13	5.0	0.33	448			1.4	18.6
0.14	5.4	0.38	519			1.4	20.0
0.15	5.8	0.44	596			1.4	21.4
0.16	6.2	0.50	678			1.4	22.9
0.17	6.6	0.56	766			1.4	24.3
0.18	7.0	0.63	859			1.4	25.7
0.19	7.4	0.70	957			1.4	27.1
0.2	7.7	0.77	1060			1.4	28.6
0.21	8.1	0.85	1169			1.4	30.0
0.22	8.5	0.94	1283			1.4	31.4
0.23	8.9	1.02	1402			1.4	32.9
0.24	9.3	1.11	1526			1.4	34.3
0.25	9.7	1.21	1656			1.4	35.7
0.26	10.1	1.31	1791			1.4	37.1
0.27	10.5	1.41	1932			1.4	38.6
0.28	10.8	1.52	2078			1.4	40.0
0.29	11.2	1.63	2229			1.4	41.4
0.3	11.6	1.74	2385	0	0	1.4	42.9
0.31	12.0	1.86	2547	0.01	2	0.0	42.9
0.32	12.4	1.98	2714	0.02	6	0.0	42.9
0.33	12.8	2.11	2886	0.03	11	0.0	42.9
0.34	13.2	2.24	3063	0.04	16	0.0	42.9
0.35	13.6	2.37	3246	0.05	23	0.0	42.9

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block A
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 15, 2018

Catchment ID:	A-202
Berm Height (mm):	300
Total Berm Length (m):	651
Surface Slope:	2.6%
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	1			1.4	1.4
0.02	0.8	0.01	5			1.4	2.9
0.03	1.2	0.02	12			1.4	4.3
0.04	1.7	0.03	22			1.4	5.7
0.05	2.1	0.05	34			1.4	7.1
0.06	2.5	0.07	49			1.4	8.6
0.07	2.9	0.10	66			1.4	10.0
0.08	3.3	0.13	86			1.4	11.4
0.09	3.7	0.17	109			1.4	12.9
0.1	4.1	0.21	135			1.4	14.3
0.11	4.6	0.25	163			1.4	15.7
0.12	5.0	0.30	194			1.4	17.1
0.13	5.4	0.35	228			1.4	18.6
0.14	5.8	0.41	265			1.4	20.0
0.15	6.2	0.47	304			1.4	21.4
0.16	6.6	0.53	345			1.4	22.9
0.17	7.0	0.60	390			1.4	24.3
0.18	7.5	0.67	437			1.4	25.7
0.19	7.9	0.75	487			1.4	27.1
0.2	8.3	0.83	540			1.4	28.6
0.21	8.7	0.91	595			1.4	30.0
0.22	9.1	1.00	653			1.4	31.4
0.23	9.5	1.10	714			1.4	32.9
0.24	10.0	1.19	777			1.4	34.3
0.25	10.4	1.30	843			1.4	35.7
0.26	10.8	1.40	912			1.4	37.1
0.27	11.2	1.51	984			1.4	38.6
0.28	11.6	1.63	1058			1.4	40.0
0.29	12.0	1.74	1135			1.4	41.4
0.3	12.4	1.87	1215	0	0	1.4	42.9
0.31	12.9	1.99	1297	0.01	1	0.0	42.9
0.32	13.3	2.12	1382	0.02	3	0.0	42.9
0.33	13.7	2.26	1470	0.03	5	0.0	42.9
0.34	14.1	2.40	1560	0.04	8	0.0	42.9
0.35	14.5	2.54	1653	0.05	11	0.0	42.9

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block A
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 15, 2018

Catchment ID:	A-203
Berm Height (mm):	300
Total Berm Length (m):	1445
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	2			1.4	1.4
0.02	0.7	0.01	10			1.4	2.9
0.03	1.0	0.01	22			1.4	4.3
0.04	1.3	0.03	38			1.4	5.7
0.05	1.7	0.04	60			1.4	7.1
0.06	2.0	0.06	87			1.4	8.6
0.07	2.3	0.08	118			1.4	10.0
0.08	2.7	0.11	154			1.4	11.4
0.09	3.0	0.13	195			1.4	12.9
0.1	3.3	0.17	241			1.4	14.3
0.11	3.7	0.20	291			1.4	15.7
0.12	4.0	0.24	346			1.4	17.1
0.13	4.3	0.28	407			1.4	18.6
0.14	4.7	0.33	472			1.4	20.0
0.15	5.0	0.37	541			1.4	21.4
0.16	5.3	0.43	616			1.4	22.9
0.17	5.7	0.48	695			1.4	24.3
0.18	6.0	0.54	780			1.4	25.7
0.19	6.3	0.60	869			1.4	27.1
0.2	6.7	0.67	962			1.4	28.6
0.21	7.0	0.73	1061			1.4	30.0
0.22	7.3	0.81	1165			1.4	31.4
0.23	7.7	0.88	1273			1.4	32.9
0.24	8.0	0.96	1386			1.4	34.3
0.25	8.3	1.04	1504			1.4	35.7
0.26	8.7	1.13	1627			1.4	37.1
0.27	9.0	1.21	1754			1.4	38.6
0.28	9.3	1.31	1886			1.4	40.0
0.29	9.7	1.40	2024			1.4	41.4
0.3	10.0	1.50	2166	0	0	1.4	42.9
0.31	10.3	1.60	2312	0.01	2	0.0	42.9
0.32	10.7	1.71	2464	0.02	6	0.0	42.9
0.33	11.0	1.81	2620	0.03	11	0.0	42.9
0.34	11.3	1.92	2782	0.04	17	0.0	42.9
0.35	11.7	2.04	2948	0.05	24	0.0	42.9

Subject: Slope Interruption Berm Storage
Project: Loyalist Solar Project
Site: Block A
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: January 15, 2018

Catchment ID:	A-204
Berm Height (mm):	300
Total Berm Length (m):	805
Surface Slope:	4.3%
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	0.5	0.01	4			1.4	2.9
0.03	0.8	0.01	10			1.4	4.3
0.04	1.1	0.02	17			1.4	5.7
0.05	1.3	0.03	26			1.4	7.1
0.06	1.6	0.05	38			1.4	8.6
0.07	1.8	0.06	52			1.4	10.0
0.08	2.1	0.08	68			1.4	11.4
0.09	2.4	0.11	86			1.4	12.9
0.1	2.6	0.13	106			1.4	14.3
0.11	2.9	0.16	128			1.4	15.7
0.12	3.2	0.19	152			1.4	17.1
0.13	3.4	0.22	179			1.4	18.6
0.14	3.7	0.26	207			1.4	20.0
0.15	3.9	0.30	238			1.4	21.4
0.16	4.2	0.34	271			1.4	22.9
0.17	4.5	0.38	305			1.4	24.3
0.18	4.7	0.43	342			1.4	25.7
0.19	5.0	0.47	382			1.4	27.1
0.2	5.3	0.53	423			1.4	28.6
0.21	5.5	0.58	466			1.4	30.0
0.22	5.8	0.64	511			1.4	31.4
0.23	6.0	0.69	559			1.4	32.9
0.24	6.3	0.76	609			1.4	34.3
0.25	6.6	0.82	660			1.4	35.7
0.26	6.8	0.89	714			1.4	37.1
0.27	7.1	0.96	770			1.4	38.6
0.28	7.4	1.03	829			1.4	40.0
0.29	7.6	1.10	889			1.4	41.4
0.3	7.9	1.18	951	0	0	1.4	42.9
0.31	8.1	1.26	1016	0.01	1	0.0	42.9
0.32	8.4	1.34	1082	0.02	3	0.0	42.9
0.33	8.7	1.43	1151	0.03	6	0.0	42.9
0.34	8.9	1.52	1222	0.04	10	0.0	42.9
0.35	9.2	1.61	1295	0.05	14	0.0	42.9

Culvert Analysis Report
Culvert 1 (Catchment A-200) - 600 mm Culvert embedded 0.15m

Analysis Component			
Storm Event	Design	Discharge	0.2470 m³/s

Peak Discharge Method: User-Specified			
Design Discharge	0.2470 m³/s	Check Discharge	0.0000 m³/s

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	137.27 m

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-525 mm Circular	0.2470 m³/s	137.83 m	1.89 m/s
Weir	Roadway (Constant Elevation)	0.0000 m³/s	137.83 m	N/A
Total	----------	0.2470 m³/s	137.83 m	N/A

Culvert Analysis Report
Culvert 1 (Catchment A-200) - 600 mm Culvert embedded 0.15m

Component:Culvert-1

Culvert Summary					
Computed Headwater Elevation	137.83	m	Discharge	0.2470	m³/s
Inlet Control HW Elev.	137.77	m	Tailwater Elevation	137.27	m
Outlet Control HW Elev.	137.83	m	Control Type	Entrance Control	
Headwater Depth/Height	1.14				

Grades					
Upstream Invert	137.22	m	Downstream Invert	136.95	m
Length	9.90	m	Constructed Slope	0.027273	m/m

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.30	m
Slope Type	Steep		Normal Depth	0.30	m
Flow Regime	Supercritical		Critical Depth	0.33	m
Velocity Downstream	1.89	m/s	Critical Slope	0.020049	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.	137.83	m	Upstream Velocity Head	0.14	m
Ke	0.90		Entrance Loss	0.13	m

Inlet Control Properties					
Inlet Control HW Elev.	137.77	m	Flow Control	N/A	
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 Analysis Report
Culvert 1 (Catchment A-200) - 600 mm Culvert embedded 0.15m

Component:Weir

Hydraulic Component(s): Roadway (Constant Elevation)					
Discharge	0.0000	m³/s	Allowable HW Elevation	137.83	m
Roadway Width	5.00	m	Overtopping Coefficient	1.38	SI
Length	30.00	m	Crest Elevation	137.90	m
Headwater Elevation	N/A	m	Discharge Coefficient (Cr)	2.50	
Submergence Factor (Kt)	1.00				

Sta (m)	Elev. (m)
0.00	137.90
30.00	137.90

Culvert Analysis Report
Culvert 2 (Catchment A-201) - 600 mm Culvert embedded 0.15m

Analysis Component			
Storm Event	Design	Discharge	0.2110 m³/s

Peak Discharge Method: User-Specified			
Design Discharge	0.2110 m³/s	Check Discharge	0.0000 m³/s

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	138.21 m

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-525 mm Circular	0.2109 m³/s	138.65 m	1.51 m/s
Weir	Roadway (Constant Elevation)	0.0000 m³/s	138.65 m	N/A
Total	----------	0.2109 m³/s	138.65 m	N/A

Culvert Analysis Report
Culvert 2 (Catchment A-201) - 600 mm Culvert embedded 0.15m

Component:Culvert-1

Culvert Summary					
Computed Headwater Elevation	138.65	m	Discharge	0.2109	m³/s
Inlet Control HW Elev.	138.59	m	Tailwater Elevation	138.21	m
Outlet Control HW Elev.	138.65	m	Control Type	Entrance Control	
Headwater Depth/Height	1.03				

Grades					
Upstream Invert	138.10	m	Downstream Invert	137.89	m
Length	9.60	m	Constructed Slope	0.021875	m/m

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	0.32	m
Slope Type	Steep		Normal Depth	0.29	m
Flow Regime	N/A		Critical Depth	0.31	m
Velocity Downstream	1.51	m/s	Critical Slope	0.018792	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.	138.65	m	Upstream Velocity Head	0.13	m
Ke	0.90		Entrance Loss	0.11	m

Inlet Control Properties					
Inlet Control HW Elev.	138.59	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 Analysis Report
Culvert 2 (Catchment A-201) - 600 mm Culvert embedded 0.15m

Component:Weir

Hydraulic Component(s): Roadway (Constant Elevation)					
Discharge	0.0000	m³/s	Allowable HW Elevation	138.65	m
Roadway Width	5.00	m	Overtopping Coefficient	1.60	SI
Length	30.00	m	Crest Elevation	138.70	m
Headwater Elevation	N/A	m	Discharge Coefficient (Cr)	2.90	
Submergence Factor (Kt)	1.00				

Sta (m)	Elev. (m)
0.00	138.70
30.00	138.70

Culvert Analysis Report
Culvert 3 (Catchment A-202) - 500 mm Culvert embedded 0.15m

Analysis Component			
Storm Event	Design	Discharge	0.0690 m³/s

Peak Discharge Method: User-Specified			
Design Discharge	0.0690 m³/s	Check Discharge	0.0000 m³/s

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	141.37 m

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-450 mm Circular	0.0691 m³/s	141.59 m	0.68 m/s
Weir	Roadway (Constant Elevation)	0.0000 m³/s	141.59 m	N/A
Total	----------	0.0691 m³/s	141.59 m	N/A

Culvert Analysis Report
Culvert 3 (Catchment A-202) - 500 mm Culvert embedded 0.15m

Component:Culvert-1

Culvert Summary					
Computed Headwater Elevation	141.59	m	Discharge	0.0691	m³/s
Inlet Control HW Elev.	141.54	m	Tailwater Elevation	141.37	m
Outlet Control HW Elev.	141.59	m	Control Type	Entrance Control	
Headwater Depth/Height	0.67				

Grades					
Upstream Invert	141.28	m	Downstream Invert	141.10	m
Length	10.50	m	Constructed Slope	0.017143	m/m

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	0.27	m
Slope Type	Steep		Normal Depth	0.18	m
Flow Regime	N/A		Critical Depth	0.18	m
Velocity Downstream	0.68	m/s	Critical Slope	0.017083	m/m

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	0.46	m
Section Size	450 mm		Rise	0.46	m
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	141.59	m	Upstream Velocity Head	0.07	m
Ke	0.90		Entrance Loss	0.06	m

Inlet Control Properties					
Inlet Control HW Elev.	141.54	m	Flow Control	N/A	
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 Analysis Report
Culvert 3 (Catchment A-202) - 500 mm Culvert embedded 0.15m

Component:Weir

Hydraulic Component(s): Roadway (Constant Elevation)					
Discharge	0.0000	m³/s	Allowable HW Elevation	141.59	m
Roadway Width	5.00	m	Overtopping Coefficient	1.38	SI
Length	30.00	m	Crest Elevation	141.85	m
Headwater Elevation	N/A	m	Discharge Coefficient (Cr)	2.50	
Submergence Factor (Kt)	1.00				

Sta (m)	Elev. (m)
0.00	141.85
30.00	141.85

Culvert Analysis Report
Culvert 4 (Catchment A-203) - 500 mm Culvert embedded 0.15m

Analysis Component			
Storm Event	Design	Discharge	0.1110 m³/s

Peak Discharge Method: User-Specified			
Design Discharge	0.1110 m³/s	Check Discharge	0.0000 m³/s

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	139.65 m

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-450 mm Circular	0.1111 m³/s	140.66 m	1.10 m/s
Weir	Roadway (Constant Elevation)	0.0000 m³/s	140.66 m	N/A
Total	----------	0.1111 m³/s	140.66 m	N/A

Culvert Analysis Report
Culvert 4 (Catchment A-203) - 500 mm Culvert embedded 0.15m

Component:Culvert-1

Culvert Summary					
Computed Headwater Elevation	140.66	m	Discharge	0.1111	m³/s
Inlet Control HW Elev.	140.61	m	Tailwater Elevation	139.65	m
Outlet Control HW Elev.	140.66	m	Control Type	Entrance Control	
Headwater Depth/Height	0.88				

Grades					
Upstream Invert	140.26	m	Downstream Invert	139.38	m
Length	14.20	m	Constructed Slope	0.061972	m/m

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	0.27	m
Slope Type	Steep		Normal Depth	0.16	m
Flow Regime	N/A		Critical Depth	0.23	m
Velocity Downstream	1.10	m/s	Critical Slope	0.018364	m/m

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	0.46	m
Section Size	450 mm		Rise	0.46	m
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	140.66	m	Upstream Velocity Head	0.09	m
Ke	0.90		Entrance Loss	0.08	m

Inlet Control Properties					
Inlet Control HW Elev.	140.61	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 Analysis Report
Culvert 4 (Catchment A-203) - 500 mm Culvert embedded 0.15m

Component:Weir

Hydraulic Component(s): Roadway (Constant Elevation)					
Discharge	0.0000	m³/s	Allowable HW Elevation	140.66	m
Roadway Width	5.00	m	Overtopping Coefficient	1.60	SI
Length	30.00	m	Crest Elevation	141.30	m
Headwater Elevation	N/A	m	Discharge Coefficient (Cr)	2.90	
Submergence Factor (Kt)	1.00				

Sta (m)	Elev. (m)
0.00	141.30
30.00	141.30

Manning's Equation Calculations for Flow in a Channel

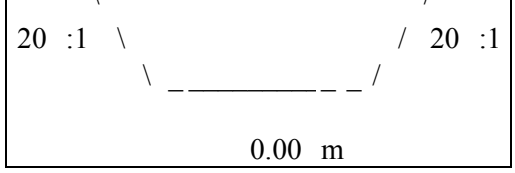
1335-60220 Loyalist Block A: EXT A-1

Section: Unregulated Tributary

Input Data:		
Flow =	0.771	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 =	0	m [0 = triangular, +ve = trapezoidal]

Calculated Values:		
Velocity =	0.51	m/s
Area=	1.500	m^2
Wetted Perimeter =	10.967	m
Top Width =	10.954	m
Hydraulic Radius (R) =	0.137	m

Configuration:



Depth Estimate:

Estimated Flow Depth = **0.274 m** lhs-rhs = 0.00012

Note: Calculations are correct when lhs-rhs = 0

Manning's Equation Calculations for Flow in a Channel

1335-60220 Loyalist Block A: EXT A-2

Section: Unregulated Tributary

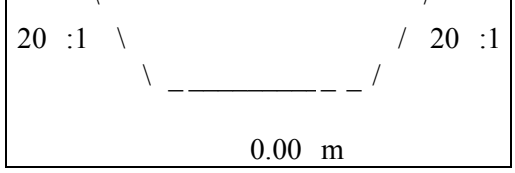
Input Data:

Flow =	0.678	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 =	0	m [0 = triangular, +ve = trapezoidal]

Calculated Values:

Velocity =	0.33	m/s
Area=	2.057	m^2
Wetted Perimeter =	12.843	m
Top Width =	12.827	m
Hydraulic Radius (R) =	0.160	m

Configuration:



Depth Estimate:

Estimated Flow Depth = **0.321 m** lhs-rhs = -6.3E-05

Note: Calculations are correct when lhs-rhs = 0

Manning's Equation Calculations for Flow in a Channel

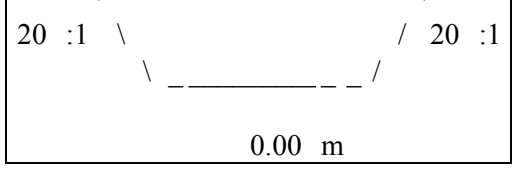
1335-60220 Loyalist Block A: EXT A-3

Section: Unregulated Tributary

Input Data:		
Flow =	0.221	m^3/s
Manning's 'n' =	0.04	
Channel Slope =	0.7%	
Side Slope =	20	m/m [3 means 3:1]
Side Slope =	20	m/m [3 means 3:1]
Bottom Width =	0	m [0 = triangular, +ve = trapezoidal]

Calculated Values:		
Velocity =	0.40	m/s
Area=	0.554	m^2
Wetted Perimeter =	6.667	m
Top Width =	6.659	m
Hydraulic Radius (R) =	0.083	m

Configuration:



Depth Estimate:

Estimated Flow Depth = **0.166 m** lhs-rhs = 0.0002

Note: Calculations are correct when lhs-rhs = 0

Manning's Equation Calculations for Flow in a Channel

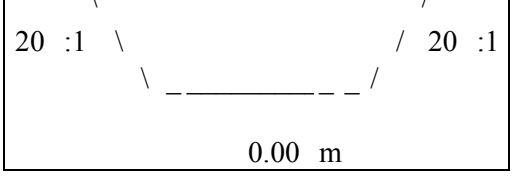
1335-60220 Loyalist Block A: EXT A-4

Section: Unregulated Tributary

Input Data:		
Flow =	0.497	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 =	0	m [0 = triangular, +ve = trapezoidal]

Calculated Values:		
Velocity =	0.46	m/s
Area=	1.079	m^2
Wetted Perimeter =	9.302	m
Top Width =	9.291	m
Hydraulic Radius (R) =	0.116	m

Configuration:



Depth Estimate:

Estimated Flow Depth = **0.232 m** lhs-rhs = 7.9E-05

Note: Calculations are correct when lhs-rhs = 0

Manning's Equation Calculations for Flow in a Channel

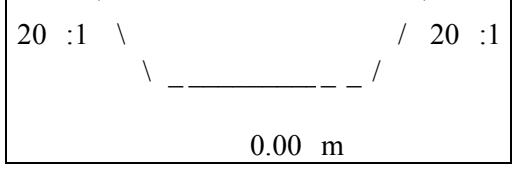
1335-60220 Loyalist Block A: EXT A-5

Section: Unregulated Tributary

Input Data:		
Flow =	1.363	m^3/s
Manning's 'n' =	0.04	
Channel Slope =	1.5%	
Side Slope =	20	m/m [3 means 3:1]
Side Slope =	20	m/m [3 means 3:1]
Bottom Width =	0	m [0 = triangular, +ve = trapezoidal]

Calculated Values:		
Velocity =	0.84	m/s
Area=	1.631	m^2
Wetted Perimeter =	11.437	m
Top Width =	11.422	m
Hydraulic Radius (R) =	0.143	m

Configuration:



Depth Estimate:

Estimated Flow Depth = **0.286 m** lhs-rhs = 3E-06

Note: Calculations are correct when lhs-rhs = 0

APPENDIX B – EXISTING CONDITIONS

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

Subject: **NRCS (SCS) Curve Number Determination - Existing Conditions**
Project: **Loyalist Solar Project**
Site: **Block A**
Project No.: **1335-60220**
Client: **Loyalist Solar LP**
Date: **December 21, 2017**

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

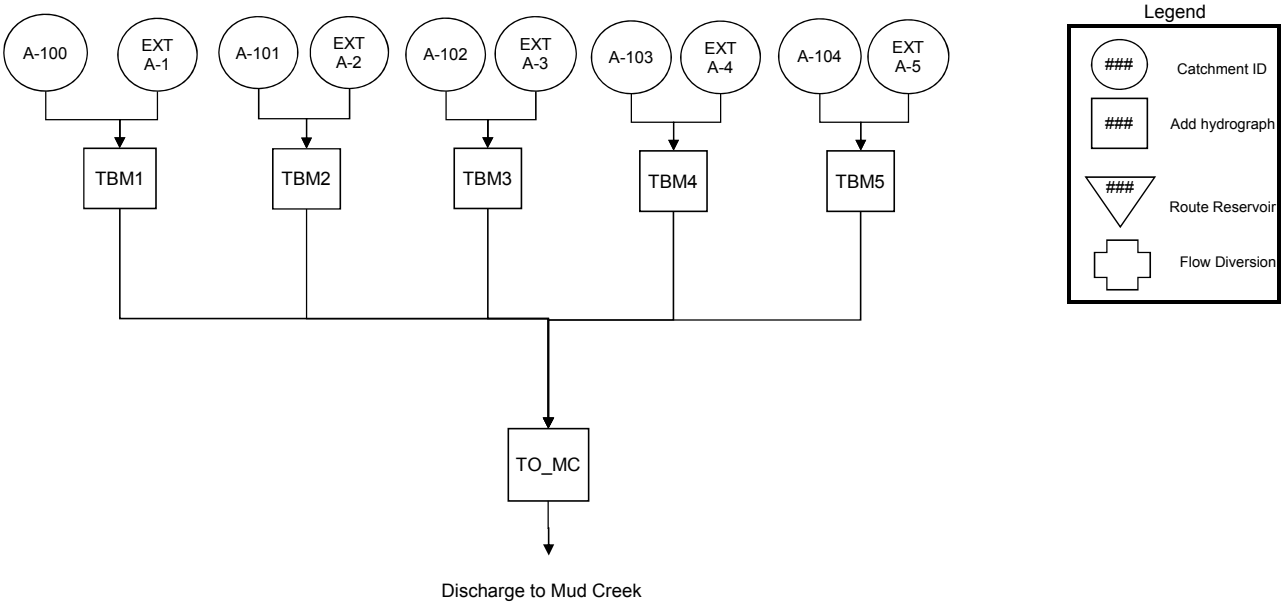
HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
	Hydrologic Soil Type							
Catchment	A	AB	B	BC	C	CD	D	TOTAL
EXT A-1				100				100
EXT A-2				100				100
EXT A-3				100				100
EXT A-4				100				100
EXT A-5				75			25	100
A-100				20			80	100
A-101				20			80	100
A-102				20			80	100
A-103				75			25	100
A-104							100	100

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Scarified Soil	Wetland	Impervious	Total
EXT A-1	6	10	2	65	15				2	100
EXT A-2	8	10	5	75					2	100
EXT A-3	8	10	10	70					2	100
EXT A-4	23	30	20		25				2	100
EXT A-5	13	85							2	100
A-100	5	70		25						100
A-101	5	30		65						100
A-102	5	20		75						100
A-103	5	40		35	20					100
A-104		100								100

CURVE NUMBER (CN) - Existing Conditions											
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Scarified Soil	Wetland/ Lakes	Impervious	Weighted CN (AMC II)	Weighted CN (AMC III)
EXT A-1	4	7	1	45	12				2	71	86
EXT A-2	5	7	3	52					2	69	84
EXT A-3	5	7	7	49					2	69	84
EXT A-4	15	20	14		20				2	70	85
EXT A-5	9	59							2	70	85
A-100	4	54		20						78	90
A-101	4	23		53						79	91
A-102	4	15		61						80	91
A-103	3	28		26	16					73	87
A-104		79								79	91

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 based on guidance presented in National Engineering Handbook

Subject: Existing Conditions SWMHYMO Schematic
Project: Loyalist Solar Project
Site: Block A
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: 1/15/2018



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

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS  W W W  M   M  H   H    Y    M   M   OOO            9      9   =========
                                                        9   9  9   9   # 4730904
         StormWater Management HYdrologic Model          999    999    =========

 ********************************************************************************
 ***************************** SWMHYMO Ver/4.05  ********************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********       based on the principles of HYMO and its successors     *********
 *********                 OTTHYMO-83 and OTTHYMO-89.                   *********
 ********************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
 *********                  Ottawa,  Ontario: (613) 836-3884            *********
 *********                  Gatineau, Quebec: (819) 243-6858            *********
 *********                  E-Mail: swmhymo@jfsa.com                    *********
 ********************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
 +++++++++                Kitchener            SERIAL#:4730904        +++++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ********************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
 *********          Maximum value for ID numbers  :     10             *********
 *********          Max. number of rainfall points: 105408             *********
 *********          Max. number of flow points    : 105408             *********
 ********************************************************************************



 **********************   D E T A I L E D   O U T P U T   **********************
 ********************************************************************************
 *         DATE: 2018-01-15     TIME: 11:57:16     RUN COUNTER: 002124          *
 ********************************************************************************
 * Input   filename: C:\TEMP\Loy\LYBAEX.dat                                     *
 * Output  filename: C:\TEMP\Loy\LYBAEX.out                                     *
 * Summary filename: C:\TEMP\Loy\LYBAEX.sum                                     *
 * User comments:                                                               *
 * 1:_____________________________________________________________________________*
 * 2:_____________________________________________________________________________*
 * 3:_____________________________________________________________________________*
 ********************************************************************************


001:0001--------------------------------------------------------------------------
*################################################################################
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*################################################################################
*################################################################################
*#
*#                    Block A - EXISTING CONDITIONS
*#
*################################################################################
--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   1
          #  1=LYA2.1hr
--------------------------------------------------------------------------------
001:0002--------------------------------------------------------------------------
--------------------
| READ STORM       |     Filename: Belleville IDF (1-hr 30% AES - 2 Year)
| Ptotal=  22.10 mm|     Comments: Belleville IDF (1-hr 30% AES - 2 Year)
--------------------
             TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
              hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
              .08  23.868 |   .33  29.172 |   .58  26.520 |   .83   7.956
              .17  37.128 |   .42  34.476 |   .67  13.260 |   .92   2.652
              .25  55.692 |   .50  23.868 |   .75  10.608 |  1.00    .000

--------------------------------------------------------------------------------
001:0003--------------------------------------------------------------------------
*################################################################################
*################################################################################
*#
*#                              AMC II Conditions
*#
*################################################################################
*################################################################################
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 01:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .123 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    3.413
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .154

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

--------------------------------------------------------------------------------
001:0004--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=78.00
| 02:A-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .286 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    4.601
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .208

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

--------------------------------------------------------------------------------
001:0005--------------------------------------------------------------------------
-----------------------
| ADD HYD (TBM1       ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXTA-1       11.83     .123     .92   3.41    .000
                      +ID2 02:A-100        20.73     .286     .92   4.60    .000
                       ==========================================================
                       SUM 04:TBM1          32.56     .410     .92   4.17    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0006--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 01:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .108 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    3.150
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .143

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

--------------------------------------------------------------------------------
001:0007--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=79.00
| 02:A-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .130 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    4.816
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .218

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

--------------------------------------------------------------------------------
001:0008--------------------------------------------------------------------------
-----------------------
| ADD HYD (TBM2       ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXTA-2       11.61     .108     .93   3.15    .000
                      +ID2 02:A-101         9.30     .130     .93   4.82    .000
                       ==========================================================
                       SUM 05:TBM2          20.91     .239     .93   3.89    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0009--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=69.00
| 01:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .035 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=    3.150
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .143

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

--------------------------------------------------------------------------------
001:0010--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=80.00
| 02:A-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .065 (i)
     TIME TO PEAK    (hrs)=     .950
     RUNOFF VOLUME    (mm)=    5.046
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .228

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

--------------------------------------------------------------------------------
001:0011--------------------------------------------------------------------------
-----------------------
| ADD HYD (TBM3       ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXTA-3        3.51     .035     .88   3.15    .000
                      +ID2 02:A-102         4.48     .065     .95   5.05    .000
                       ==========================================================
                       SUM 06:TBM3           7.99     .100     .93   4.21    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0012--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .056 (i)
     TIME TO PEAK    (hrs)=     .717
     RUNOFF VOLUME    (mm)=    3.278
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .148

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

```
--------------------------------------------------------------------------------
001:0013----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=73.00
| 02:A-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .108 (i)
     TIME TO PEAK    (hrs)=     .950
     RUNOFF VOLUME    (mm)=    3.705
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .168

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

--------------------------------------------------------------------------------
001:0014----------------------------------------------------------------------
------------------------
| ADD HYD (TBM4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4         4.22     .056     .72   3.28    .000
                     +ID2 02:A-103         10.16     .108     .95   3.70    .000
                      ========================================================
                      SUM 07:TBM4          14.38     .155     .87   3.58    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0015----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=70.00
| 01:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .166 (i)
     TIME TO PEAK    (hrs)=    1.083
     RUNOFF VOLUME    (mm)=    3.278
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .148

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

--------------------------------------------------------------------------------
001:0016----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=79.00
| 02:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .098 (i)
     TIME TO PEAK    (hrs)=     .683
     RUNOFF VOLUME    (mm)=    4.816
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .218

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

--------------------------------------------------------------------------------
001:0017----------------------------------------------------------------------
------------------------
| ADD HYD (TBM5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-5        21.58     .166    1.08   3.28    .000
                     +ID2 02:A-204          4.74     .098     .68   4.82    .000
                      ========================================================
                      SUM 08:TBM5          26.32     .223     .90   3.55    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0018----------------------------------------------------------------------
*#############################################################################
*#                          TOTAL FLOW TO MUD CREEK
*#############################################################################
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 04:TBM1          32.56     .410     .92   4.17    .000
                     +ID2 05:TBM2          20.91     .239     .93   3.89    .000
                     +ID3 06:TBM3           7.99     .100     .93   4.21    .000
                     +ID4 07:TBM4          14.38     .155     .87   3.58    .000
                     +ID5 08:TBM5          26.32     .223     .90   3.55    .000
                      ========================================================
                      SUM 01:TO_MC        102.16    1.125     .92   3.87    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0019----------------------------------------------------------------------
*#############################################################################
*#############################################################################
*#
*#                             AMC III Conditions
*#
*#############################################################################
*#############################################################################
---------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 01:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .247 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    6.850
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .310

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

--------------------------------------------------------------------------------
001:0020----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=90.00
| 02:A-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .539 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    8.692
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .393

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

--------------------------------------------------------------------------------
001:0021----------------------------------------------------------------------
------------------------
| ADD HYD (TBM1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-1        11.83     .247     .90   6.85    .000
                     +ID2 02:A-100         20.73     .539     .90   8.69    .000
                      ========================================================
                      SUM 04:TBM1          32.56     .786     .90   8.02    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0022----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 01:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .211 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    6.152
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .278

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

--------------------------------------------------------------------------------
001:0023----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=91.00
| 02:A-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .250 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    9.282
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .420

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

--------------------------------------------------------------------------------
001:0024----------------------------------------------------------------------
------------------------
| ADD HYD (TBM2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-2        11.61     .211     .92   6.15    .000
                     +ID2 02:A-101          9.30     .250     .92   9.28    .000
                      ========================================================
                      SUM 05:TBM2          20.91     .461     .92   7.54    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0025----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 01:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .069 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=    6.152
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .278

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

--------------------------------------------------------------------------------
001:0026----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=91.00
| 02:A-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .119 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    9.282
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .420

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

--------------------------------------------------------------------------------
001:0027----------------------------------------------------------------------
------------------------
| ADD HYD (TBM3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-3         3.51     .069     .87   6.15    .000
                     +ID2 02:A-102          4.48     .119     .93   9.28    .000
                      ========================================================
                      SUM 06:TBM3           7.99     .187     .90   7.91    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0028----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .230
```

```
     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .111 (i)
     TIME TO PEAK    (hrs)=     .700
     RUNOFF VOLUME    (mm)=    6.486
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .293

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

------------------------------------------------------------------------------
001:0029----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   10.16   Curve Number   (CN)=87.00
| 02:A-103  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .211 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    7.247
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .328

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

------------------------------------------------------------------------------
001:0030----------------------------------------------------------------------
------------------------
| ADD HYD (TBM4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4         4.22     .111     .70   6.49    .000
                     +ID2 02:A-103         10.16     .211     .93   7.25    .000
                      ========================================================
                      SUM 07:TBM4          14.38     .304     .85   7.02    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0031----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   21.58   Curve Number   (CN)=85.00
| 01:EXTA-5 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .327 (i)
     TIME TO PEAK    (hrs)=    1.067
     RUNOFF VOLUME    (mm)=    6.486
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .293

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

------------------------------------------------------------------------------
001:0032----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.74   Curve Number   (CN)=91.00
| 02:A-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .188 (i)
     TIME TO PEAK    (hrs)=     .667
     RUNOFF VOLUME    (mm)=    9.282
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .420

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

------------------------------------------------------------------------------
001:0033----------------------------------------------------------------------
------------------------
| ADD HYD (TBM5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-5        21.58     .327    1.07   6.49    .000
                     +ID2 02:A-204          4.74     .188     .67   9.28    .000
                      ========================================================
                      SUM 08:TBM5          26.32     .434     .88   6.99    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0034----------------------------------------------------------------------
*#*************************************************************************
*#                            TOTAL FLOW TO MUD CREEK
*#*************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 04:TBM1          32.56     .786     .90   8.02    .000
                     +ID2 05:TBM2          20.91     .461     .92   7.54    .000
                     +ID3 06:TBM3           7.99     .187     .90   7.91    .000
                     +ID4 07:TBM4          14.38     .304     .85   7.02    .000
                     +ID5 08:TBM5          26.32     .434     .88   6.99    .000
                      ========================================================
                      SUM 01:TO_MC        102.16    2.168     .90   7.51    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0035----------------------------------------------------------------------
  ** END OF RUN :   1

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 002
    NSTORM=   1
          #  1=LYA2.12h

------------------------------------------------------------------------------
002:0002----------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   : 4730904
*#*************************************************************************
*#*************************************************************************
*#
*#                     Block A - EXISTING CONDITIONS
*#
*#*************************************************************************
------------------------------------------------------------------------------
002:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 2 Year)
| Ptotal=  42.24 mm|    Comments: Belleville IDF (12-hr 30% AES - 2 Year)
--------------------
            TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
             hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
            1.00   3.960 |   4.00   6.600 |   7.00   1.320 |  10.00    .000
            2.00  11.440 |   5.00   6.160 |   8.00    .440 |  11.00    .000
            3.00   8.800 |   6.00   3.520 |   9.00    .000 |  12.00    .000

------------------------------------------------------------------------------
002:0003----------------------------------------------------------------------
*#*************************************************************************
*#*************************************************************************
*#
*#                              AMC II Conditions
*#
*#*************************************************************************
*#*************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.83   Curve Number   (CN)=71.00
| 01:EXTA-1 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .085 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   11.487
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .272

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

------------------------------------------------------------------------------
002:0004----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   20.73   Curve Number   (CN)=78.00
| 02:A-100  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .188 (i)
     TIME TO PEAK    (hrs)=    3.217
     RUNOFF VOLUME    (mm)=   14.769
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .350

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

------------------------------------------------------------------------------
002:0005----------------------------------------------------------------------
------------------------
| ADD HYD (TBM1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-1        11.83     .085    5.07  11.49    .000
                     +ID2 02:A-100         20.73     .188    3.22  14.77    .000
                      ========================================================
                      SUM 04:TBM1          32.56     .271    5.07  13.58    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
002:0006----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.61   Curve Number   (CN)=69.00
| 01:EXTA-2 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .078 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   10.718
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .254

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

------------------------------------------------------------------------------
002:0007----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    9.30   Curve Number   (CN)=79.00
| 02:A-101  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .087 (i)
     TIME TO PEAK    (hrs)=    3.233
     RUNOFF VOLUME    (mm)=   15.331
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .363

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

------------------------------------------------------------------------------
002:0008----------------------------------------------------------------------
------------------------
| ADD HYD (TBM2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-2        11.61     .078    5.07  10.72    .000
                     +ID2 02:A-101          9.30     .087    3.23  15.33    .000
                      ========================================================
                      SUM 05:TBM2          20.91     .164    5.07  12.77    .000
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0009

DESIGN NASHYD	Area (ha)= 3.51	Curve Number (CN)=69.00
01:EXTA-3 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .370	

Unit Hyd Qpeak (cms)= .362

PEAK FLOW (cms)= .024 (i)
TIME TO PEAK (hrs)= 5.067
RUNOFF VOLUME (mm)= 10.718
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .254

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

002:0010

DESIGN NASHYD	Area (ha)= 4.48	Curve Number (CN)=80.00
02:A-102 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .440	

Unit Hyd Qpeak (cms)= .389

PEAK FLOW (cms)= .044 (i)
TIME TO PEAK (hrs)= 3.233
RUNOFF VOLUME (mm)= 15.922
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .377

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

002:0011

ADD HYD (TBM3)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-3	3.51	.024	5.07	10.72	.000
	+ID2 02:A-102	4.48	.044	3.23	15.92	.000
	SUM 06:TBM3	7.99	.067	5.07	13.64	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0012

DESIGN NASHYD	Area (ha)= 4.22	Curve Number (CN)=70.00
01:EXTA-4 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .230	

Unit Hyd Qpeak (cms)= .701

PEAK FLOW (cms)= .030 (i)
TIME TO PEAK (hrs)= 5.017
RUNOFF VOLUME (mm)= 11.095
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .263

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

002:0013

DESIGN NASHYD	Area (ha)= 10.16	Curve Number (CN)=73.00
02:A-103 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .440	

Unit Hyd Qpeak (cms)= .882

PEAK FLOW (cms)= .077 (i)
TIME TO PEAK (hrs)= 5.067
RUNOFF VOLUME (mm)= 12.323
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .292

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

002:0014

ADD HYD (TBM4)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-4	4.22	.030	5.02	11.09	.000
	+ID2 02:A-103	10.16	.077	5.07	12.32	.000
	SUM 07:TBM4	14.38	.107	5.05	11.96	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0015

DESIGN NASHYD	Area (ha)= 21.58	Curve Number (CN)=70.00
01:EXTA-5 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .580	

Unit Hyd Qpeak (cms)= 1.421

PEAK FLOW (cms)= .147 (i)
TIME TO PEAK (hrs)= 5.117
RUNOFF VOLUME (mm)= 11.095
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .263

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

002:0016

DESIGN NASHYD	Area (ha)= 4.74	Curve Number (CN)=79.00
02:A-204 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .200	

Unit Hyd Qpeak (cms)= .905

PEAK FLOW (cms)= .047 (i)
TIME TO PEAK (hrs)= 3.050
RUNOFF VOLUME (mm)= 15.331
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .363

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

002:0017

ADD HYD (TBM5)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-5	21.58	.147	5.12	11.09	.000
	+ID2 02:A-204	4.74	.047	3.05	15.33	.000
	SUM 08:TBM5	26.32	.192	5.03	11.86	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0018

***

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

002:0024

ADD HYD (TBM2)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-2	11.61	.135	3.20	18.62	.000
	+ID2 02:A-101	9.30	.151	3.15	25.20	.000
	SUM 05:TBM2	20.91	.286	3.17	21.55	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0025

DESIGN NASHYD	Area (ha)= 3.51	Curve Number (CN)=84.00
01:EXTA-3 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .370	

Unit Hyd Qpeak (cms)= .362

PEAK FLOW (cms)= .041 (i)
TIME TO PEAK (hrs)= 3.150
RUNOFF VOLUME (mm)= 18.624
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .441

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

002:0026

DESIGN NASHYD	Area (ha)= 4.48	Curve Number (CN)=91.00
02:A-102 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .440	

Unit Hyd Qpeak (cms)= .389

PEAK FLOW (cms)= .073 (i)
TIME TO PEAK (hrs)= 3.150
RUNOFF VOLUME (mm)= 25.201
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .597

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

002:0027

ADD HYD (TBM3)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-3	3.51	.041	3.15	18.62	.000
	+ID2 02:A-102	4.48	.073	3.15	25.20	.000
	SUM 06:TBM3	7.99	.114	3.15	22.31	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0028

DESIGN NASHYD	Area (ha)= 4.22	Curve Number (CN)=85.00
01:EXTA-4 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .230	

Unit Hyd Qpeak (cms)= .701

PEAK FLOW (cms)= .054 (i)
TIME TO PEAK (hrs)= 3.067
RUNOFF VOLUME (mm)= 19.398
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .459

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

002:0029

DESIGN NASHYD	Area (ha)= 10.16	Curve Number (CN)=87.00
02:A-103 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .440	

Unit Hyd Qpeak (cms)= .882

PEAK FLOW (cms)= .135 (i)
TIME TO PEAK (hrs)= 3.183
RUNOFF VOLUME (mm)= 21.091
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .499

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

002:0030

ADD HYD (TBM4)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-4	4.22	.054	3.07	19.40	.000
	+ID2 02:A-103	10.16	.135	3.18	21.09	.000
	SUM 07:TBM4	14.38	.188	3.12	20.59	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0031

DESIGN NASHYD	Area (ha)= 21.58	Curve Number (CN)=85.00
01:EXTA-5 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .580	

Unit Hyd Qpeak (cms)= 1.421

PEAK FLOW (cms)= .252 (i)
TIME TO PEAK (hrs)= 3.400
RUNOFF VOLUME (mm)= 19.398
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .459

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

002:0032

DESIGN NASHYD	Area (ha)= 4.74	Curve Number (CN)=91.00
02:A-204 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .200	

Unit Hyd Qpeak (cms)= .905

PEAK FLOW (cms)= .080 (i)
TIME TO PEAK (hrs)= 3.033
RUNOFF VOLUME (mm)= 25.201
TOTAL RAINFALL (mm)= 42.240
RUNOFF COEFFICIENT = .597

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

002:0033

ADD HYD (TBM5)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-5	21.58	.252	3.40	19.40	.000
	+ID2 02:A-204	4.74	.080	3.03	25.20	.000
	SUM 08:TBM5	26.32	.325	3.17	20.44	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0034

*# TOTAL FLOW TO MUD CREEK

ADD HYD (TO_MC)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 04:TBM1	32.56	.473	3.15	22.67	.000
	+ID2 05:TBM2	20.91	.286	3.17	21.55	.000
	+ID3 06:TBM3	7.99	.114	3.15	22.31	.000
	+ID4 07:TBM4	14.38	.188	3.12	20.59	.000
	+ID5 08:TBM5	26.32	.325	3.17	20.44	.000
	SUM 01:TO_MC	102.16	1.386	3.15	21.55	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0035

002:0002

** END OF RUN : 2

START	Project dir.: C:\TEMP\Loy\
	Rainfall dir.: C:\TEMP\Loy\

TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 003
NSTORM= 1
# 1=LYA5.1hr

003:0002

*# Project Name: [Loyalist Solar - Block A] Project Number: [133560220]
*# Date : 2018-01-15
*# Modeller : [B.Weersink]
*# Company : Stantec Consulting Ltd. (Kitchener)
*# License # : 4730904

*#
*# Block A - 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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN 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 II Conditions
*#

DESIGN NASHYD	Area (ha)= 11.83	Curve Number (CN)=71.00
01:EXTA-1 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .400	

Unit Hyd Qpeak (cms)= 1.130

PEAK FLOW (cms)= .194 (i)
TIME TO PEAK (hrs)= .917
RUNOFF VOLUME (mm)= 5.392
TOTAL RAINFALL (mm)= 28.000
RUNOFF COEFFICIENT = .193

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

003:0004

DESIGN NASHYD	Area (ha)= 20.73	Curve Number (CN)=78.00

```
| 02:A-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .444 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    7.156
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .256

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

------------------------------------------------------------------------------
003:0005----------------------------------------------------------------------
------------------------
| ADD HYD (TBM1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-1       11.83     .194     .92   5.39    .000
                      +ID2 02:A-100        20.73     .444     .92   7.16    .000
                       ========================================================
                       SUM 04:TBM1         32.56     .638     .92   6.51    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0006----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 01:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .171 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    4.994
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .178

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

------------------------------------------------------------------------------
003:0007----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=79.00
| 02:A-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .202 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    7.469
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .267

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

------------------------------------------------------------------------------
003:0008----------------------------------------------------------------------
------------------------
| ADD HYD (TBM2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-2       11.61     .171     .93   4.99    .000
                      +ID2 02:A-101         9.30     .202     .93   7.47    .000
                       ========================================================
                       SUM 05:TBM2         20.91     .373     .93   6.09    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0009----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=69.00
| 01:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .056 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=    4.994
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .178

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

------------------------------------------------------------------------------
003:0010----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=80.00
| 02:A-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .100 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    7.803
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .279

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

------------------------------------------------------------------------------
003:0011----------------------------------------------------------------------
------------------------
| ADD HYD (TBM3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-3        3.51     .056     .88   4.99    .000
                      +ID2 02:A-102         4.48     .100     .93   7.80    .000
                       ========================================================
                       SUM 06:TBM3          7.99     .155     .92   6.57    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0012----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .088 (i)
     TIME TO PEAK    (hrs)=     .717
     RUNOFF VOLUME    (mm)=    5.188
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .185

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

------------------------------------------------------------------------------
003:0013----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=73.00
| 02:A-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .170 (i)
     TIME TO PEAK    (hrs)=     .950
     RUNOFF VOLUME    (mm)=    5.830
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .208

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

------------------------------------------------------------------------------
003:0014----------------------------------------------------------------------
------------------------
| ADD HYD (TBM4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4        4.22     .088     .72   5.19    .000
                      +ID2 02:A-103        10.16     .170     .95   5.83    .000
                       ========================================================
                       SUM 07:TBM4         14.38     .244     .85   5.64    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0015----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=70.00
| 01:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .262 (i)
     TIME TO PEAK    (hrs)=    1.083
     RUNOFF VOLUME    (mm)=    5.188
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .185

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

------------------------------------------------------------------------------
003:0016----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=79.00
| 02:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .151 (i)
     TIME TO PEAK    (hrs)=     .667
     RUNOFF VOLUME    (mm)=    7.469
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .267

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

------------------------------------------------------------------------------
003:0017----------------------------------------------------------------------
------------------------
| ADD HYD (TBM5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-5       21.58     .262    1.08   5.19    .000
                      +ID2 02:A-204         4.74     .151     .67   7.47    .000
                       ========================================================
                       SUM 08:TBM5         26.32     .350     .90   5.60    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0018----------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 04:TBM1         32.56     .638     .92   6.51    .000
                      +ID2 05:TBM2         20.91     .373     .93   6.09    .000
                      +ID3 06:TBM3          7.99     .155     .92   6.57    .000
                      +ID4 07:TBM4         14.38     .244     .85   5.64    .000
                      +ID5 08:TBM5         26.32     .350     .90   5.60    .000
                       ========================================================
                       SUM 01:TO_MC       102.16    1.757     .90   6.07    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0019----------------------------------------------------------------------
*#*************************************************************************
*#*************************************************************************
*#
*#                            AMC III Conditions
*#
*#*************************************************************************
*#*************************************************************************
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 01:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .371 (i)
```

```
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   10.350
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .370

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

-------------------------------------------------------------------------------
003:0020---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=90.00
| 02:A-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .793 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   12.833
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .458

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

-------------------------------------------------------------------------------
003:0021---------------------------------------------------------------------
------------------------
| ADD HYD (TBM1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-1       11.83     .371     .90  10.35    .000
                      +ID2 02:A-100        20.73     .793     .90  12.83    .000
                       ========================================================
                       SUM 04:TBM1         32.56    1.164     .90  11.93    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0022---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 01:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .321 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    9.378
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .335

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

-------------------------------------------------------------------------------
003:0023---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=91.00
| 02:A-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .366 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   13.604
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .486

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

-------------------------------------------------------------------------------
003:0024---------------------------------------------------------------------
------------------------
| ADD HYD (TBM2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-2       11.61     .321     .92   9.38    .000
                      +ID2 02:A-101         9.30     .366     .92  13.60    .000
                       ========================================================
                       SUM 05:TBM2         20.91     .686     .92  11.26    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0025---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 01:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .105 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=    9.378
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .335

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

-------------------------------------------------------------------------------
003:0026---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=91.00
| 02:A-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .173 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   13.604
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .486

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

-------------------------------------------------------------------------------
003:0027---------------------------------------------------------------------
------------------------
| ADD HYD (TBM3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-3        3.51     .105     .87   9.38    .000
                      +ID2 02:A-102         4.48     .173     .92  13.60    .000
                       ========================================================
                       SUM 06:TBM3          7.99     .278     .90  11.75    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0028---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .168 (i)
     TIME TO PEAK    (hrs)=     .700
     RUNOFF VOLUME    (mm)=    9.846
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .352

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

-------------------------------------------------------------------------------
003:0029---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=87.00
| 02:A-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .316 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=   10.895
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .389

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

-------------------------------------------------------------------------------
003:0030---------------------------------------------------------------------
------------------------
| ADD HYD (TBM4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4        4.22     .168     .70   9.85    .000
                      +ID2 02:A-103        10.16     .316     .93  10.90    .000
                       ========================================================
                       SUM 07:TBM4         14.38     .456     .83  10.59    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0031---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 01:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .496 (i)
     TIME TO PEAK    (hrs)=    1.067
     RUNOFF VOLUME    (mm)=    9.846
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .352

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

-------------------------------------------------------------------------------
003:0032---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=91.00
| 02:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .273 (i)
     TIME TO PEAK    (hrs)=     .650
     RUNOFF VOLUME    (mm)=   13.604
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .486

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

-------------------------------------------------------------------------------
003:0033---------------------------------------------------------------------
------------------------
| ADD HYD (TBM5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-5       21.58     .496    1.07   9.85    .000
                      +ID2 02:A-204         4.74     .273     .65  13.60    .000
                       ========================================================
                       SUM 08:TBM5         26.32     .648     .88  10.52    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0034---------------------------------------------------------------------
*#*****************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*****************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 04:TBM1         32.56    1.164     .90  11.93    .000
                      +ID2 05:TBM2         20.91     .686     .92  11.26    .000
                      +ID3 06:TBM3          7.99     .278     .90  11.75    .000
                      +ID4 07:TBM4         14.38     .456     .83  10.59    .000
                      +ID5 08:TBM5         26.32     .648     .88  10.52    .000
                       ========================================================
                       SUM 01:TO_MC       102.16    3.227     .88  11.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0035---------------------------------------------------------------------
-------------------------------------------------------------------------------
003:0002---------------------------------------------------------------------
-------------------------------------------------------------------------------
003:0002---------------------------------------------------------------------
```

```
  ** END OF RUN :   3

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =    .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 004
    NSTORM=   1
           #  1=LYA5.12h
-------------------------------------------------------------------------------
004:0002---------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*****************************************************************************
*#*****************************************************************************
*#
*#                     Block A - EXISTING 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 II Conditions
*#
*#*****************************************************************************
*#*****************************************************************************
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 01:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .135 (i)
     TIME TO PEAK    (hrs)=    3.200
     RUNOFF VOLUME    (mm)=   18.752
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .335

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

-------------------------------------------------------------------------------
004:0004---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=78.00
| 02:A-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .303 (i)
     TIME TO PEAK    (hrs)=    3.183
     RUNOFF VOLUME    (mm)=   23.525
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .420

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

-------------------------------------------------------------------------------
004:0005---------------------------------------------------------------------
------------------------
| ADD HYD (TBM1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-1       11.83     .135    3.20  18.75    .000
                      +ID2 02:A-100        20.73     .303    3.18  23.53    .000
                       ========================================================
                       SUM 04:TBM1         32.56     .438    3.20  21.79    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0006---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 01:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .125 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   17.598
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .314

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

-------------------------------------------------------------------------------
004:0007---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=79.00
| 02:A-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .140 (i)
     TIME TO PEAK    (hrs)=    3.200
     RUNOFF VOLUME    (mm)=   24.320
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .435

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

-------------------------------------------------------------------------------
004:0008---------------------------------------------------------------------
------------------------
| ADD HYD (TBM2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-2       11.61     .125    5.07  17.60    .000
                      +ID2 02:A-101         9.30     .140    3.20  24.32    .000
                       ========================================================
                       SUM 05:TBM2         20.91     .264    3.22  20.59    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0009---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=69.00
| 01:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .038 (i)
     TIME TO PEAK    (hrs)=    5.050
     RUNOFF VOLUME    (mm)=   17.598
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .314

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

-------------------------------------------------------------------------------
004:0010---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=80.00
| 02:A-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .070 (i)
     TIME TO PEAK    (hrs)=    3.200
     RUNOFF VOLUME    (mm)=   25.149
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .449

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

-------------------------------------------------------------------------------
004:0011---------------------------------------------------------------------
------------------------
| ADD HYD (TBM3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-3        3.51     .038    5.05  17.60    .000
                      +ID2 02:A-102         4.48     .070    3.20  25.15    .000
                       ========================================================
                       SUM 06:TBM3          7.99     .108    3.20  21.83    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0012---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .049 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   18.165
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .325

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

-------------------------------------------------------------------------------
004:0013---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=73.00
| 02:A-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .123 (i)
     TIME TO PEAK    (hrs)=    3.250
     RUNOFF VOLUME    (mm)=   19.990
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .357

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

-------------------------------------------------------------------------------
004:0014---------------------------------------------------------------------
------------------------
| ADD HYD (TBM4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4        4.22     .049    3.07  18.16    .000
                      +ID2 02:A-103        10.16     .123    3.25  19.99    .000
                       ========================================================
                       SUM 07:TBM4         14.38     .171    3.15  19.45    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0015---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=70.00
| 01:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .236 (i)
     TIME TO PEAK    (hrs)=    5.100
```

```
     RUNOFF VOLUME    (mm)=   18.165
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .325

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

--------------------------------------------------------------------------------
004:0016----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.74   Curve Number   (CN)=79.00
| 02:A-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .076 (i)
     TIME TO PEAK    (hrs)=    3.050
     RUNOFF VOLUME    (mm)=   24.320
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .435

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

--------------------------------------------------------------------------------
004:0017----------------------------------------------------------------------
------------------------
| ADD HYD (TBM5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-5        21.58     .236    5.10  18.16    .000
                     +ID2 02:A-204          4.74     .076    3.05  24.32    .000
                      ========================================================
                      SUM 08:TBM5          26.32     .304    5.03  19.27    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0018----------------------------------------------------------------------
*#*****************************************************************************
*#                            TOTAL FLOW TO MUD CREEK
*#*****************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 04:TBM1          32.56     .438    3.20  21.79    .000
                     +ID2 05:TBM2          20.91     .264    3.22  20.59    .000
                     +ID3 06:TBM3           7.99     .108    3.20  21.83    .000
                     +ID4 07:TBM4          14.38     .171    3.15  19.45    .000
                     +ID5 08:TBM5          26.32     .304    5.03  19.27    .000
                      ========================================================
                      SUM 01:TO_MC        102.16    1.275    3.20  20.57    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0019----------------------------------------------------------------------
*#*****************************************************************************
*#*****************************************************************************
*#
*#                              AMC III Conditions
*#
*#*****************************************************************************
*#*****************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.83   Curve Number   (CN)=86.00
| 01:EXTA-1 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .235 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   30.963
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .553

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

--------------------------------------------------------------------------------
004:0020----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   20.73   Curve Number   (CN)=90.00
| 02:A-100  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .483 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   35.878
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .641

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

--------------------------------------------------------------------------------
004:0021----------------------------------------------------------------------
------------------------
| ADD HYD (TBM1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-1        11.83     .235    3.13  30.96    .000
                     +ID2 02:A-100         20.73     .483    3.12  35.88    .000
                      ========================================================
                      SUM 04:TBM1          32.56     .718    3.12  34.09    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0022----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.61   Curve Number   (CN)=84.00
| 01:EXTA-2 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .212 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   28.846
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .515

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

--------------------------------------------------------------------------------
004:0023----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    9.30   Curve Number   (CN)=91.00
| 02:A-101  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .226 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   37.276
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .666

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

--------------------------------------------------------------------------------
004:0024----------------------------------------------------------------------
------------------------
| ADD HYD (TBM2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-2        11.61     .212    3.17  28.85    .000
                     +ID2 02:A-101          9.30     .226    3.10  37.28    .000
                      ========================================================
                      SUM 05:TBM2          20.91     .437    3.13  32.60    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0025----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    3.51   Curve Number   (CN)=84.00
| 01:EXTA-3 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .065 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   28.846
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .515

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

--------------------------------------------------------------------------------
004:0026----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.48   Curve Number   (CN)=91.00
| 02:A-102  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .109 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   37.276
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .666

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

--------------------------------------------------------------------------------
004:0027----------------------------------------------------------------------
------------------------
| ADD HYD (TBM3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-3         3.51     .065    3.13  28.85    .000
                     +ID2 02:A-102          4.48     .109    3.12  37.28    .000
                      ========================================================
                      SUM 06:TBM3           7.99     .173    3.12  33.57    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0028----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .083 (i)
     TIME TO PEAK    (hrs)=    3.050
     RUNOFF VOLUME    (mm)=   29.879
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .534

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

--------------------------------------------------------------------------------
004:0029----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   10.16   Curve Number   (CN)=87.00
| 02:A-103  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .208 (i)
     TIME TO PEAK    (hrs)=    3.150
     RUNOFF VOLUME    (mm)=   32.100
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .574

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

--------------------------------------------------------------------------------
004:0030----------------------------------------------------------------------
------------------------
| ADD HYD (TBM4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4         4.22     .083    3.05  29.88    .000
                     +ID2 02:A-103         10.16     .208    3.15  32.10    .000
                      ========================================================
                      SUM 07:TBM4          14.38     .291    3.10  31.45    .000

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

```
--------------------------------------------------------------------------------
004:0031--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 01:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .395 (i)
     TIME TO PEAK    (hrs)=    3.317
     RUNOFF VOLUME    (mm)=   29.879
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .534

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

--------------------------------------------------------------------------------
004:0032--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=91.00
| 02:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .121 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=   37.276
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .666

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

--------------------------------------------------------------------------------
004:0033--------------------------------------------------------------------------
------------------------
| ADD HYD (TBM5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 01:EXTA-5      21.58     .395    3.32  29.88    .000
                       +ID2 02:A-204        4.74     .121    2.08  37.28    .000
                        ==========================================================
                        SUM 08:TBM5        26.32     .504    3.13  31.21    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0034--------------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 04:TBM1        32.56     .718    3.12  34.09    .000
                       +ID2 05:TBM2        20.91     .437    3.13  32.60    .000
                       +ID3 06:TBM3         7.99     .173    3.12  33.57    .000
                       +ID4 07:TBM4        14.38     .291    3.10  31.45    .000
                       +ID5 08:TBM5        26.32     .504    3.13  31.21    .000
                        ==========================================================
                        SUM 01:TO_MC      102.16    2.124    3.12  32.63    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0035--------------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002--------------------------------------------------------------------------
  ** END OF RUN :   4

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 005
    NSTORM=   1
          #  1=LYA100.1hr
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*************************************************************************
*#*************************************************************************
*#
*#                     Block A - 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)=   11.83   Curve Number   (CN)=71.00
| 01:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .444 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   12.400
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .281

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

--------------------------------------------------------------------------------
005:0004--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=78.00
| 02:A-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .981 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   15.885
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .360

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

--------------------------------------------------------------------------------
005:0005--------------------------------------------------------------------------
------------------------
| ADD HYD (TBM1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 01:EXTA-1      11.83     .444     .90  12.40    .000
                       +ID2 02:A-100       20.73     .981     .90  15.89    .000
                        ==========================================================
                        SUM 04:TBM1        32.56    1.425     .90  14.62    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0006--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 01:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .395 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   11.580
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .263

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

--------------------------------------------------------------------------------
005:0007--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=79.00
| 02:A-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .443 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   16.480
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .374

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

--------------------------------------------------------------------------------
005:0008--------------------------------------------------------------------------
------------------------
| ADD HYD (TBM2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 01:EXTA-2      11.61     .395     .92  11.58    .000
                       +ID2 02:A-101        9.30     .443     .92  16.48    .000
                        ==========================================================
                        SUM 05:TBM2        20.91     .838     .92  13.76    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0009--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=69.00
| 01:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .129 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=   11.580
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .263

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

--------------------------------------------------------------------------------
005:0010--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=80.00
| 02:A-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .218 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=   17.104
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .388
```

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

005:0011

ADD HYD (TBM3)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-3	3.51	.129	.87	11.58	.000
	+ID2 02:A-102	4.48	.218	.93	17.10	.000
	SUM 06:TBM3	7.99	.346	.90	14.68	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0012

DESIGN NASHYD	Area (ha)= 4.22	Curve Number (CN)=70.00
01:EXTA-4 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .230	

Unit Hyd Qpeak (cms)= .701

PEAK FLOW (cms)= .203 (i)
TIME TO PEAK (hrs)= .700
RUNOFF VOLUME (mm)= 11.982
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .272

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

005:0013

DESIGN NASHYD	Area (ha)= 10.16	Curve Number (CN)=73.00
02:A-103 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .440	

Unit Hyd Qpeak (cms)= .882

PEAK FLOW (cms)= .385 (i)
TIME TO PEAK (hrs)= .933
RUNOFF VOLUME (mm)= 13.291
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .301

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

005:0014

ADD HYD (TBM4)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-4	4.22	.203	.70	11.98	.000
	+ID2 02:A-103	10.16	.385	.93	13.29	.000
	SUM 07:TBM4	14.38	.555	.85	12.91	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0015

DESIGN NASHYD	Area (ha)= 21.58	Curve Number (CN)=70.00
01:EXTA-5 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .580	

Unit Hyd Qpeak (cms)= 1.421

PEAK FLOW (cms)= .603 (i)
TIME TO PEAK (hrs)= 1.067
RUNOFF VOLUME (mm)= 11.982
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .272

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

005:0016

DESIGN NASHYD	Area (ha)= 4.74	Curve Number (CN)=79.00
02:A-204 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .200	

Unit Hyd Qpeak (cms)= .905

PEAK FLOW (cms)= .330 (i)
TIME TO PEAK (hrs)= .667
RUNOFF VOLUME (mm)= 16.480
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .374

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

005:0017

ADD HYD (TBM5)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-5	21.58	.603	1.07	11.98	.000
	+ID2 02:A-204	4.74	.330	.67	16.48	.000
	SUM 08:TBM5	26.32	.791	.88	12.79	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0018

*# TOTAL FLOW TO MUD CREEK

ADD HYD (TO_MC)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 04:TBM1	32.56	1.425	.90	14.62	.000
	+ID2 05:TBM2	20.91	.838	.92	13.76	.000
	+ID3 06:TBM3	7.99	.346	.90	14.68	.000
	+ID4 07:TBM4	14.38	.555	.85	12.91	.000
	+ID5 08:TBM5	26.32	.791	.88	12.79	.000
	SUM 01:TO_MC	102.16	3.947	.90	13.74	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0019

*# AMC III Conditions

DESIGN NASHYD	Area (ha)= 11.83	Curve Number (CN)=86.00
01:EXTA-1 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .400	

Unit Hyd Qpeak (cms)= 1.130

PEAK FLOW (cms)= .771 (i)
TIME TO PEAK (hrs)= .867
RUNOFF VOLUME (mm)= 21.617
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .490

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

005:0020

DESIGN NASHYD	Area (ha)= 20.73	Curve Number (CN)=90.00
02:A-100 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .410	

Unit Hyd Qpeak (cms)= 1.931

PEAK FLOW (cms)= 1.574 (i)
TIME TO PEAK (hrs)= .867
RUNOFF VOLUME (mm)= 25.624
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .581

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

005:0021

ADD HYD (TBM1)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-1	11.83	.771	.87	21.62	.000
	+ID2 02:A-100	20.73	1.574	.87	25.62	.000
	SUM 04:TBM1	32.56	2.345	.87	24.17	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0022

DESIGN NASHYD	Area (ha)= 11.61	Curve Number (CN)=84.00
01:EXTA-2 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .420	

Unit Hyd Qpeak (cms)= 1.056

PEAK FLOW (cms)= .678 (i)
TIME TO PEAK (hrs)= .900
RUNOFF VOLUME (mm)= 19.947
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .452

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

005:0023

DESIGN NASHYD	Area (ha)= 9.30	Curve Number (CN)=91.00
02:A-101 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .430	

Unit Hyd Qpeak (cms)= .826

PEAK FLOW (cms)= .716 (i)
TIME TO PEAK (hrs)= .883
RUNOFF VOLUME (mm)= 26.798
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .608

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

005:0024

ADD HYD (TBM2)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-2	11.61	.678	.90	19.95	.000
	+ID2 02:A-101	9.30	.716	.88	26.80	.000
	SUM 05:TBM2	20.91	1.394	.90	22.99	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0025

DESIGN NASHYD	Area (ha)= 3.51	Curve Number (CN)=84.00
01:EXTA-3 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .370	

Unit Hyd Qpeak (cms)= .362

PEAK FLOW (cms)= .221 (i)
TIME TO PEAK (hrs)= .850
RUNOFF VOLUME (mm)= 19.947
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .452

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

005:0026

```
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=91.00
| 02:A-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .340 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   26.798
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .608

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

------------------------------------------------------------------------------
005:0027----------------------------------------------------------------------
------------------------
| ADD HYD (TBM3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-3        3.51     .221     .85  19.95    .000
                      +ID2 02:A-102         4.48     .340     .90  26.80    .000
                       ========================================================
                       SUM 06:TBM3          7.99     .560     .88  23.79    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
005:0028----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .351 (i)
     TIME TO PEAK    (hrs)=     .683
     RUNOFF VOLUME    (mm)=   20.758
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .471

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

------------------------------------------------------------------------------
005:0029----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=87.00
| 02:A-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .649 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   22.528
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .511

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

------------------------------------------------------------------------------
005:0030----------------------------------------------------------------------
------------------------
| ADD HYD (TBM4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4        4.22     .351     .68  20.76    .000
                      +ID2 02:A-103        10.16     .649     .92  22.53    .000
                       ========================================================
                       SUM 07:TBM4         14.38     .944     .82  22.01    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
005:0031----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 01:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=    1.041 (i)
     TIME TO PEAK    (hrs)=    1.050
     RUNOFF VOLUME    (mm)=   20.758
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .471

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

------------------------------------------------------------------------------
005:0032----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=91.00
| 02:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .533 (i)
     TIME TO PEAK    (hrs)=     .633
     RUNOFF VOLUME    (mm)=   26.798
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .608

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

------------------------------------------------------------------------------
005:0033----------------------------------------------------------------------
------------------------
| ADD HYD (TBM5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-5        21.58    1.041    1.05  20.76    .000
                      +ID2 02:A-204          4.74     .533     .63  26.80    .000
                       ========================================================
                       SUM 08:TBM5          26.32    1.330     .88  21.85    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
005:0034----------------------------------------------------------------------
*#**************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#**************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 04:TBM1          32.56    2.345     .87  24.17    .000
                      +ID2 05:TBM2          20.91    1.394     .90  22.99    .000
                      +ID3 06:TBM3           7.99     .560     .88  23.79    .000
                      +ID4 07:TBM4          14.38     .944     .82  22.01    .000
                      +ID5 08:TBM5          26.32    1.330     .88  21.85    .000
                       ========================================================
                       SUM 01:TO_MC        102.16    6.560     .87  23.00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
005:0035----------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
  ** END OF RUN :   5

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
           #  1=LYA100.12h
------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
*#**************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#**************************************************************************
*#**************************************************************************
*#
*#                    Block A - 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)=   11.83   Curve Number   (CN)=71.00
| 01:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .321 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   43.381
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .463

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

------------------------------------------------------------------------------
006:0004----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=78.00
| 02:A-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .685 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   51.882
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .554

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

------------------------------------------------------------------------------
006:0005----------------------------------------------------------------------
------------------------
| ADD HYD (TBM1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-1        11.83     .321    3.17  43.38    .000
                      +ID2 02:A-100         20.73     .685    3.13  51.88    .000
                       ========================================================
                       SUM 04:TBM1          32.56    1.006    3.15  48.79    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
006:0006----------------------------------------------------------------------
----------------------
```

DESIGN NASHYD	Area (ha)= 11.61	Curve Number (CN)=69.00
01:EXTA-2 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .420	

Unit Hyd Qpeak (cms)= 1.056

PEAK FLOW (cms)= .297 (i)
TIME TO PEAK (hrs)= 3.183
RUNOFF VOLUME (mm)= 41.200
TOTAL RAINFALL (mm)= 93.696
RUNOFF COEFFICIENT = .440

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

006:0007

DESIGN NASHYD	Area (ha)= 9.30	Curve Number (CN)=79.00
02:A-101 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .430	

Unit Hyd Qpeak (cms)= .826

PEAK FLOW (cms)= .315 (i)
TIME TO PEAK (hrs)= 3.150
RUNOFF VOLUME (mm)= 53.221
TOTAL RAINFALL (mm)= 93.696
RUNOFF COEFFICIENT = .568

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

006:0008

ADD HYD (TBM2)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-2	11.61	.297	3.18	41.20	.000
	+ID2 02:A-101	9.30	.315	3.15	53.22	.000
	SUM 05:TBM2	20.91	.611	3.17	46.55	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

006:0009

DESIGN NASHYD	Area (ha)= 3.51	Curve Number (CN)=69.00
01:EXTA-3 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .370	

Unit Hyd Qpeak (cms)= .362

PEAK FLOW (cms)= .091 (i)
TIME TO PEAK (hrs)= 3.150
RUNOFF VOLUME (mm)= 41.200
TOTAL RAINFALL (mm)= 93.696
RUNOFF COEFFICIENT = .440

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

006:0010

DESIGN NASHYD	Area (ha)= 4.48	Curve Number (CN)=80.00
02:A-102 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .440	

Unit Hyd Qpeak (cms)= .389

PEAK FLOW (cms)= .156 (i)
TIME TO PEAK (hrs)= 3.150
RUNOFF VOLUME (mm)= 54.594
TOTAL RAINFALL (mm)= 93.696
RUNOFF COEFFICIENT = .583

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

006:0011

ADD HYD (TBM3)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-3	3.51	.091	3.15	41.20	.000
	+ID2 02:A-102	4.48	.156	3.15	54.59	.000
	SUM 06:TBM3	7.99	.246	3.15	48.71	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

006:0012

DESIGN NASHYD	Area (ha)= 4.22	Curve Number (CN)=70.00
01:EXTA-4 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .230	

Unit Hyd Qpeak (cms)= .701

PEAK FLOW (cms)= .116 (i)
TIME TO PEAK (hrs)= 3.067
RUNOFF VOLUME (mm)= 42.278
TOTAL RAINFALL (mm)= 93.696
RUNOFF COEFFICIENT = .451

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

006:0013

DESIGN NASHYD	Area (ha)= 10.16	Curve Number (CN)=73.00
02:A-103 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .440	

Unit Hyd Qpeak (cms)= .882

PEAK FLOW (cms)= .290 (i)
TIME TO PEAK (hrs)= 3.183
RUNOFF VOLUME (mm)= 45.665
TOTAL RAINFALL (mm)= 93.696
RUNOFF COEFFICIENT = .487

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

006:0014

ADD HYD (TBM4)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-4	4.22	.116	3.07	42.28	.000
	+ID2 02:A-103	10.16	.290	3.18	45.66	.000
	SUM 07:TBM4	14.38	.404	3.12	44.67	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

006:0015

DESIGN NASHYD	Area (ha)= 21.58	Curve Number (CN)=70.00
01:EXTA-5 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .580	

Unit Hyd Qpeak (cms)= 1.421

PEAK FLOW (cms)= .546 (i)
TIME TO PEAK (hrs)= 3.383
RUNOFF VOLUME (mm)= 42.278
TOTAL RAINFALL (mm)= 93.696
RUNOFF COEFFICIENT = .451

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

006:0016

DESIGN NASHYD	Area (ha)= 4.74	Curve Number (CN)=79.00
02:A-204 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .200	

Unit Hyd Qpeak (cms)= .905

PEAK FLOW (cms)= .167 (i)
TIME TO PEAK (hrs)= 3.033
RUNOFF VOLUME (mm)= 53.221
TOTAL RAINFALL (mm)= 93.696
RUNOFF COEFFICIENT = .568

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

006:0017

ADD HYD (TBM5)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-5	21.58	.546	3.38	42.28	.000
	+ID2 02:A-204	4.74	.167	3.03	53.22	.000
	SUM 08:TBM5	26.32	.698	3.15	44.25	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

006:0018

****
\# TOTAL FLOW TO MUD CREEK
****

ADD HYD (TO_MC)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 04:TBM1	32.56	1.006	3.15	48.79	.000
	+ID2 05:TBM2	20.91	.611	3.17	46.55	.000
	+ID3 06:TBM3	7.99	.246	3.15	48.71	.000
	+ID4 07:TBM4	14.38	.404	3.12	44.67	.000
	+ID5 08:TBM5	26.32	.698	3.15	44.25	.000
	SUM 01:TO_MC	102.16	2.965	3.15	46.58	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

006:0019

****
\#
\# AMC III Conditions
\#
****

DESIGN NASHYD	Area (ha)= 11.83	Curve Number (CN)=86.00
01:EXTA-1 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .400	

Unit Hyd Qpeak (cms)= 1.130

PEAK FLOW (cms)= .489 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 63.650
TOTAL RAINFALL (mm)= 93.696
RUNOFF COEFFICIENT = .679

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

006:0020

DESIGN NASHYD	Area (ha)= 20.73	Curve Number (CN)=90.00
02:A-100 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .410	

Unit Hyd Qpeak (cms)= 1.931

PEAK FLOW (cms)= .956 (i)
TIME TO PEAK (hrs)= 2.467
RUNOFF VOLUME (mm)= 70.588
TOTAL RAINFALL (mm)= 93.696
RUNOFF COEFFICIENT = .753

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

006:0021

ADD HYD (TBM1)	ID: NHYD	AREA	QPEAK	TPEAK	R.V.	DWF

```
                                          (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-1       11.83     .489    3.08  63.65    .000
                     +ID2 02:A-100        20.73     .956    2.47  70.59    .000
                      ========================================================
                      SUM 04:TBM1         32.56    1.444    3.07  68.07    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0022----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 01:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .453 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   60.466
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .645

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

--------------------------------------------------------------------------------
006:0023----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=91.00
| 02:A-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .442 (i)
     TIME TO PEAK    (hrs)=    2.483
     RUNOFF VOLUME    (mm)=   72.454
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .773

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

--------------------------------------------------------------------------------
006:0024----------------------------------------------------------------------
------------------------
| ADD HYD (TBM2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-2       11.61     .453    3.12  60.47    .000
                     +ID2 02:A-101         9.30     .442    2.48  72.45    .000
                      ========================================================
                      SUM 05:TBM2         20.91     .892    3.08  65.80    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0025----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 01:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .138 (i)
     TIME TO PEAK    (hrs)=    3.083
     RUNOFF VOLUME    (mm)=   60.466
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .645

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

--------------------------------------------------------------------------------
006:0026----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=91.00
| 02:A-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .212 (i)
     TIME TO PEAK    (hrs)=    2.533
     RUNOFF VOLUME    (mm)=   72.454
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .773

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

--------------------------------------------------------------------------------
006:0027----------------------------------------------------------------------
------------------------
| ADD HYD (TBM3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-3        3.51     .138    3.08  60.47    .000
                     +ID2 02:A-102         4.48     .212    2.53  72.45    .000
                      ========================================================
                      SUM 06:TBM3          7.99     .350    3.07  67.19    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0028----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .175 (i)
     TIME TO PEAK    (hrs)=    2.117
     RUNOFF VOLUME    (mm)=   62.036
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .662

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

--------------------------------------------------------------------------------
006:0029----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=87.00
| 02:A-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .430 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   65.310
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .697

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

--------------------------------------------------------------------------------
006:0030----------------------------------------------------------------------
------------------------
| ADD HYD (TBM4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4        4.22     .175    2.12  62.04    .000
                     +ID2 02:A-103        10.16     .430    3.10  65.31    .000
                      ========================================================
                      SUM 07:TBM4         14.38     .603    3.07  64.35    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0031----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 01:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .842 (i)
     TIME TO PEAK    (hrs)=    3.217
     RUNOFF VOLUME    (mm)=   62.036
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .662

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

--------------------------------------------------------------------------------
006:0032----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=91.00
| 02:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .252 (i)
     TIME TO PEAK    (hrs)=    2.067
     RUNOFF VOLUME    (mm)=   72.454
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .773

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

--------------------------------------------------------------------------------
006:0033----------------------------------------------------------------------
------------------------
| ADD HYD (TBM5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-5       21.58     .842    3.22  62.04    .000
                     +ID2 02:A-204         4.74     .252    2.07  72.45    .000
                      ========================================================
                      SUM 08:TBM5         26.32    1.059    3.08  63.91    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0034----------------------------------------------------------------------
*#**************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#**************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 04:TBM1         32.56    1.444    3.07  68.07    .000
                     +ID2 05:TBM2         20.91     .892    3.08  65.80    .000
                     +ID3 06:TBM3          7.99     .350    3.07  67.19    .000
                     +ID4 07:TBM4         14.38     .603    3.07  64.35    .000
                     +ID5 08:TBM5         26.32    1.059    3.08  63.91    .000
                      ========================================================
                      SUM 01:TO_MC       102.16    4.348    3.07  65.94    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0035----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
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006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
  ** END OF RUN :   6

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 007
    NSTORM=   1
          #  1=25mm.4hr
--------------------------------------------------------------------------------
007:0002----------------------------------------------------------------------
*#**************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
```

```
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*************************************************************************
*#*************************************************************************
*#
*#                     Block A - EXISTING CONDITIONS
*#
*#*************************************************************************
-------------------------------------------------------------------------------
007:0002----------------------------------------------------------------------
--------------------
| 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

-------------------------------------------------------------------------------
007:0003----------------------------------------------------------------------
*#*************************************************************************
*#*************************************************************************
*#
*#                              AMC II Conditions
*#
*#*************************************************************************
*#*************************************************************************
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 01:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .107 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=    4.340
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .174

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

-------------------------------------------------------------------------------
007:0004----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=78.00
| 02:A-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .251 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=    5.805
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .232

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

-------------------------------------------------------------------------------
007:0005----------------------------------------------------------------------
------------------------
| ADD HYD (TBM1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-1        11.83     .107    2.10   4.34    .000
                     +ID2 02:A-100         20.73     .251    2.10   5.80    .000
                      ==========================================================
                      SUM 04:TBM1          32.56     .358    2.10   5.27    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0006----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 01:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .094 (i)
     TIME TO PEAK    (hrs)=    2.117
     RUNOFF VOLUME    (mm)=    4.013
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .161

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

-------------------------------------------------------------------------------
007:0007----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=79.00
| 02:A-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .114 (i)
     TIME TO PEAK    (hrs)=    2.133
     RUNOFF VOLUME    (mm)=    6.068
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .243

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

-------------------------------------------------------------------------------
007:0008----------------------------------------------------------------------
------------------------
| ADD HYD (TBM2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-2        11.61     .094    2.12   4.01    .000
                     +ID2 02:A-101         9.30      .114    2.13   6.07    .000
                      ==========================================================
                      SUM 05:TBM2          20.91     .208    2.12   4.93    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0009----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=69.00
| 01:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .031 (i)
     TIME TO PEAK    (hrs)=    2.050
     RUNOFF VOLUME    (mm)=    4.013
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .161

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

-------------------------------------------------------------------------------
007:0010----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=80.00
| 02:A-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .057 (i)
     TIME TO PEAK    (hrs)=    2.133
     RUNOFF VOLUME    (mm)=    6.348
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .254

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

-------------------------------------------------------------------------------
007:0011----------------------------------------------------------------------
------------------------
| ADD HYD (TBM3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-3         3.51     .031    2.05   4.01    .000
                     +ID2 02:A-102          4.48     .057    2.13   6.35    .000
                      ==========================================================
                      SUM 06:TBM3           7.99     .087    2.10   5.32    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0012----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .052 (i)
     TIME TO PEAK    (hrs)=    1.867
     RUNOFF VOLUME    (mm)=    4.172
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .167

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

-------------------------------------------------------------------------------
007:0013----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=73.00
| 02:A-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .094 (i)
     TIME TO PEAK    (hrs)=    2.150
     RUNOFF VOLUME    (mm)=    4.702
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .188

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

-------------------------------------------------------------------------------
007:0014----------------------------------------------------------------------
------------------------
| ADD HYD (TBM4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4         4.22     .052    1.87   4.17    .000
                     +ID2 02:A-103         10.16     .094    2.15   4.70    .000
                      ==========================================================
                      SUM 07:TBM4          14.38     .135    2.02   4.55    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0015----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=70.00
| 01:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .146 (i)
     TIME TO PEAK    (hrs)=    2.333
     RUNOFF VOLUME    (mm)=    4.173
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .167

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

-------------------------------------------------------------------------------
007:0016----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=79.00
| 02:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200
```

```
     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .095 (i)
     TIME TO PEAK    (hrs)=    1.817
     RUNOFF VOLUME    (mm)=    6.068
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .243

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

-------------------------------------------------------------------------------
007:0017----------------------------------------------------------------------
----------------------
| ADD HYD (TBM5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-5       21.58     .146    2.33   4.17    .000
                     +ID2 02:A-204         4.74     .095    1.82   6.07    .000
                      ========================================================
                      SUM 08:TBM5         26.32     .191    2.08   4.51    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0018----------------------------------------------------------------------
*#############################################################################
*#                          TOTAL FLOW TO MUD CREEK
*#############################################################################
----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 04:TBM1         32.56     .358    2.10   5.27    .000
                     +ID2 05:TBM2         20.91     .208    2.12   4.93    .000
                     +ID3 06:TBM3          7.99     .087    2.10   5.32    .000
                     +ID4 07:TBM4         14.38     .135    2.02   4.55    .000
                     +ID5 08:TBM5         26.32     .191    2.08   4.51    .000
                      ========================================================
                      SUM 01:TO_MC       102.16     .976    2.10   4.91    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0019----------------------------------------------------------------------
*#############################################################################
*#############################################################################
*#
*#                              AMC III Conditions
*#
*#############################################################################
*#############################################################################
---------------------
| DESIGN NASHYD     |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 01:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .219 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=    8.516
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .341

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

-------------------------------------------------------------------------------
007:0020----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   20.73   Curve Number   (CN)=90.00
| 02:A-100  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .482 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=   10.677
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .427

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

-------------------------------------------------------------------------------
007:0021----------------------------------------------------------------------
----------------------
| ADD HYD (TBM1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-1       11.83     .219    2.08   8.52    .000
                     +ID2 02:A-100        20.73     .482    2.08  10.68    .000
                      ========================================================
                      SUM 04:TBM1         32.56     .701    2.08   9.89    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0022----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 01:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .186 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=    7.683
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .307

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

-------------------------------------------------------------------------------
007:0023----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    9.30   Curve Number   (CN)=91.00
| 02:A-101  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .224 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=   11.358
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .454

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

-------------------------------------------------------------------------------
007:0024----------------------------------------------------------------------
----------------------
| ADD HYD (TBM2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-2       11.61     .186    2.10   7.68    .000
                     +ID2 02:A-101         9.30     .224    2.10  11.36    .000
                      ========================================================
                      SUM 05:TBM2         20.91     .410    2.10   9.32    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0025----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 01:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .061 (i)
     TIME TO PEAK    (hrs)=    2.033
     RUNOFF VOLUME    (mm)=    7.683
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .307

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

-------------------------------------------------------------------------------
007:0026----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    4.48   Curve Number   (CN)=91.00
| 02:A-102  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .106 (i)
     TIME TO PEAK    (hrs)=    2.117
     RUNOFF VOLUME    (mm)=   11.358
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .454

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

-------------------------------------------------------------------------------
007:0027----------------------------------------------------------------------
----------------------
| ADD HYD (TBM3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-3        3.51     .061    2.03   7.68    .000
                     +ID2 02:A-102         4.48     .106    2.12  11.36    .000
                      ========================================================
                      SUM 06:TBM3          7.99     .167    2.08   9.74    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0028----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .106 (i)
     TIME TO PEAK    (hrs)=    1.850
     RUNOFF VOLUME    (mm)=    8.083
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .323

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

-------------------------------------------------------------------------------
007:0029----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   10.16   Curve Number   (CN)=87.00
| 02:A-103  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .187 (i)
     TIME TO PEAK    (hrs)=    2.133
     RUNOFF VOLUME    (mm)=    8.987
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .359

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

-------------------------------------------------------------------------------
007:0030----------------------------------------------------------------------
----------------------
| ADD HYD (TBM4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4        4.22     .106    1.85   8.08    .000
                     +ID2 02:A-103        10.16     .187    2.13   8.99    .000
                      ========================================================
                      SUM 07:TBM4         14.38     .269    2.00   8.72    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0031----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 01:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .291 (i)
     TIME TO PEAK    (hrs)=    2.317
     RUNOFF VOLUME    (mm)=    8.083
     TOTAL RAINFALL   (mm)=   25.000
```

```
     RUNOFF COEFFICIENT   =     .323

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

--------------------------------------------------------------------------------
007:0032--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.74   Curve Number    (CN)=91.00
| 02:A-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .189 (i)
     TIME TO PEAK    (hrs)=    1.817
     RUNOFF VOLUME    (mm)=   11.358
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .454

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

--------------------------------------------------------------------------------
007:0033--------------------------------------------------------------------------
------------------------
| ADD HYD (TBM5      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-5        21.58     .291    2.32   8.08    .000
                      +ID2 02:A-204          4.74     .189    1.82  11.36    .000
                       ==========================================================
                       SUM 08:TBM5          26.32     .377    2.07   8.67    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0034--------------------------------------------------------------------------
*#*************************************************************************************
*#                              TOTAL FLOW TO MUD CREEK
*#*************************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 04:TBM1          32.56     .701    2.08   9.89    .000
                      +ID2 05:TBM2          20.91     .410    2.10   9.32    .000
                      +ID3 06:TBM3           7.99     .167    2.08   9.74    .000
                      +ID4 07:TBM4          14.38     .269    2.00   8.72    .000
                      +ID5 08:TBM5          26.32     .377    2.07   8.67    .000
                       ==========================================================
                       SUM 01:TO_MC        102.16    1.919    2.07   9.28    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0035--------------------------------------------------------------------------
--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------
     FINISH
--------------------------------------------------------------------------------
*******************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2018-01-15     at 11:57:20
===============================================================================
```

APPENDIX C – INTERIM CONDITIONS

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

Subject: **NRCS (SCS) Curve Number Determination - Interim Conditions (During Construction)**
Project: **Loyalist Solar Project**
Site: **Block A**
Project No.: **1335-60220**
Client: **Loyalist Solar LP**
Date: **December 21, 2017**

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
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
EXT A-1				100				100
EXT A-2				100				100
EXT A-3				100				100
EXT A-4				100				100
EXT A-5				75			25	100
A-200				20			80	100
A-201				20			80	100
A-202				20			80	100
A-203				75			25	100
A-204							100	100

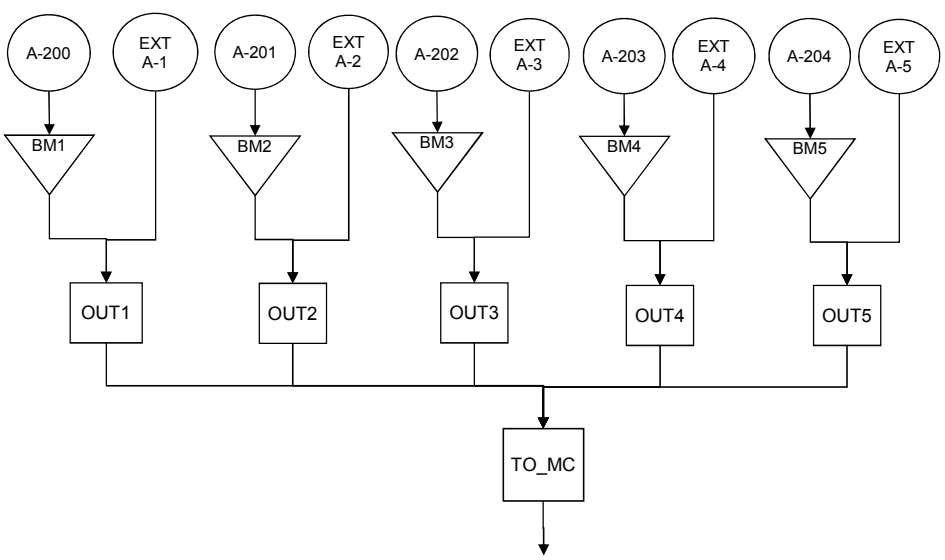
LAND USE (%) - Interim Conditions										
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Scarified Soil	Wetland	Impervious	Total
EXT A-1	6	10	2	65	15				2	100
EXT A-2	8	10	5	75					2	100
EXT A-3	8	10	10	70					2	100
EXT A-4	23	30	20		25				2	100
EXT A-5	13	85							2	100
A-200							97		3	100
A-201							92		8	100
A-202							94		6	100
A-203							80		20	100
A-204							99		1	100

CURVE NUMBER (CN) - Interim Conditions											
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Scarified Soil	Wetland/ Lakes	Impervious	Weighted CN (AMC II)	Weighted CN (AMC III)
EXT A-1	4	7	1	45	12				2	71	86
EXT A-2	5	7	3	52					2	69	84
EXT A-3	5	7	7	49					2	69	84
EXT A-4	15	20	14		20				2	70	85
EXT A-5	9	59							2	70	85
A-200							83		3	86	94
A-201							79		8	87	95
A-202							81		6	87	95
A-203							66		20	86	94
A-204							86		1	87	95

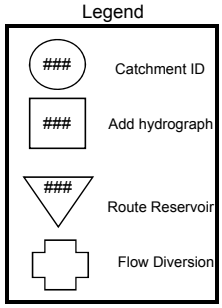
Notes: AMC II assumed - AMC III Conversion Per Soil Conservation Service Curve Number (SCS-CN) Methodology (Mishra, Surendra and Vijay P. Sing (2003)]
Hydrological Soil Groups based on guidance presented in National Engineering Handbook

V:\01614\active\133560220\design\analysis\SWM\Block A\[20171127_133560220_BlockA_swm_storage_bw.xlsx]A-204

Subject: Interim and Proposed Conditions SWMHYMO Schematic
Project: Loyalist Solar Project
Site: Block A
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: 1/15/2018



Discharge to Mud Creek



```
================================================================================
   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO            9      9   =========
                                                          9   9  9   9   # 4730904
         StormWater Management HYdrologic Model            999    999    =========

 ********************************************************************************
 ***************************** SWMHYMO Ver/4.05  ********************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********      based on the principles of HYMO and its successors     *********
 *********                 OTTHYMO-83 and OTTHYMO-89.                  *********
 ********************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.com                   *********
 ********************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
 +++++++++                Kitchener            SERIAL#:4730904        +++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ********************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
 *********           Maximum value for ID numbers  :     10            *********
 *********           Max. number of rainfall points: 105408            *********
 *********           Max. number of flow points    : 105408            *********
 ********************************************************************************


 **********************   D E T A I L E D   O U T P U T   **********************
 ********************************************************************************
 *         DATE: 2018-01-15     TIME: 16:02:55     RUN COUNTER: 002127          *
 ********************************************************************************
 * Input   filename: C:\TEMP\Loy\LYAIN4.dat                                     *
 * Output  filename: C:\TEMP\Loy\LYAIN4.out                                     *
 * Summary filename: C:\TEMP\Loy\LYAIN4.sum                                     *
 * User comments:                                                               *
 * 1:_____________________________________________________________________________*
 * 2:_____________________________________________________________________________*
 * 3:_____________________________________________________________________________*
 ********************************************************************************


--------------------------------------------------------------------------------
001:0001----------------------------------------------------------------------
*################################################################################
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*################################################################################
*################################################################################
*#
*#                    Block A - INTERIM CONDITIONS
*#
*################################################################################
--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   1
          #  1=LYA2.1hr
--------------------------------------------------------------------------------
001:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: Belleville IDF (1-hr 30% AES - 2 Year)
| Ptotal=  22.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 2 Year)
--------------------
             TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
              hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
              .08  23.868 |   .33  29.172 |   .58  26.520 |   .83   7.956
              .17  37.128 |   .42  34.476 |   .67  13.260 |   .92   2.652
              .25  55.692 |   .50  23.868 |   .75  10.608 |  1.00    .000


--------------------------------------------------------------------------------
001:0003----------------------------------------------------------------------
*################################################################################
*################################################################################
*#
*#                              AMC II Conditions
*#
*################################################################################
*################################################################################
--------------------
| CALIB NASHYD     |   Area    (ha)=   20.73   Curve Number   (CN)=86.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .342 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    5.003
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .226

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

--------------------------------------------------------------------------------
001:0004----------------------------------------------------------------------
*################################################################################
*#                    Route A-200 through slope berms
*################################################################################
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )  |
| OUT<02:(BM1   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00     |   6.000  .6450E+00
                          .000  .6040E+00     |  17.000  .6872E+00


     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .342      .917      5.003
     OUTFLOW<02: (BM1   )       20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )         .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)=   -55.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1037E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
001:0005----------------------------------------------------------------------
--------------------
| DESIGN NASHYD    |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .123 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    3.413
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .154

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

--------------------------------------------------------------------------------
001:0006----------------------------------------------------------------------
----------------------
| ADD HYD (OUT1    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:BM1         20.73     .000     .00    .00     .000
                     +ID2 03:EXTA-1      11.83     .123     .92   3.41     .000
                      ==========================================================
                      SUM 05:OUT1        32.56     .123     .92   1.24     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0007----------------------------------------------------------------------
--------------------
| CALIB NASHYD     |   Area    (ha)=    9.30   Curve Number   (CN)=87.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .158 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    5.311
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .240

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

--------------------------------------------------------------------------------
001:0008----------------------------------------------------------------------
*################################################################################
*#                    Route A-201 through slope berms
*################################################################################
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00     |   2.000  .2547E+00
                          .000  .2385E+00     |   6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .158      .933      5.311
     OUTFLOW<02: (BM2   )        9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )         .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)=   -56.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.4940E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
001:0009----------------------------------------------------------------------
--------------------
| DESIGN NASHYD    |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .108 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    3.150
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .143

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

--------------------------------------------------------------------------------
001:0010----------------------------------------------------------------------
----------------------
| ADD HYD (OUT2    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:BM2          9.30     .000     .00    .00     .000
                     +ID2 03:EXTA-2      11.61     .108     .93   3.15     .000
                      ==========================================================
                      SUM 06:OUT2        20.91     .108     .93   1.75     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0011----------------------------------------------------------------------
----------------------
```

```
| CALIB NASHYD       |   Area    (ha)=    4.48   Curve Number    (CN)=87.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .075 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    5.311
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .240

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

--------------------------------------------------------------------------------
001:0012----------------------------------------------------------------------
*#*************************************************************************
*#                  Route A-202 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )   |
| OUT<02:(BM3   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    1.000  .1297E+00
                           .000  .1215E+00   |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .075      .933      5.311
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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)=   -56.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2379E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
001:0013----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    3.51   Curve Number    (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .035 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=    3.150
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .143

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

--------------------------------------------------------------------------------
001:0014----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT3     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 02:BM3            4.48     .000     .00    .00     .000
                    +ID2 03:EXTA-3         3.51     .035     .88   3.15     .000
                     ========================================================
                     SUM 07:OUT3           7.99     .035     .88   1.38     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0015----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   10.16   Curve Number    (CN)=86.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .159 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    5.003
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .226

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

--------------------------------------------------------------------------------
001:0016----------------------------------------------------------------------
*#*************************************************************************
*#                  Route A-203 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.000  .2312E+00
                           .000  .2166E+00   |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )      10.16      .159      .933      5.003
     OUTFLOW<04: (BM4   )      10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )        .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)=   -56.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.5083E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
001:0017----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number    (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .056 (i)
     TIME TO PEAK    (hrs)=     .717
     RUNOFF VOLUME    (mm)=    3.278
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .148

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

--------------------------------------------------------------------------------
001:0018----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 01:EXTA-4         4.22     .056     .72   3.28     .000
                    +ID2 04:BM4           10.16     .000     .00    .00     .000
                     ========================================================
                     SUM 08:OUT4          14.38     .056     .72    .96     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0019----------------------------------------------------------------------
---------------------
| CALIB NASHYD       |   Area    (ha)=    4.74   Curve Number    (CN)=87.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .118 (i)
     TIME TO PEAK    (hrs)=     .683
     RUNOFF VOLUME    (mm)=    5.311
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .240

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

--------------------------------------------------------------------------------
001:0020----------------------------------------------------------------------
*#*************************************************************************
*#                  Route A-204 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )   |
| OUT<02:(BM5   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    1.000  .1016E+00
                           .000  .9510E-01   |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .118      .683      5.311
     OUTFLOW<02: (BM5   )       4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )        .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.)=.2518E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
001:0021----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number    (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .166 (i)
     TIME TO PEAK    (hrs)=    1.083
     RUNOFF VOLUME    (mm)=    3.278
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .148

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

--------------------------------------------------------------------------------
001:0022----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT5     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 02:BM5            4.74     .000     .00    .00     .000
                    +ID2 03:EXTA-5        21.58     .166    1.08   3.28     .000
                     ========================================================
                     SUM 09:OUT5          26.32     .166    1.08   2.69     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0023----------------------------------------------------------------------
*#*************************************************************************
*#                              TOTAL FLOW TO MUD CREEK
*#*************************************************************************
-----------------------
| ADD HYD (TO_MC    ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 05:OUT1          32.56     .123     .92   1.24     .000
                    +ID2 06:OUT2          20.91     .108     .93   1.75     .000
                    +ID3 07:OUT3           7.99     .035     .88   1.38     .000
                    +ID4 08:OUT4          14.38     .056     .72    .96     .000
                    +ID5 09:OUT5          26.32     .166    1.08   2.69     .000
                     ========================================================
                     SUM 01:TO_MC        102.16     .466     .93   1.69     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

```
001:0024-------------------------------------------------------------------------
*#########################################################################
*#########################################################################
*#
*#                              AMC III Conditions
*#
*#########################################################################
*#########################################################################
---------------------
| CALIB NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=94.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .598 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=    8.778
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .397

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

-------------------------------------------------------------------------------
001:0025-------------------------------------------------------------------------
*#########################################################################
*#                    Route A-200 through slope berms
*#########################################################################
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )   |
| OUT<02:(BM1   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    6.000  .6450E+00
                           .000  .6040E+00    |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73      .598      .883      8.778
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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)=   -53.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1820E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
001:0026-------------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .247 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    6.850
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .310

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

-------------------------------------------------------------------------------
001:0027-------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT1     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM1          20.73     .000     .00    .00    .000
                     +ID2 03:EXTA-1       11.83     .247     .90   6.85    .000
                      ==========================================================
                      SUM 05:OUT1         32.56     .247     .90   2.49    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
001:0028-------------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=95.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .283 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    9.597
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .434

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

-------------------------------------------------------------------------------
001:0029-------------------------------------------------------------------------
*#########################################################################
*#                    Route A-201 through slope berms
*#########################################################################
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )   |
| OUT<02:(BM2   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2547E+00
                           .000  .2385E+00    |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .283      .900      9.597
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=   -54.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.8925E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
001:0030-------------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .211 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    6.152
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .278

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

-------------------------------------------------------------------------------
001:0031-------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT2     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM2          9.30     .000     .00    .00    .000
                     +ID2 03:EXTA-2       11.61     .211     .92   6.15    .000
                      ==========================================================
                      SUM 06:OUT2         20.91     .211     .92   3.42    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
001:0032-------------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=95.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .134 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    9.597
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .434

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

-------------------------------------------------------------------------------
001:0033-------------------------------------------------------------------------
*#########################################################################
*#                    Route A-202 through slope berms
*#########################################################################
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )   |
| OUT<02:(BM3   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1297E+00
                           .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .134      .917      9.597
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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)=   -55.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4300E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
001:0034-------------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .069 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=    6.152
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .278

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

-------------------------------------------------------------------------------
001:0035-------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT3     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM3          4.48     .000     .00    .00    .000
                     +ID2 03:EXTA-3       3.51     .069     .87   6.15    .000
                      ==========================================================
                      SUM 07:OUT3         7.99     .069     .87   2.70    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
001:0036-------------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=94.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .279 (i)
```

```
     TIME TO PEAK     (hrs)=     .917
     RUNOFF VOLUME     (mm)=    8.778
     TOTAL RAINFALL    (mm)=   22.100
     RUNOFF COEFFICIENT   =     .397

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

------------------------------------------------------------------------------
001:0037--------------------------------------------------------------------
*#**************************************************************************
*#                    Route A-203 through slope berms
*#**************************************************************************
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00    |    2.000  .2312E+00
                           .000  .2166E+00    |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .279      .917      8.778
     OUTFLOW<04: (BM4   )       10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )         .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)=   -55.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.8918E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
001:0038--------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .111 (i)
     TIME TO PEAK    (hrs)=     .700
     RUNOFF VOLUME    (mm)=    6.486
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .293

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

------------------------------------------------------------------------------
001:0039--------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXTA-4        4.22     .111     .70   6.49    .000
                      +ID2 04:BM4          10.16     .000     .00    .00    .000
                       ==========================================================
                       SUM 08:OUT4          14.38     .111     .70   1.90    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0040--------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.74   Curve Number   (CN)=95.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .214 (i)
     TIME TO PEAK    (hrs)=     .667
     RUNOFF VOLUME    (mm)=    9.597
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .434

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

------------------------------------------------------------------------------
001:0041--------------------------------------------------------------------
*#**************************************************************************
*#                    Route A-204 through slope berms
*#**************************************************************************
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )   |
| OUT<02:(BM5   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00    |    1.000  .1016E+00
                           .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )        4.74      .214      .667      9.597
     OUTFLOW<02: (BM5   )        4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )         .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)=   -40.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4549E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
001:0042--------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .327 (i)
     TIME TO PEAK    (hrs)=    1.067
     RUNOFF VOLUME    (mm)=    6.486
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .293

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

------------------------------------------------------------------------------
001:0043--------------------------------------------------------------------
------------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM5           4.74     .000     .00    .00    .000
                      +ID2 03:EXTA-5       21.58     .327    1.07   6.49    .000
                       ==========================================================
                       SUM 09:OUT5          26.32     .327    1.07   5.32    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0044--------------------------------------------------------------------
*#**************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#**************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 05:OUT1         32.56     .247     .90   2.49    .000
                      +ID2 06:OUT2         20.91     .211     .92   3.42    .000
                      +ID3 07:OUT3          7.99     .069     .87   2.70    .000
                      +ID4 08:OUT4         14.38     .111     .70   1.90    .000
                      +ID5 09:OUT5         26.32     .327    1.07   5.32    .000
                       ==========================================================
                       SUM 01:TO_MC       102.16     .920     .93   3.34    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0045--------------------------------------------------------------------
  ** END OF RUN :   1

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 002
    NSTORM=   1
           #  1=LYA2.12h
------------------------------------------------------------------------------
002:0002--------------------------------------------------------------------
*#**************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#**************************************************************************
*#**************************************************************************
*#
*#                     Block A - INTERIM CONDITIONS
*#
*#**************************************************************************
------------------------------------------------------------------------------
002:0002--------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 2 Year)
| Ptotal=  42.24 mm|    Comments: Belleville IDF (12-hr 30% AES - 2 Year)
--------------------
            TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
             hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
            1.00   3.960 |   4.00   6.600 |   7.00   1.320 |  10.00    .000
            2.00  11.440 |   5.00   6.160 |   8.00    .440 |  11.00    .000
            3.00   8.800 |   6.00   3.520 |   9.00    .000 |  12.00    .000

------------------------------------------------------------------------------
002:0003--------------------------------------------------------------------
*#**************************************************************************
*#**************************************************************************
*#
*#                            AMC II Conditions
*#
*#**************************************************************************
*#**************************************************************************
----------------------
| CALIB NASHYD       |   Area    (ha)=   20.73   Curve Number   (CN)=86.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .237 (i)
     TIME TO PEAK    (hrs)=    3.200
     RUNOFF VOLUME    (mm)=   17.647
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .418

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

------------------------------------------------------------------------------
002:0004--------------------------------------------------------------------
*#**************************************************************************
*#                    Route A-200 through slope berms
*#**************************************************************************
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )   |
| OUT<02:(BM1   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00    |    6.000  .6450E+00
                           .000  .6040E+00    |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
```

```
     INFLOW >01: (A-200 )      20.73      .237     3.200     17.647
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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)=  -192.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.3658E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
002:0005----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .085 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   11.487
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .272

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

--------------------------------------------------------------------------------
002:0006----------------------------------------------------------------------
----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM1           20.73     .000     .00    .00    .000
                    +ID2 03:EXTA-1        11.83     .085    5.07  11.49    .000
                     ==========================================================
                     SUM 05:OUT1          32.56     .085    5.07   4.17    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
002:0007----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    9.30   Curve Number   (CN)=87.00
| 01:A-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .111 (i)
     TIME TO PEAK    (hrs)=    3.217
     RUNOFF VOLUME    (mm)=   18.443
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .437

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

--------------------------------------------------------------------------------
002:0008----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-201 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.000  .2547E+00
                           .000  .2385E+00   |    6.000  .2714E+00

     ROUTING RESULTS           AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .111     3.217     18.443
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=  -193.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1715E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
002:0009----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .078 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   10.718
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .254

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

--------------------------------------------------------------------------------
002:0010----------------------------------------------------------------------
----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM2           9.30      .000     .00    .00    .000
                    +ID2 03:EXTA-2        11.61     .078    5.07  10.72    .000
                     ==========================================================
                     SUM 06:OUT2          20.91     .078    5.07   5.95    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
002:0011----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    4.48   Curve Number   (CN)=87.00
| 01:A-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .053 (i)
     TIME TO PEAK    (hrs)=    3.217
     RUNOFF VOLUME    (mm)=   18.443
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .437

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

--------------------------------------------------------------------------------
002:0012----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-202 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )  |
| OUT<02:(BM3   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    1.000  .1297E+00
                           .000  .1215E+00   |    3.000  .1382E+00

     ROUTING RESULTS           AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .053     3.217     18.443
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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)=  -193.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.8263E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
002:0013----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    3.51   Curve Number   (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .024 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   10.718
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .254

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

--------------------------------------------------------------------------------
002:0014----------------------------------------------------------------------
----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM3           4.48      .000     .00    .00    .000
                    +ID2 03:EXTA-3        3.51      .024    5.07  10.72    .000
                     ==========================================================
                     SUM 07:OUT3          7.99      .024    5.07   4.71    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
002:0015----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=   10.16   Curve Number   (CN)=86.00
| 01:A-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .115 (i)
     TIME TO PEAK    (hrs)=    3.233
     RUNOFF VOLUME    (mm)=   17.647
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .418

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

--------------------------------------------------------------------------------
002:0016----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-203 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )  |
| OUT<04:(BM4   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.000  .2312E+00
                           .000  .2166E+00   |    6.000  .2464E+00

     ROUTING RESULTS           AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )      10.16      .115     3.233     17.647
     OUTFLOW<04: (BM4   )      10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )        .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)=  -194.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1793E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
002:0017----------------------------------------------------------------------
```

```
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .030 (i)
     TIME TO PEAK    (hrs)=    5.017
     RUNOFF VOLUME    (mm)=   11.095
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .263

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

--------------------------------------------------------------------------------
002:0018----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4         4.22     .030    5.02  11.09    .000
                     +ID2 04:BM4           10.16     .000     .00    .00    .000
                      ==========================================================
                      SUM 08:OUT4          14.38     .030    5.02   3.26    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
002:0019----------------------------------------------------------------------
---------------------
| CALIB NASHYD       |   Area    (ha)=    4.74   Curve Number   (CN)=87.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .061 (i)
     TIME TO PEAK    (hrs)=    3.050
     RUNOFF VOLUME    (mm)=   18.443
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .437

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

--------------------------------------------------------------------------------
002:0020----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-204 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00     |    1.000  .1016E+00
                           .000  .9510E-01     |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .061     3.050     18.443
     OUTFLOW<02: (BM5   )       4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )        .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)=  -183.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.8742E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
002:0021----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .147 (i)
     TIME TO PEAK    (hrs)=    5.117
     RUNOFF VOLUME    (mm)=   11.095
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .263

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

--------------------------------------------------------------------------------
002:0022----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM5            4.74     .000     .00    .00    .000
                     +ID2 03:EXTA-5        21.58     .147    5.12  11.09    .000
                      ==========================================================
                      SUM 09:OUT5          26.32     .147    5.12   9.10    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
002:0023----------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
-----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 05:OUT1          32.56     .085    5.07   4.17    .000
                     +ID2 06:OUT2          20.91     .078    5.07   5.95    .000
                     +ID3 07:OUT3           7.99     .024    5.07   4.71    .000
                     +ID4 08:OUT4          14.38     .030    5.02   3.26    .000
                     +ID5 09:OUT5          26.32     .147    5.12   9.10    .000
                      ==========================================================
                      SUM 01:TO_MC        102.16     .363    5.07   5.72    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
002:0024----------------------------------------------------------------------
*#*************************************************************************
*#*************************************************************************
*#
*#                          AMC III Conditions
*#
*#*************************************************************************
*#*************************************************************************
---------------------
| CALIB NASHYD       |   Area    (ha)=   20.73   Curve Number   (CN)=94.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .371 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   25.945
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .614

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

--------------------------------------------------------------------------------
002:0025----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-200 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )    |
| OUT<02:(BM1   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00     |    6.000  .6450E+00
                           .000  .6040E+00     |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .371     3.117     25.945
     OUTFLOW<02: (BM1   )       20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )         .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)=  -187.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.5378E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
002:0026----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .152 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   20.219
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .479

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

--------------------------------------------------------------------------------
002:0027----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM1           20.73     .000     .00    .00    .000
                     +ID2 03:EXTA-1        11.83     .152    3.17  20.22    .000
                      ==========================================================
                      SUM 05:OUT1          32.56     .152    3.17   7.35    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
002:0028----------------------------------------------------------------------
---------------------
| CALIB NASHYD       |   Area    (ha)=    9.30   Curve Number   (CN)=95.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .176 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   27.403
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .649

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

--------------------------------------------------------------------------------
002:0029----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-201 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )    |
| OUT<02:(BM2   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00     |    2.000  .2547E+00
                           .000  .2385E+00     |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .176     3.117     27.403
     OUTFLOW<02: (BM2   )        9.30      .046     6.733      1.831
    OVERFLOW<09: (OVBM2 )         .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](%)=   26.113
                    TIME SHIFT OF PEAK FLOW        (min)=   217.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2389E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0030-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .135 (i)
     TIME TO PEAK    (hrs)=    3.200
     RUNOFF VOLUME    (mm)=   18.624
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .441

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

-------------------------------------------------------------------------------
002:0031-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM2           9.30     .046    6.73   1.83    .000
                      +ID2 03:EXTA-2       11.61     .135    3.20  18.62    .000
                       ==========================================================
                       SUM 06:OUT2          20.91     .135    3.20  11.12    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
002:0032-------------------------------------------------------------------------
---------------------
| CALIB NASHYD       |   Area     (ha)=    4.48   Curve Number   (CN)=95.00
| 01:A-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .085 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   27.403
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .649

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

-------------------------------------------------------------------------------
002:0033-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )  |
| OUT<02:(BM3   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1297E+00
                           .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     --------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )        4.48      .085     3.117     27.403
     OUTFLOW<02: (BM3   )        4.48      .006     8.067       .321
    OVERFLOW<09: (OVBM3 )         .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](%)=    7.152
                    TIME SHIFT OF PEAK FLOW        (min)=   297.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1215E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0034-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .041 (i)
     TIME TO PEAK    (hrs)=    3.150
     RUNOFF VOLUME    (mm)=   18.624
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .441

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

-------------------------------------------------------------------------------
002:0035-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3           4.48     .006    8.07    .32    .000
                      +ID2 03:EXTA-3        3.51     .041    3.15  18.62    .000
                       ==========================================================
                       SUM 07:OUT3          7.99     .041    3.15   8.34    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
002:0036-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=   10.16   Curve Number   (CN)=94.00
| 01:A-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .180 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   25.945
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .614

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

-------------------------------------------------------------------------------
002:0037-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )  |
| OUT<04:(BM4   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2312E+00
                           .000  .2166E+00    |    6.000  .2464E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     --------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )        10.16      .180     3.133     25.945
     OUTFLOW<04: (BM4   )        10.16      .104     5.783      4.733
    OVERFLOW<09: (OVBM4 )          .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](%)=   57.693
                    TIME SHIFT OF PEAK FLOW        (min)=   159.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2174E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0038-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .054 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   19.398
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .459

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

-------------------------------------------------------------------------------
002:0039-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4        4.22     .054    3.07  19.40    .000
                      +ID2 04:BM4          10.16     .104    5.78   4.73    .000
                       ==========================================================
                       SUM 08:OUT4          14.38     .134    5.78   9.04    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
002:0040-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    4.74   Curve Number   (CN)=95.00
| 01:A-204  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .093 (i)
     TIME TO PEAK    (hrs)=    3.033
     RUNOFF VOLUME    (mm)=   27.403
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .649

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

-------------------------------------------------------------------------------
002:0041-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-204 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )  |
| OUT<02:(BM5   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1016E+00
                           .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     --------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )        4.74      .093     3.033     27.403
     OUTFLOW<02: (BM5   )        4.74      .073     5.017      7.340
    OVERFLOW<04: (OVBM5 )         .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](%)=   78.774
                    TIME SHIFT OF PEAK FLOW        (min)=   119.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9558E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0042-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421
```

```
     PEAK FLOW       (cms)=     .252 (i)
     TIME TO PEAK    (hrs)=    3.400
     RUNOFF VOLUME    (mm)=   19.398
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .459

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

------------------------------------------------------------------------------
002:0043------------------------------------------------------------------------
----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM5           4.74     .073    5.02   7.34    .000
                     +ID2 03:EXTA-5       21.58     .252    3.40  19.40    .000
                      ========================================================
                      SUM 09:OUT5          26.32     .317    5.03  17.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
002:0044------------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 05:OUT1          32.56     .152    3.17   7.35    .000
                     +ID2 06:OUT2          20.91     .135    3.20  11.12    .000
                     +ID3 07:OUT3           7.99     .041    3.15   8.34    .000
                     +ID4 08:OUT4          14.38     .134    5.78   9.04    .000
                     +ID5 09:OUT5          26.32     .317    5.03  17.23    .000
                      ========================================================
                      SUM 01:TO_MC        102.16     .670    5.03  10.97    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
002:0045------------------------------------------------------------------------
------------------------------------------------------------------------------
002:0002------------------------------------------------------------------------
  ** END OF RUN :   2

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 003
    NSTORM=   1
          #  1=LYA5.1hr
------------------------------------------------------------------------------
003:0002------------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*************************************************************************
*#*************************************************************************
*#
*#                     Block A - INTERIM 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 II Conditions
*#
*#*************************************************************************
*#*************************************************************************
--------------------
| CALIB NASHYD     |   Area     (ha)=   20.73   Curve Number    (CN)=86.00
| 01:A-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .556 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    8.221
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .294

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

------------------------------------------------------------------------------
003:0004------------------------------------------------------------------------
*#*************************************************************************
*#                     Route A-200 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )  |
| OUT<02:(BM1   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00     |   6.000  .6450E+00
                          .000  .6040E+00     |  17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .556      .900      8.221
     OUTFLOW<02: (BM1   )       20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )         .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)=   -54.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1704E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0005------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.83   Curve Number    (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .194 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    5.392
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .193

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

------------------------------------------------------------------------------
003:0006------------------------------------------------------------------------
----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM1           20.73     .000     .00    .00    .000
                     +ID2 03:EXTA-1        11.83     .194     .92   5.39    .000
                      ========================================================
                      SUM 05:OUT1          32.56     .194     .92   1.96    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0007------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    9.30   Curve Number    (CN)=87.00
| 01:A-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .255 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    8.679
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .310

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

------------------------------------------------------------------------------
003:0008------------------------------------------------------------------------
*#*************************************************************************
*#                     Route A-201 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00     |   2.000  .2547E+00
                          .000  .2385E+00     |   6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .255      .917      8.679
     OUTFLOW<02: (BM2   )        9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )         .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)=   -55.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.8071E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0009------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.61   Curve Number    (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .171 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    4.994
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .178

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

------------------------------------------------------------------------------
003:0010------------------------------------------------------------------------
----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM2           9.30     .000     .00    .00    .000
                     +ID2 03:EXTA-2       11.61     .171     .93   4.99    .000
                      ========================================================
                      SUM 06:OUT2          20.91     .171     .93   2.77    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

```
003:0011-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    4.48   Curve Number    (CN)=87.00
| 01:A-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .121 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    8.679
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .310

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

-------------------------------------------------------------------------------
003:0012-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )    |
| OUT<02:(BM3   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    1.000  .1297E+00
                            .000  .1215E+00   |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )        4.48      .121      .917      8.679
     OUTFLOW<02: (BM3   )        4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )         .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)=    -55.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.3888E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
003:0013-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    3.51   Curve Number    (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .056 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=    4.994
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .178

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

-------------------------------------------------------------------------------
003:0014-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:BM3            4.48      .000     .00    .00     .000
                     +ID2 03:EXTA-3         3.51      .056     .88   4.99     .000
                      ========================================================
                      SUM 07:OUT3           7.99      .056     .88   2.19     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0015-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=   10.16   Curve Number    (CN)=86.00
| 01:A-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .259 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    8.221
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .294

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

-------------------------------------------------------------------------------
003:0016-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )    |
| OUT<04:(BM4   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    2.000  .2312E+00
                            .000  .2166E+00   |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .259      .917      8.221
     OUTFLOW<04: (BM4   )       10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )         .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)=    -55.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.8352E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
003:0017-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.22   Curve Number    (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .088 (i)
     TIME TO PEAK    (hrs)=     .717
     RUNOFF VOLUME    (mm)=    5.188
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .185

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

-------------------------------------------------------------------------------
003:0018-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 01:EXTA-4         4.22      .088     .72   5.19     .000
                     +ID2 04:BM4           10.16      .000     .00    .00     .000
                      ========================================================
                      SUM 08:OUT4          14.38      .088     .72   1.52     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0019-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    4.74   Curve Number    (CN)=87.00
| 01:A-204  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .190 (i)
     TIME TO PEAK    (hrs)=     .667
     RUNOFF VOLUME    (mm)=    8.679
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .310

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

-------------------------------------------------------------------------------
003:0020-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-204 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    1.000  .1016E+00
                            .000  .9510E-01   |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )        4.74      .190      .667      8.679
     OUTFLOW<02: (BM5   )        4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )         .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)=    -40.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4114E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
003:0021-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   21.58   Curve Number    (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .262 (i)
     TIME TO PEAK    (hrs)=    1.083
     RUNOFF VOLUME    (mm)=    5.188
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .185

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

-------------------------------------------------------------------------------
003:0022-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT5      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:BM5            4.74      .000     .00    .00     .000
                     +ID2 03:EXTA-5        21.58      .262    1.08   5.19     .000
                      ========================================================
                      SUM 09:OUT5          26.32      .262    1.08   4.25     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0023-------------------------------------------------------------------------
*#*****************************************************************************
*#                              TOTAL FLOW TO MUD CREEK
*#*****************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 05:OUT1          32.56      .194     .92   1.96     .000
                     +ID2 06:OUT2          20.91      .171     .93   2.77     .000
                     +ID3 07:OUT3           7.99      .056     .88   2.19     .000
                     +ID4 08:OUT4          14.38      .088     .72   1.52     .000
                     +ID5 09:OUT5          26.32      .262    1.08   4.25     .000
                      ========================================================
                      SUM 01:TO_MC        102.16      .736     .93   2.67     .000

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

```
--------------------------------------------------------------------------------
003:0024--------------------------------------------------------------------------
*#*************************************************************************
*#*************************************************************************
*#
*#                              AMC III Conditions
*#
*#*************************************************************************
*#*************************************************************************
----------------------
| CALIB NASHYD       |   Area     (ha)=   20.73   Curve Number    (CN)=94.00
| 01:A-200  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .908 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=   13.491
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .482

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

--------------------------------------------------------------------------------
003:0025--------------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-200 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )   |
| OUT<02:(BM1   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    6.000  .6450E+00
                            .000  .6040E+00   |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73      .908      .867     13.491
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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.)=.2797E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
003:0026--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.83   Curve Number    (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .371 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   10.350
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .370

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

--------------------------------------------------------------------------------
003:0027--------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM1          20.73     .000     .00    .00    .000
                      +ID2 03:EXTA-1       11.83     .371     .90  10.35    .000
                       ============================================================
                       SUM 05:OUT1         32.56     .371     .90   3.76    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
003:0028--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    9.30   Curve Number    (CN)=95.00
| 01:A-201  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .425 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=   14.546
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .519

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

--------------------------------------------------------------------------------
003:0029--------------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-201 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )   |
| OUT<02:(BM2   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    2.000  .2547E+00
                            .000  .2385E+00   |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .425      .883     14.546
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=   -54.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1353E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
003:0030--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.61   Curve Number    (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .321 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    9.378
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .335

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

--------------------------------------------------------------------------------
003:0031--------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM2          9.30     .000     .00    .00    .000
                      +ID2 03:EXTA-2       11.61     .321     .92   9.38    .000
                       ============================================================
                       SUM 06:OUT2         20.91     .321     .92   5.21    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
003:0032--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    4.48   Curve Number    (CN)=95.00
| 01:A-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .201 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   14.546
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .519

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

--------------------------------------------------------------------------------
003:0033--------------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-202 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )   |
| OUT<02:(BM3   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    1.000  .1297E+00
                            .000  .1215E+00   |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .201      .900     14.546
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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)=   -54.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6516E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
003:0034--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    3.51   Curve Number    (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .105 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=    9.378
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .335

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

--------------------------------------------------------------------------------
003:0035--------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3          4.48     .000     .00    .00    .000
                      +ID2 03:EXTA-3       3.51     .105     .87   9.38    .000
                       ============================================================
                       SUM 07:OUT3         7.99     .105     .87   4.12    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
003:0036--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=   10.16   Curve Number    (CN)=94.00
| 01:A-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970
```

```
     PEAK FLOW       (cms)=     .424 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   13.490
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .482

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

------------------------------------------------------------------------------
003:0037----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-203 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    2.000  .2312E+00
                            .000  .2166E+00   |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )      10.16      .424      .900     13.490
     OUTFLOW<04: (BM4   )      10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )        .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)=   -54.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1371E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0038----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .168 (i)
     TIME TO PEAK    (hrs)=     .700
     RUNOFF VOLUME    (mm)=    9.846
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .352

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

------------------------------------------------------------------------------
003:0039----------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXTA-4        4.22     .168     .70   9.85    .000
                      +ID2 04:BM4          10.16     .000     .00    .00    .000
                       ==========================================================
                       SUM 08:OUT4          14.38     .168     .70   2.89    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0040----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.74   Curve Number   (CN)=95.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .317 (i)
     TIME TO PEAK    (hrs)=     .633
     RUNOFF VOLUME    (mm)=   14.546
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .519

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

------------------------------------------------------------------------------
003:0041----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-204 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )   |
| OUT<02:(BM5   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    1.000  .1016E+00
                            .000  .9510E-01   |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .317      .633     14.546
     OUTFLOW<02: (BM5   )       4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )        .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)=   -38.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.6895E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0042----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .496 (i)
     TIME TO PEAK    (hrs)=    1.067
     RUNOFF VOLUME    (mm)=    9.846
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .352

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

------------------------------------------------------------------------------
003:0043----------------------------------------------------------------------
------------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM5           4.74     .000     .00    .00    .000
                      +ID2 03:EXTA-5       21.58     .496    1.07   9.85    .000
                       ==========================================================
                       SUM 09:OUT5          26.32     .496    1.07   8.07    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0044----------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 05:OUT1          32.56     .371     .90   3.76    .000
                      +ID2 06:OUT2          20.91     .321     .92   5.21    .000
                      +ID3 07:OUT3           7.99     .105     .87   4.12    .000
                      +ID4 08:OUT4          14.38     .168     .70   2.89    .000
                      +ID5 09:OUT5          26.32     .496    1.07   8.07    .000
                       ==========================================================
                       SUM 01:TO_MC        102.16    1.392     .92   5.07    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0045----------------------------------------------------------------------
------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
  ** END OF RUN :   3

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 004
    NSTORM=   1
           #  1=LYA5.12h
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*************************************************************************
*#*************************************************************************
*#
*#                     Block A - INTERIM 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 II Conditions
*#
*#*************************************************************************
*#*************************************************************************
----------------------
| CALIB NASHYD       |   Area    (ha)=   20.73   Curve Number   (CN)=86.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .384 (i)
     TIME TO PEAK    (hrs)=    3.150
     RUNOFF VOLUME    (mm)=   28.139
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .503

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

------------------------------------------------------------------------------
004:0004----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-200 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )   |
| OUT<02:(BM1   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
```

(cms)	(ha.m.)	(cms)	(ha.m.)
.000	.0000E+00	6.000	.6450E+00
.000	.6040E+00	17.000	.6872E+00

ROUTING RESULTS	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW >01: (A-200)	20.73	.384	3.150	28.139
OUTFLOW<02: (BM1)	20.73	.000	.000	.000
OVERFLOW<09: (OVBM1)	.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)= -189.00
MAXIMUM STORAGE USED (ha.m.)=.5833E+00

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

004:0005

DESIGN NASHYD	Area (ha)= 11.83	Curve Number (CN)=71.00
03:EXTA-1 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .400	

Unit Hyd Qpeak (cms)= 1.130

PEAK FLOW (cms)= .135 (i)
TIME TO PEAK (hrs)= 3.200
RUNOFF VOLUME (mm)= 18.752
TOTAL RAINFALL (mm)= 55.968
RUNOFF COEFFICIENT = .335

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

004:0006

ADD HYD (OUT1)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 02:BM1	20.73	.000	.00	.00	.000
	+ID2 03:EXTA-1	11.83	.135	3.20	18.75	.000
	SUM 05:OUT1	32.56	.135	3.20	6.81	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

004:0007

CALIB NASHYD	Area (ha)= 9.30	Curve Number (CN)=87.00
01:A-201 DT= 1.00	Ia (mm)= 5.000	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .390	

Unit Hyd Qpeak (cms)= .911

PEAK FLOW (cms)= .179 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 29.214
TOTAL RAINFALL (mm)= 55.968
RUNOFF COEFFICIENT = .522

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

004:0008

*# Route A-201 through slope berms

ROUTE RESERVOIR IN>01:(A-201)	Requested routing time step = 1.0 min.			
OUT<02:(BM2)	========= OUTLFOW STORAGE TABLE =========			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.000	.0000E+00	2.000	.2547E+00
	.000	.2385E+00	6.000	.2714E+00

ROUTING RESULTS	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW >01: (A-201)	9.30	.179	3.167	29.214
OUTFLOW<02: (BM2)	9.30	.092	6.233	3.656
OVERFLOW<09: (OVBM2)	.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](%)= 51.556
TIME SHIFT OF PEAK FLOW (min)= 184.00
MAXIMUM STORAGE USED (ha.m.)=.2392E+00

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

004:0009

DESIGN NASHYD	Area (ha)= 11.61	Curve Number (CN)=69.00
03:EXTA-2 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .420	

Unit Hyd Qpeak (cms)= 1.056

PEAK FLOW (cms)= .125 (i)
TIME TO PEAK (hrs)= 5.067
RUNOFF VOLUME (mm)= 17.598
TOTAL RAINFALL (mm)= 55.968
RUNOFF COEFFICIENT = .314

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

004:0010

ADD HYD (OUT2)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 02:BM2	9.30	.092	6.23	3.66	.000
	+ID2 03:EXTA-2	11.61	.125	5.07	17.60	.000
	SUM 06:OUT2	20.91	.169	6.22	11.36	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

004:0011

CALIB NASHYD	Area (ha)= 4.48	Curve Number (CN)=87.00
01:A-202 DT= 1.00	Ia (mm)= 5.000	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .400	

Unit Hyd Qpeak (cms)= .428

PEAK FLOW (cms)= .086 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 29.214
TOTAL RAINFALL (mm)= 55.968
RUNOFF COEFFICIENT = .522

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

004:0012

*# Route A-202 through slope berms

ROUTE RESERVOIR IN>01:(A-202)	Requested routing time step = 1.0 min.			
OUT<02:(BM3)	========= OUTLFOW STORAGE TABLE =========			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.000	.0000E+00	1.000	.1297E+00
	.000	.1215E+00	3.000	.1382E+00

ROUTING RESULTS	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW >01: (A-202)	4.48	.086	3.167	29.214
OUTFLOW<02: (BM3)	4.48	.026	6.733	2.124
OVERFLOW<09: (OVBM3)	.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](%)= 30.535
TIME SHIFT OF PEAK FLOW (min)= 214.00
MAXIMUM STORAGE USED (ha.m.)=.1217E+00

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

004:0013

DESIGN NASHYD	Area (ha)= 3.51	Curve Number (CN)=69.00
03:EXTA-3 DT= 1.00	Ia (mm)= 1.500	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .370	

Unit Hyd Qpeak (cms)= .362

PEAK FLOW (cms)= .038 (i)
TIME TO PEAK (hrs)= 5.050
RUNOFF VOLUME (mm)= 17.598
TOTAL RAINFALL (mm)= 55.968
RUNOFF COEFFICIENT = .314

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

004:0014

ADD HYD (OUT3)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 02:BM3	4.48	.026	6.73	2.12	.000
	+ID2 03:EXTA-3	3.51	.038	5.05	17.60	.000
	SUM 07:OUT3	7.99	.039	6.72	8.90	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

004:0015

CALIB NASHYD	Area (ha)= 10.16	Curve Number (CN)=86.00
01:A-203 DT= 1.00	Ia (mm)= 5.000	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .400	

Unit Hyd Qpeak (cms)= .970

PEAK FLOW (cms)= .187 (i)
TIME TO PEAK (hrs)= 3.183
RUNOFF VOLUME (mm)= 28.139
TOTAL RAINFALL (mm)= 55.968
RUNOFF COEFFICIENT = .503

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

004:0016

*# Route A-203 through slope berms

ROUTE RESERVOIR IN>01:(A-203)	Requested routing time step = 1.0 min.			
OUT<04:(BM4)	========= OUTLFOW STORAGE TABLE =========			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.000	.0000E+00	2.000	.2312E+00
	.000	.2166E+00	6.000	.2464E+00

ROUTING RESULTS	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW >01: (A-203)	10.16	.187	3.183	28.139
OUTFLOW<04: (BM4)	10.16	.142	5.483	6.927
OVERFLOW<09: (OVBM4)	.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](%)= 75.952

```
                TIME SHIFT OF PEAK FLOW         (min)=   138.00
                MAXIMUM  STORAGE   USED       (ha.m.)=.2176E+00

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0017----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .049 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   18.165
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .325

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

--------------------------------------------------------------------------------
004:0018----------------------------------------------------------------------
----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4         4.22     .049    3.07  18.16    .000
                     +ID2 04:BM4           10.16     .142    5.48   6.93    .000
                      ========================================================
                      SUM 08:OUT4          14.38     .175    5.47  10.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0019----------------------------------------------------------------------
---------------------
| CALIB NASHYD       |   Area    (ha)=    4.74   Curve Number   (CN)=87.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .096 (i)
     TIME TO PEAK    (hrs)=    3.033
     RUNOFF VOLUME    (mm)=   29.214
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .522

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

--------------------------------------------------------------------------------
004:0020----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-204 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)     (ha.m.)
                           .000  .0000E+00     |    1.000  .1016E+00
                           .000  .9510E-01     |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .096     3.033     29.214
     OUTFLOW<02: (BM5   )       4.74      .083     5.017      9.150
    OVERFLOW<04: (OVBM5 )        .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](%)=   86.358
                TIME SHIFT OF PEAK FLOW         (min)=   119.00
                MAXIMUM  STORAGE   USED       (ha.m.)=.9564E-01

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0021----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .236 (i)
     TIME TO PEAK    (hrs)=    5.100
     RUNOFF VOLUME    (mm)=   18.165
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .325

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

--------------------------------------------------------------------------------
004:0022----------------------------------------------------------------------
----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM5            4.74     .083    5.02   9.15    .000
                     +ID2 03:EXTA-5        21.58     .236    5.10  18.16    .000
                      ========================================================
                      SUM 09:OUT5          26.32     .318    5.03  16.54    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0023----------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 05:OUT1         32.56     .135    3.20   6.81    .000
                      +ID2 06:OUT2         20.91     .169    6.22  11.36    .000
                      +ID3 07:OUT3          7.99     .039    6.72   8.90    .000
                      +ID4 08:OUT4         14.38     .175    5.47  10.23    .000
                      +ID5 09:OUT5         26.32     .318    5.03  16.54    .000
                      ========================================================
                      SUM 01:TO_MC        102.16     .701    5.45  10.88    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0024----------------------------------------------------------------------
*#*************************************************************************
*#*************************************************************************
*#
*#                          AMC III Conditions
*#
*#*************************************************************************
*#*************************************************************************
---------------------
| CALIB NASHYD       |   Area    (ha)=   20.73   Curve Number   (CN)=94.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .550 (i)
     TIME TO PEAK    (hrs)=    3.083
     RUNOFF VOLUME    (mm)=   38.668
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .691

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

--------------------------------------------------------------------------------
004:0025----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-200 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )    |
| OUT<02:(BM1   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)     (ha.m.)
                           .000  .0000E+00     |    6.000  .6450E+00
                           .000  .6040E+00     |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73      .550     3.083     38.668
     OUTFLOW<02: (BM1   )      20.73      .407     5.233      9.531
    OVERFLOW<09: (OVBM1 )        .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](%)=   74.042
                TIME SHIFT OF PEAK FLOW         (min)=   129.00
                MAXIMUM  STORAGE   USED       (ha.m.)=.6068E+00

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0026----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .235 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   30.963
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .553

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

--------------------------------------------------------------------------------
004:0027----------------------------------------------------------------------
----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM1           20.73     .407    5.23   9.53    .000
                     +ID2 03:EXTA-1        11.83     .235    3.13  30.96    .000
                      ========================================================
                      SUM 05:OUT1          32.56     .603    5.23  17.32    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0028----------------------------------------------------------------------
---------------------
| CALIB NASHYD       |   Area    (ha)=    9.30   Curve Number   (CN)=95.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .258 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   40.377
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .721

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

--------------------------------------------------------------------------------
004:0029----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-201 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )    |
| OUT<02:(BM2   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)     (ha.m.)
                           .000  .0000E+00     |    2.000  .2547E+00
                           .000  .2385E+00     |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .258     3.067     40.377
```

```
    OUTFLOW<02: (BM2    )       9.30      .200     4.667     14.849
   OVERFLOW<09: (OVBM2 )         .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](%)=   77.710
                  TIME SHIFT OF PEAK FLOW          (min)=    96.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.2401E+00

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0030----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .212 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   28.846
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .515

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

--------------------------------------------------------------------------------
004:0031----------------------------------------------------------------------
------------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM2           9.30     .200    4.67  14.85    .000
                      +ID2 03:EXTA-2       11.61     .212    3.17  28.85    .000
                       ==========================================================
                       SUM 06:OUT2         20.91     .389    4.67  22.57    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0032----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.48   Curve Number   (CN)=95.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .124 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   40.377
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .721

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

--------------------------------------------------------------------------------
004:0033----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |     Requested routing time step =  1.0 min.
|  IN>01:(A-202 )    |
| OUT<02:(BM3   )    |     =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |    1.000  .1297E+00
                             .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .124     3.067     40.377
     OUTFLOW<02: (BM3   )       4.48      .096     4.900     13.257
    OVERFLOW<09: (OVBM3 )        .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](%)=   77.263
                  TIME SHIFT OF PEAK FLOW          (min)=   110.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1223E+00

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0034----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .065 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   28.846
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .515

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

--------------------------------------------------------------------------------
004:0035----------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3           4.48     .096    4.90  13.26    .000
                      +ID2 03:EXTA-3        3.51     .065    3.13  28.85    .000
                       ==========================================================
                       SUM 07:OUT3          7.99     .153    5.02  20.11    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0036----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   10.16   Curve Number   (CN)=94.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .268 (i)
     TIME TO PEAK    (hrs)=    3.083
     RUNOFF VOLUME    (mm)=   38.668
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .691

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

--------------------------------------------------------------------------------
004:0037----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |     Requested routing time step =  1.0 min.
|  IN>01:(A-203 )    |
| OUT<04:(BM4   )    |     =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |    2.000  .2312E+00
                             .000  .2166E+00    |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .268     3.083     38.668
     OUTFLOW<04: (BM4   )       10.16      .220     4.283     17.349
    OVERFLOW<09: (OVBM4 )         .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](%)=   81.944
                  TIME SHIFT OF PEAK FLOW          (min)=    72.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.2182E+00

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0038----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .083 (i)
     TIME TO PEAK    (hrs)=    3.050
     RUNOFF VOLUME    (mm)=   29.879
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .534

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

--------------------------------------------------------------------------------
004:0039----------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4        4.22     .083    3.05  29.88    .000
                      +ID2 04:BM4          10.16     .220    4.28  17.35    .000
                       ==========================================================
                       SUM 08:OUT4         14.38     .291    4.28  21.03    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0040----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.74   Curve Number   (CN)=95.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .143 (i)
     TIME TO PEAK    (hrs)=    2.067
     RUNOFF VOLUME    (mm)=   40.377
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .721

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

--------------------------------------------------------------------------------
004:0041----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-204 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |     Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |     =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |    1.000  .1016E+00
                             .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .143     2.067     40.377
     OUTFLOW<02: (BM5   )       4.74      .106     4.033     20.314
    OVERFLOW<04: (OVBM5 )        .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](%)=   74.168
                  TIME SHIFT OF PEAK FLOW          (min)=   118.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.9579E-01

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0042----------------------------------------------------------------------
----------------------
```

```
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .395 (i)
     TIME TO PEAK    (hrs)=    3.317
     RUNOFF VOLUME    (mm)=   29.879
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .534

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

------------------------------------------------------------------------------
004:0043----------------------------------------------------------------------
------------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM5          4.74     .106    4.03  20.31    .000
                      +ID2 03:EXTA-5      21.58     .395    3.32  29.88    .000
                       ========================================================
                       SUM 09:OUT5        26.32     .493    3.60  28.16    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
004:0044----------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 05:OUT1        32.56     .603    5.23  17.32    .000
                      +ID2 06:OUT2        20.91     .389    4.67  22.57    .000
                      +ID3 07:OUT3         7.99     .153    5.02  20.11    .000
                      +ID4 08:OUT4        14.38     .291    4.28  21.03    .000
                      +ID5 09:OUT5        26.32     .493    3.60  28.16    .000
                       ========================================================
                       SUM 01:TO_MC      102.16    1.833    5.22  21.93    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
004:0045----------------------------------------------------------------------
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
  ** END OF RUN :   4

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 005
    NSTORM=   1
          #  1=LYA100.1hr
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*************************************************************************
*#*************************************************************************
*#
*#                     Block A - INTERIM 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
*#
*#*************************************************************************
*#*************************************************************************
--------------------
| CALIB NASHYD       |   Area    (ha)=   20.73   Curve Number   (CN)=86.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=    1.266 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=   19.004
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .431

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

------------------------------------------------------------------------------
005:0004----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-200 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )  |
| OUT<02:(BM1   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    6.000  .6450E+00
                           .000  .6040E+00    |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73     1.266      .867     19.004
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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.)=.3939E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
005:0005----------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .444 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   12.400
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .281

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

------------------------------------------------------------------------------
005:0006----------------------------------------------------------------------
------------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM1         20.73     .000     .00    .00    .000
                      +ID2 03:EXTA-1      11.83     .444     .90  12.40    .000
                       ========================================================
                       SUM 05:OUT1        32.56     .444     .90   4.51    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
005:0007----------------------------------------------------------------------
--------------------
| CALIB NASHYD       |   Area    (ha)=    9.30   Curve Number   (CN)=87.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .574 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=   19.841
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .450

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

------------------------------------------------------------------------------
005:0008----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-201 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2547E+00
                           .000  .2385E+00    |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .574      .883     19.841
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=    -53.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1845E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
005:0009----------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .395 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   11.580
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .263

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

------------------------------------------------------------------------------
005:0010----------------------------------------------------------------------
------------------------
```

```
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM2           9.30      .000     .00    .00    .000
                    +ID2 03:EXTA-2       11.61      .395     .92  11.58    .000
                     ==========================================================
                     SUM 06:OUT2         20.91      .395     .92   6.43    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0011----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    4.48   Curve Number    (CN)=87.00
| 01:A-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .272 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   19.841
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .450

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

--------------------------------------------------------------------------------
005:0012----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )  |
| OUT<02:(BM3   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    1.000  .1297E+00
                           .000  .1215E+00   |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .272      .900     19.841
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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)=   -54.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.8889E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0013----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    3.51   Curve Number    (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .129 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=   11.580
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .263

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

--------------------------------------------------------------------------------
005:0014----------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM3           4.48      .000     .00    .00    .000
                    +ID2 03:EXTA-3        3.51      .129     .87  11.58    .000
                     ==========================================================
                     SUM 07:OUT3          7.99      .129     .87   5.09    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0015----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=   10.16   Curve Number    (CN)=86.00
| 01:A-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .591 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   19.003
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .431

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

--------------------------------------------------------------------------------
005:0016----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )  |
| OUT<04:(BM4   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.000  .2312E+00
                           .000  .2166E+00   |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .591      .900     19.003
     OUTFLOW<04: (BM4   )       10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )         .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)=   -38.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1931E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0017----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.22   Curve Number    (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .203 (i)
     TIME TO PEAK    (hrs)=     .700
     RUNOFF VOLUME    (mm)=   11.982
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .272

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

--------------------------------------------------------------------------------
005:0018----------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 01:EXTA-4         4.22      .203     .70  11.98    .000
                    +ID2 04:BM4           10.16      .000     .00    .00    .000
                     ==========================================================
                     SUM 08:OUT4          14.38      .203     .70   3.52    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0019----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    4.74   Curve Number    (CN)=87.00
| 01:A-204  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .422 (i)
     TIME TO PEAK    (hrs)=     .633
     RUNOFF VOLUME    (mm)=   19.841
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .450

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

--------------------------------------------------------------------------------
005:0020----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-204 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )  |
| OUT<02:(BM5   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    1.000  .1016E+00
                           .000  .9510E-01   |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .422      .633     19.841
     OUTFLOW<02: (BM5   )       4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )        .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)=   -38.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9405E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0021----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   21.58   Curve Number    (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .603 (i)
     TIME TO PEAK    (hrs)=    1.067
     RUNOFF VOLUME    (mm)=   11.982
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .272

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

--------------------------------------------------------------------------------
005:0022----------------------------------------------------------------------
------------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM5           4.74      .000     .00    .00    .000
                    +ID2 03:EXTA-5        21.58      .603    1.07  11.98    .000
                     ==========================================================
                     SUM 09:OUT5          26.32      .603    1.07   9.82    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0023----------------------------------------------------------------------
*#*****************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*****************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
```

```
                                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 05:OUT1    32.56     .444     .90   4.51    .000
                    +ID2 06:OUT2    20.91     .395     .92   6.43    .000
                    +ID3 07:OUT3     7.99     .129     .87   5.09    .000
                    +ID4 08:OUT4    14.38     .203     .70   3.52    .000
                    +ID5 09:OUT5    26.32     .603    1.07   9.82    .000
                     ================================================
                     SUM 01:TO_MC  102.16    1.692     .92   6.18    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0024----------------------------------------------------------------------
*#*************************************************************************
*#*************************************************************************
*#
*#                              AMC III Conditions
*#
*#*************************************************************************
*#*************************************************************************
----------------------
| CALIB NASHYD       |   Area    (ha)=   20.73   Curve Number   (CN)=94.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=    1.831 (i)
     TIME TO PEAK    (hrs)=     .833
     RUNOFF VOLUME    (mm)=   27.639
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .627

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

--------------------------------------------------------------------------------
005:0025----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-200 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )  |
| OUT<02:(BM1   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |   6.000  .6450E+00
                           .000  .6040E+00   |  17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73    1.831      .833     27.639
     OUTFLOW<02: (BM1   )      20.73     .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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.)=.5730E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0026----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .771 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=   21.617
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .490

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

--------------------------------------------------------------------------------
005:0027----------------------------------------------------------------------
----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM1          20.73     .000     .00    .00    .000
                    +ID2 03:EXTA-1       11.83     .771     .87  21.62    .000
                     ================================================
                     SUM 05:OUT1         32.56     .771     .87   7.85    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0028----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    9.30   Curve Number   (CN)=95.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .838 (i)
     TIME TO PEAK    (hrs)=     .850
     RUNOFF VOLUME    (mm)=   29.138
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .661

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

--------------------------------------------------------------------------------
005:0029----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-201 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |   2.000  .2547E+00
                           .000  .2385E+00   |   6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .838      .850     29.138
     OUTFLOW<02: (BM2   )       9.30      .251     1.500      3.581
    OVERFLOW<09: (OVBM2 )        .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](%)=   29.928
                  TIME SHIFT OF PEAK FLOW         (min)=   39.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.2405E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0030----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .678 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   19.947
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .452

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

--------------------------------------------------------------------------------
005:0031----------------------------------------------------------------------
----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM2          9.30      .251    1.50   3.58    .000
                    +ID2 03:EXTA-2      11.61      .678     .90  19.95    .000
                     ================================================
                     SUM 06:OUT2        20.91      .678     .90  12.63    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0032----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.48   Curve Number   (CN)=95.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .397 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=   29.138
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .661

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

--------------------------------------------------------------------------------
005:0033----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-202 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )  |
| OUT<02:(BM3   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |   1.000  .1297E+00
                           .000  .1215E+00   |   3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .397      .867     29.138
     OUTFLOW<02: (BM3   )       4.48      .072     1.700      2.048
    OVERFLOW<09: (OVBM3 )        .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](%)=   18.175
                  TIME SHIFT OF PEAK FLOW         (min)=   50.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1221E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0034----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .221 (i)
     TIME TO PEAK    (hrs)=     .850
     RUNOFF VOLUME    (mm)=   19.947
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .452

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

--------------------------------------------------------------------------------
005:0035----------------------------------------------------------------------
----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM3          4.48      .072    1.70   2.05    .000
                    +ID2 03:EXTA-3       3.51      .221     .85  19.95    .000
                     ================================================
                     SUM 07:OUT3         7.99      .221     .85   9.89    .000
```

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

---------------------------------------------------------------------------
005:0036-----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   10.16   Curve Number   (CN)=94.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .855 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=   27.639
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .627

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

---------------------------------------------------------------------------
005:0037-----------------------------------------------------------------------
*#************************************************************************
*#                  Route A-203 through slope berms
*#************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   2.000  .2312E+00
                           .000  .2166E+00    |   6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )      10.16      .855      .867     27.639
     OUTFLOW<04: (BM4   )      10.16      .450     1.333      6.428
    OVERFLOW<09: (OVBM4 )        .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](%)=   52.654
                  TIME SHIFT OF PEAK FLOW         (min)=    28.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.2199E+00

      *** WARNING: Outflow volume is less than inflow volume.
---------------------------------------------------------------------------
005:0038-----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .351 (i)
     TIME TO PEAK    (hrs)=     .683
     RUNOFF VOLUME    (mm)=   20.758
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .471

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

---------------------------------------------------------------------------
005:0039-----------------------------------------------------------------------
----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXTA-4       4.22     .351     .68  20.76    .000
                      +ID2 04:BM4         10.16     .450    1.33   6.43    .000
                       ==========================================================
                       SUM 08:OUT4         14.38     .497    1.32  10.63    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------
005:0040-----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.74   Curve Number   (CN)=95.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .614 (i)
     TIME TO PEAK    (hrs)=     .617
     RUNOFF VOLUME    (mm)=   29.138
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .661

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

---------------------------------------------------------------------------
005:0041-----------------------------------------------------------------------
*#************************************************************************
*#                  Route A-204 through slope berms
*#************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )   |
| OUT<02:(BM5   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   1.000  .1016E+00
                           .000  .9510E-01    |   3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .614      .617     29.138
     OUTFLOW<02: (BM5   )       4.74      .433      .833      9.075
    OVERFLOW<04: (OVBM5 )        .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](%)=   70.534
                  TIME SHIFT OF PEAK FLOW         (min)=    13.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.9792E-01

      *** WARNING: Outflow volume is less than inflow volume.
---------------------------------------------------------------------------
005:0042-----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=    1.041 (i)
     TIME TO PEAK    (hrs)=    1.050
     RUNOFF VOLUME    (mm)=   20.758
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .471

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

---------------------------------------------------------------------------
005:0043-----------------------------------------------------------------------
----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM5          4.74     .433     .83   9.07    .000
                      +ID2 03:EXTA-5      21.58    1.041    1.05  20.76    .000
                       ==========================================================
                       SUM 09:OUT5         26.32    1.363     .87  18.65    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------
005:0044-----------------------------------------------------------------------
*#************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#************************************************************************
----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 05:OUT1         32.56     .771     .87   7.85    .000
                      +ID2 06:OUT2         20.91     .678     .90  12.63    .000
                      +ID3 07:OUT3          7.99     .221     .85   9.89    .000
                      +ID4 08:OUT4         14.38     .497    1.32  10.63    .000
                      +ID5 09:OUT5         26.32    1.363     .87  18.65    .000
                       ==========================================================
                       SUM 01:TO_MC       102.16    3.322     .87  12.15    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------
005:0045-----------------------------------------------------------------------
---------------------------------------------------------------------------
005:0002-----------------------------------------------------------------------
---------------------------------------------------------------------------
005:0002-----------------------------------------------------------------------
---------------------------------------------------------------------------
005:0002-----------------------------------------------------------------------
---------------------------------------------------------------------------
005:0002-----------------------------------------------------------------------
  ** END OF RUN :   5

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




----------------------
| START              |  Project  dir.: C:\TEMP\Loy\
----------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
           #  1=LYA100.12h
---------------------------------------------------------------------------
006:0002-----------------------------------------------------------------------
*#************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#************************************************************************
*#************************************************************************
*#
*#                     Block A - INTERIM 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
*#
*#************************************************************************
*#************************************************************************
----------------------
| CALIB NASHYD       |   Area    (ha)=   20.73   Curve Number   (CN)=86.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .834 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   60.495
     TOTAL RAINFALL   (mm)=   93.696
```

```
     RUNOFF COEFFICIENT   =     .646

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

--------------------------------------------------------------------------------
006:0004----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-200 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )   |
| OUT<02:(BM1   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00    |    6.000  .6450E+00
                          .000  .6040E+00    |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73      .834     3.100     60.495
     OUTFLOW<02: (BM1   )      20.73      .710     3.917     31.358
    OVERFLOW<09: (OVBM1 )        .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](%)=   85.125
                   TIME SHIFT OF PEAK FLOW          (min)=    49.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.6089E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
006:0005----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .321 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   43.381
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .463

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

--------------------------------------------------------------------------------
006:0006----------------------------------------------------------------------
------------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM1          20.73     .710    3.92  31.36    .000
                      +ID2 03:EXTA-1       11.83     .321    3.17  43.38    .000
                       ========================================================
                       SUM 05:OUT1         32.56    1.003    3.92  35.73    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0007----------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=87.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .384 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   62.116
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .663

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

--------------------------------------------------------------------------------
006:0008----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-201 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )   |
| OUT<02:(BM2   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00    |    2.000  .2547E+00
                          .000  .2385E+00    |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .384     3.100     62.116
     OUTFLOW<02: (BM2   )       9.30      .344     3.600     36.471
    OVERFLOW<09: (OVBM2 )        .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](%)=   89.642
                   TIME SHIFT OF PEAK FLOW          (min)=    30.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.2413E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
006:0009----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .297 (i)
     TIME TO PEAK    (hrs)=    3.183
     RUNOFF VOLUME    (mm)=   41.200
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .440

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

--------------------------------------------------------------------------------
006:0010----------------------------------------------------------------------
------------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM2          9.30      .344    3.60  36.47    .000
                      +ID2 03:EXTA-2       11.61     .297    3.18  41.20    .000
                       ========================================================
                       SUM 06:OUT2         20.91     .626    3.58  39.10    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0011----------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=87.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .185 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   62.116
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .663

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

--------------------------------------------------------------------------------
006:0012----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )   |
| OUT<02:(BM3   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00    |    1.000  .1297E+00
                          .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .185     3.100     62.116
     OUTFLOW<02: (BM3   )       4.48      .162     3.733     34.996
    OVERFLOW<09: (OVBM3 )        .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](%)=   87.628
                   TIME SHIFT OF PEAK FLOW          (min)=    38.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.1228E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
006:0013----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    3.51   Curve Number   (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .091 (i)
     TIME TO PEAK    (hrs)=    3.150
     RUNOFF VOLUME    (mm)=   41.200
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .440

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

--------------------------------------------------------------------------------
006:0014----------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM3          4.48      .162    3.73  35.00    .000
                      +ID2 03:EXTA-3       3.51      .091    3.15  41.20    .000
                       ========================================================
                       SUM 07:OUT3         7.99      .245    3.72  37.72    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0015----------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=86.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .407 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   60.494
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .646

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

--------------------------------------------------------------------------------
006:0016----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00    |    2.000  .2312E+00
```

```
                        .000  .2166E+00   |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .407     3.100     60.494
     OUTFLOW<04: (BM4   )       10.16      .391     3.350     39.176
    OVERFLOW<09: (OVBM4 )         .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](%)=   96.173
                    TIME SHIFT OF PEAK FLOW          (min)=    15.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2195E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0017---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .116 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   42.278
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .451

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

-------------------------------------------------------------------------------
006:0018---------------------------------------------------------------------
----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4         4.22     .116    3.07  42.28    .000
                     +ID2 04:BM4           10.16     .391    3.35  39.18    .000
                      ========================================================
                      SUM 08:OUT4          14.38     .496    3.35  40.09    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0019---------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.74   Curve Number   (CN)=87.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .205 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=   62.116
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .663

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

-------------------------------------------------------------------------------
006:0020---------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-204 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00    |    1.000  .1016E+00
                            .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .205     2.083     62.116
     OUTFLOW<02: (BM5   )       4.74      .201     3.033     42.053
    OVERFLOW<04: (OVBM5 )        .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](%)=   98.046
                    TIME SHIFT OF PEAK FLOW          (min)=    57.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9641E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0021---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .546 (i)
     TIME TO PEAK    (hrs)=    3.383
     RUNOFF VOLUME    (mm)=   42.278
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .451

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

-------------------------------------------------------------------------------
006:0022---------------------------------------------------------------------
----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM5            4.74     .201    3.03  42.05    .000
                     +ID2 03:EXTA-5        21.58     .546    3.38  42.28    .000
                      ========================================================
                      SUM 09:OUT5          26.32     .730    3.12  42.24    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0023---------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 05:OUT1          32.56    1.003    3.92  35.73    .000
                     +ID2 06:OUT2          20.91     .626    3.58  39.10    .000
                     +ID3 07:OUT3           7.99     .245    3.72  37.72    .000
                     +ID4 08:OUT4          14.38     .496    3.35  40.09    .000
                     +ID5 09:OUT5          26.32     .730    3.12  42.24    .000
                      ========================================================
                      SUM 01:TO_MC        102.16    2.991    3.90  38.86    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0024---------------------------------------------------------------------
*#*************************************************************************
*#*************************************************************************
*#
*#                            AMC III Conditions
*#
*#*************************************************************************
*#*************************************************************************
----------------------
| CALIB NASHYD       |   Area    (ha)=   20.73   Curve Number   (CN)=94.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=    1.089 (i)
     TIME TO PEAK    (hrs)=    2.300
     RUNOFF VOLUME    (mm)=   74.989
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .800

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

-------------------------------------------------------------------------------
006:0025---------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-200 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )    |
| OUT<02:(BM1   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00    |    6.000  .6450E+00
                            .000  .6040E+00    |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73     1.089     2.300     74.989
     OUTFLOW<02: (BM1   )       20.73     1.007     3.233     45.853
    OVERFLOW<09: (OVBM1 )         .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](%)=   92.423
                    TIME SHIFT OF PEAK FLOW          (min)=    56.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6109E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0026---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .489 (i)
     TIME TO PEAK    (hrs)=    3.083
     RUNOFF VOLUME    (mm)=   63.650
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .679

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

-------------------------------------------------------------------------------
006:0027---------------------------------------------------------------------
----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM1           20.73    1.007    3.23  45.85    .000
                     +ID2 03:EXTA-1        11.83     .489    3.08  63.65    .000
                      ========================================================
                      SUM 05:OUT1          32.56    1.488    3.23  52.32    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0028---------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    9.30   Curve Number   (CN)=95.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .506 (i)
     TIME TO PEAK    (hrs)=    2.317
     RUNOFF VOLUME    (mm)=   77.079
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .823

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

-------------------------------------------------------------------------------
006:0029---------------------------------------------------------------------
*#*************************************************************************
```

```
*#                  Route A-201 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR  |     Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |     =========  OUTLFOW STORAGE TABLE  =========
--------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   2.000  .2547E+00
                           .000  .2385E+00    |   6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .506     2.317     77.079
     OUTFLOW<02: (BM2   )        9.30      .479     3.050     51.434
    OVERFLOW<09: (OVBM2 )         .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](%)=   94.704
                    TIME SHIFT OF PEAK FLOW         (min)=    44.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2424E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0030---------------------------------------------------------------------
--------------------
| DESIGN NASHYD    |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .453 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   60.466
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .645

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

-------------------------------------------------------------------------------
006:0031---------------------------------------------------------------------
----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:BM2           9.30      .479    3.05  51.43    .000
                     +ID2 03:EXTA-2       11.61      .453    3.12  60.47    .000
                      ========================================================
                      SUM 06:OUT2         20.91      .931    3.07  56.45    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0032---------------------------------------------------------------------
--------------------
| CALIB NASHYD     |   Area    (ha)=    4.48   Curve Number   (CN)=95.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .242 (i)
     TIME TO PEAK    (hrs)=    2.333
     RUNOFF VOLUME    (mm)=   77.079
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .823

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

-------------------------------------------------------------------------------
006:0033---------------------------------------------------------------------
*#########################################################################
*#                  Route A-202 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR  |     Requested routing time step =  1.0 min.
|  IN>01:(A-202 )  |
| OUT<02:(BM3   )  |     =========  OUTLFOW STORAGE TABLE  =========
--------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   1.000  .1297E+00
                           .000  .1215E+00    |   3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )        4.48      .242     2.333     77.079
     OUTFLOW<02: (BM3   )        4.48      .229     3.117     49.958
    OVERFLOW<09: (OVBM3 )         .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](%)=   94.544
                    TIME SHIFT OF PEAK FLOW         (min)=    47.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1234E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0034---------------------------------------------------------------------
--------------------
| DESIGN NASHYD    |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .138 (i)
     TIME TO PEAK    (hrs)=    3.083
     RUNOFF VOLUME    (mm)=   60.466
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .645

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

-------------------------------------------------------------------------------
006:0035---------------------------------------------------------------------
----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:BM3           4.48      .229    3.12  49.96    .000
                     +ID2 03:EXTA-3        3.51      .138    3.08  60.47    .000
                      ========================================================
                      SUM 07:OUT3          7.99      .367    3.12  54.57    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0036---------------------------------------------------------------------
--------------------
| CALIB NASHYD     |   Area    (ha)=   10.16   Curve Number   (CN)=94.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .526 (i)
     TIME TO PEAK    (hrs)=    2.367
     RUNOFF VOLUME    (mm)=   74.989
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .800

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

-------------------------------------------------------------------------------
006:0037---------------------------------------------------------------------
*#########################################################################
*#                  Route A-203 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR  |     Requested routing time step =  1.0 min.
|  IN>01:(A-203 )  |
| OUT<04:(BM4   )  |     =========  OUTLFOW STORAGE TABLE  =========
--------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   2.000  .2312E+00
                           .000  .2166E+00    |   6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .526     2.367     74.989
     OUTFLOW<04: (BM4   )       10.16      .512     2.900     53.670
    OVERFLOW<09: (OVBM4 )         .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](%)=   97.339
                    TIME SHIFT OF PEAK FLOW         (min)=    32.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2203E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0038---------------------------------------------------------------------
--------------------
| DESIGN NASHYD    |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .175 (i)
     TIME TO PEAK    (hrs)=    2.117
     RUNOFF VOLUME    (mm)=   62.036
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .662

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

-------------------------------------------------------------------------------
006:0039---------------------------------------------------------------------
----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 01:EXTA-4        4.22      .175    2.12  62.04    .000
                     +ID2 04:BM4          10.16      .512    2.90  53.67    .000
                      ========================================================
                      SUM 08:OUT4         14.38      .684    3.03  56.13    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0040---------------------------------------------------------------------
--------------------
| CALIB NASHYD     |   Area    (ha)=    4.74   Curve Number   (CN)=95.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .287 (i)
     TIME TO PEAK    (hrs)=    2.033
     RUNOFF VOLUME    (mm)=   77.079
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .823

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

-------------------------------------------------------------------------------
006:0041---------------------------------------------------------------------
*#########################################################################
*#                  Route A-204 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR  |     Requested routing time step =  1.0 min.
|  IN>01:(A-204 )  |
| OUT<02:(BM5   )  |     =========  OUTLFOW STORAGE TABLE  =========
--------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   1.000  .1016E+00
                           .000  .9510E-01    |   3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )        4.74      .287     2.033     77.079
     OUTFLOW<02: (BM5   )        4.74      .248     2.367     57.016
    OVERFLOW<04: (OVBM5 )         .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](%)=   86.331
                  TIME SHIFT OF PEAK FLOW         (min)=    20.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.9671E-01

     *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0042---------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .842 (i)
     TIME TO PEAK    (hrs)=    3.217
     RUNOFF VOLUME    (mm)=   62.036
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .662

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

-------------------------------------------------------------------------------
006:0043---------------------------------------------------------------------
-----------------------
| ADD HYD (OUT5      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM5           4.74     .248    2.37  57.02    .000
                      +ID2 03:EXTA-5       21.58     .842    3.22  62.04    .000
                       ========================================================
                       SUM 09:OUT5          26.32    1.076    3.08  61.13    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0044---------------------------------------------------------------------
*#*****************************************************************************
*#                              TOTAL FLOW TO MUD CREEK
*#*****************************************************************************
-----------------------
| ADD HYD (TO_MC     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 05:OUT1          32.56    1.488    3.23  52.32    .000
                      +ID2 06:OUT2          20.91     .931    3.07  56.45    .000
                      +ID3 07:OUT3           7.99     .367    3.12  54.57    .000
                      +ID4 08:OUT4          14.38     .684    3.03  56.13    .000
                      +ID5 09:OUT5          26.32    1.076    3.08  61.13    .000
                       ========================================================
                       SUM 01:TO_MC        102.16    4.492    3.22  56.15    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0045---------------------------------------------------------------------
-------------------------------------------------------------------------------
006:0002---------------------------------------------------------------------
-------------------------------------------------------------------------------
006:0002---------------------------------------------------------------------
-------------------------------------------------------------------------------
006:0002---------------------------------------------------------------------
-------------------------------------------------------------------------------
006:0002---------------------------------------------------------------------
-------------------------------------------------------------------------------
006:0002---------------------------------------------------------------------
  ** END OF RUN :   6

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 007
    NSTORM=   1
          #  1=25mm.4hr
-------------------------------------------------------------------------------
007:0002---------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*****************************************************************************
*#*****************************************************************************
*#
*#                     Block A - INTERIM CONDITIONS
*#
*#*****************************************************************************
-------------------------------------------------------------------------------
007:0002---------------------------------------------------------------------
--------------------
| 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
-------------------------------------------------------------------------------
007:0003---------------------------------------------------------------------
*#*****************************************************************************
*#*****************************************************************************
*#
*#                            AMC II Conditions
*#
*#*****************************************************************************
*#*****************************************************************************
---------------------
| CALIB NASHYD       |   Area    (ha)=   20.73   Curve Number   (CN)=86.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .290 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=    6.520
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .261

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

-------------------------------------------------------------------------------
007:0004---------------------------------------------------------------------
*#*****************************************************************************
*#                     Route A-200 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )    |
| OUT<02:(BM1   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |     6.000  .6450E+00
                            .000  .6040E+00    |    17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73      .290     2.083      6.520
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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)=  -125.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1352E+00

     *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
007:0005---------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .107 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=    4.340
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .174

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

-------------------------------------------------------------------------------
007:0006---------------------------------------------------------------------
-----------------------
| ADD HYD (OUT1      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM1           20.73     .000     .00    .00    .000
                      +ID2 03:EXTA-1        11.83     .107    2.10   4.34    .000
                       ========================================================
                       SUM 05:OUT1          32.56     .107    2.10   1.58    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0007---------------------------------------------------------------------
---------------------
| CALIB NASHYD       |   Area    (ha)=    9.30   Curve Number   (CN)=87.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .134 (i)
     TIME TO PEAK    (hrs)=    2.117
     RUNOFF VOLUME    (mm)=    6.902
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .276

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

-------------------------------------------------------------------------------
007:0008---------------------------------------------------------------------
*#*****************************************************************************
*#                     Route A-201 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )    |
| OUT<02:(BM2   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |     2.000  .2547E+00
                            .000  .2385E+00    |     6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .134     2.117      6.902
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=  -127.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6419E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
007:0009----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .094 (i)
     TIME TO PEAK    (hrs)=    2.117
     RUNOFF VOLUME    (mm)=    4.013
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .161

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

-------------------------------------------------------------------------------
007:0010----------------------------------------------------------------------
------------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM2           9.30     .000     .00    .00    .000
                      +ID2 03:EXTA-2       11.61     .094    2.12   4.01    .000
                       ==========================================================
                       SUM 06:OUT2         20.91     .094    2.12   2.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0011----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    4.48   Curve Number   (CN)=87.00
| 01:A-202  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .063 (i)
     TIME TO PEAK    (hrs)=    2.133
     RUNOFF VOLUME    (mm)=    6.902
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .276

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

-------------------------------------------------------------------------------
007:0012----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-202 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )    |
| OUT<02:(BM3   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1297E+00
                           .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     --------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )        4.48      .063     2.133      6.902
     OUTFLOW<02: (BM3   )        4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )         .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)=  -128.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.3092E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
007:0013----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    3.51   Curve Number   (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .031 (i)
     TIME TO PEAK    (hrs)=    2.050
     RUNOFF VOLUME    (mm)=    4.013
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .161

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

-------------------------------------------------------------------------------
007:0014----------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3           4.48     .000     .00    .00    .000
                      +ID2 03:EXTA-3        3.51     .031    2.05   4.01    .000
                       ==========================================================
                       SUM 07:OUT3          7.99     .031    2.05   1.76    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0015----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=   10.16   Curve Number   (CN)=86.00
| 01:A-203  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .135 (i)
     TIME TO PEAK    (hrs)=    2.133
     RUNOFF VOLUME    (mm)=    6.520
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .261

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

-------------------------------------------------------------------------------
007:0016----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-203 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )    |
| OUT<04:(BM4   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2312E+00
                           .000  .2166E+00    |    6.000  .2464E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     --------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .135     2.133      6.520
     OUTFLOW<04: (BM4   )       10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )         .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)=  -128.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6625E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
007:0017----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .052 (i)
     TIME TO PEAK    (hrs)=    1.867
     RUNOFF VOLUME    (mm)=    4.172
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .167

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

-------------------------------------------------------------------------------
007:0018----------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4        4.22     .052    1.87   4.17    .000
                      +ID2 04:BM4          10.16     .000     .00    .00    .000
                       ==========================================================
                       SUM 08:OUT4         14.38     .052    1.87   1.22    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0019----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area     (ha)=    4.74   Curve Number   (CN)=87.00
| 01:A-204  DT= 1.00 |   Ia       (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .110 (i)
     TIME TO PEAK    (hrs)=    1.817
     RUNOFF VOLUME    (mm)=    6.902
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .276

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

-------------------------------------------------------------------------------
007:0020----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-204 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1016E+00
                           .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     --------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )        4.74      .110     1.817      6.902
     OUTFLOW<02: (BM5   )        4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )         .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.)=.3272E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
007:0021----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   21.58   Curve Number   (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421
```

```
     PEAK FLOW       (cms)=     .146 (i)
     TIME TO PEAK    (hrs)=    2.333
     RUNOFF VOLUME    (mm)=    4.173
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .167

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

------------------------------------------------------------------------------
007:0022------------------------------------------------------------------------
----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM5           4.74     .000     .00    .00    .000
                     +ID2 03:EXTA-5       21.58     .146    2.33   4.17    .000
                      ========================================================
                      SUM 09:OUT5          26.32     .146    2.33   3.42    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0023------------------------------------------------------------------------
*#############################################################################
*#                          TOTAL FLOW TO MUD CREEK
*#############################################################################
----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 05:OUT1          32.56     .107    2.10   1.58    .000
                     +ID2 06:OUT2          20.91     .094    2.12   2.23    .000
                     +ID3 07:OUT3           7.99     .031    2.05   1.76    .000
                     +ID4 08:OUT4          14.38     .052    1.87   1.22    .000
                     +ID5 09:OUT5          26.32     .146    2.33   3.42    .000
                      ========================================================
                      SUM 01:TO_MC        102.16     .403    2.13   2.15    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0024------------------------------------------------------------------------
*#############################################################################
*#############################################################################
*#
*#                              AMC III Conditions
*#
*#############################################################################
*#############################################################################
----------------------
| CALIB NASHYD       |   Area    (ha)=   20.73   Curve Number   (CN)=94.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=    5.000  # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=    2.140

     PEAK FLOW       (cms)=     .524 (i)
     TIME TO PEAK    (hrs)=    2.067
     RUNOFF VOLUME    (mm)=   11.046
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .442

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

------------------------------------------------------------------------------
007:0025------------------------------------------------------------------------
*#############################################################################
*#                    Route A-200 through slope berms
*#############################################################################
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )   |
| OUT<02:(BM1   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    6.000  .6450E+00
                           .000  .6040E+00    |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .524     2.067     11.046
     OUTFLOW<02: (BM1   )       20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )         .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)=  -124.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.2290E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
007:0026------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=    1.500  # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .219 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=    8.516
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .341

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

------------------------------------------------------------------------------
007:0027------------------------------------------------------------------------
----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM1           20.73     .000     .00    .00    .000
                     +ID2 03:EXTA-1        11.83     .219    2.08   8.52    .000
                      ========================================================
                      SUM 05:OUT1          32.56     .219    2.08   3.09    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0028------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    9.30   Curve Number   (CN)=95.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=    5.000  # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .390

     Unit Hyd Qpeak  (cms)=     .911

     PEAK FLOW       (cms)=     .249 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=   11.988
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .479

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

------------------------------------------------------------------------------
007:0029------------------------------------------------------------------------
*#############################################################################
*#                    Route A-201 through slope berms
*#############################################################################
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )   |
| OUT<02:(BM2   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2547E+00
                           .000  .2385E+00    |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .249     2.083     11.988
     OUTFLOW<02: (BM2   )        9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )         .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)=  -125.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1115E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
007:0030------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=    1.500  # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .186 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=    7.683
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .307

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

------------------------------------------------------------------------------
007:0031------------------------------------------------------------------------
----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM2           9.30     .000     .00    .00    .000
                     +ID2 03:EXTA-2       11.61     .186    2.10   7.68    .000
                      ========================================================
                      SUM 06:OUT2          20.91     .186    2.10   4.27    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0032------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.48   Curve Number   (CN)=95.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=    5.000  # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .428

     PEAK FLOW       (cms)=     .118 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=   11.988
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .479

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

------------------------------------------------------------------------------
007:0033------------------------------------------------------------------------
*#############################################################################
*#                    Route A-202 through slope berms
*#############################################################################
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )   |
| OUT<02:(BM3   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1297E+00
                           .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )        4.48      .118     2.100     11.988
     OUTFLOW<02: (BM3   )        4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )         .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)=  -126.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.5370E-01

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

```
--------------------------------------------------------------------------------
007:0034--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .061 (i)
     TIME TO PEAK    (hrs)=    2.033
     RUNOFF VOLUME    (mm)=    7.683
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .307

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

--------------------------------------------------------------------------------
007:0035--------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3           4.48     .000     .00    .00    .000
                      +ID2 03:EXTA-3        3.51     .061    2.03   7.68    .000
                       ==========================================================
                       SUM 07:OUT3          7.99     .061    2.03   3.38    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0036--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   10.16   Curve Number   (CN)=94.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=     .970

     PEAK FLOW       (cms)=     .243 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=   11.046
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .442

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

--------------------------------------------------------------------------------
007:0037--------------------------------------------------------------------------
*#*************************************************************************
*#                     Route A-203 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )    |
| OUT<04:(BM4   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)     (ha.m.)
                           .000  .0000E+00     |    2.000  .2312E+00
                           .000  .2166E+00     |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .243     2.100     11.046
     OUTFLOW<04: (BM4   )       10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )         .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)=  -126.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1122E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
007:0038--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .106 (i)
     TIME TO PEAK    (hrs)=    1.850
     RUNOFF VOLUME    (mm)=    8.083
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .323

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

--------------------------------------------------------------------------------
007:0039--------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4        4.22     .106    1.85   8.08    .000
                      +ID2 04:BM4          10.16     .000     .00    .00    .000
                       ==========================================================
                       SUM 08:OUT4         14.38     .106    1.85   2.37    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0040--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.74   Curve Number   (CN)=95.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   5.000   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .180

     Unit Hyd Qpeak  (cms)=    1.006

     PEAK FLOW       (cms)=     .211 (i)
     TIME TO PEAK    (hrs)=    1.800
     RUNOFF VOLUME    (mm)=   11.988
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .479

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

--------------------------------------------------------------------------------
007:0041--------------------------------------------------------------------------
*#*************************************************************************
*#                     Route A-204 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)    |    (cms)     (ha.m.)
                            .000  .0000E+00     |    1.000  .1016E+00
                            .000  .9510E-01     |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .211     1.800     11.988
     OUTFLOW<02: (BM5   )       4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )        .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)=  -108.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.5682E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
007:0042--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .291 (i)
     TIME TO PEAK    (hrs)=    2.317
     RUNOFF VOLUME    (mm)=    8.083
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .323

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

--------------------------------------------------------------------------------
007:0043--------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM5           4.74     .000     .00    .00    .000
                      +ID2 03:EXTA-5       21.58     .291    2.32   8.08    .000
                       ==========================================================
                       SUM 09:OUT5         26.32     .291    2.32   6.63    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0044--------------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 05:OUT1         32.56     .219    2.08   3.09    .000
                      +ID2 06:OUT2         20.91     .186    2.10   4.27    .000
                      +ID3 07:OUT3          7.99     .061    2.03   3.38    .000
                      +ID4 08:OUT4         14.38     .106    1.85   2.37    .000
                      +ID5 09:OUT5         26.32     .291    2.32   6.63    .000
                       ==========================================================
                       SUM 01:TO_MC       102.16     .807    2.12   4.16    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
007:0045--------------------------------------------------------------------------
--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------
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007:0002--------------------------------------------------------------------------
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007:0002--------------------------------------------------------------------------
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007:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
007:0002--------------------------------------------------------------------------
      FINISH
--------------------------------------------------------------------------------
*********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0008 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0016 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0020 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0025 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0029 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0033 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0037 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 001:0041 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0004 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0008 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
 002:0012 ROUTE RESERVOIR
      *** WARNING: Outflow volume is less than inflow volume.
```

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002:0016 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
002:0020 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
002:0025 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
002:0029 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
002:0033 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
002:0037 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
002:0041 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
003:0004 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
003:0008 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
003:0012 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
003:0016 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
003:0020 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
003:0025 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
003:0029 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
003:0033 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
003:0037 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
003:0041 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
004:0004 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
004:0008 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
004:0012 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
004:0016 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
004:0020 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
004:0025 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
004:0029 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
004:0033 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
004:0037 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
004:0041 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
005:0004 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
005:0008 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
005:0012 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
005:0016 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
005:0020 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
005:0025 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
005:0029 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
005:0033 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
005:0037 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
005:0041 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
006:0004 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
006:0008 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
006:0012 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
006:0016 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
006:0020 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
006:0025 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
006:0029 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
006:0033 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
006:0037 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
006:0041 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
007:0004 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
007:0008 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
007:0012 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
007:0016 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
007:0020 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
007:0025 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
007:0029 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
007:0033 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
007:0037 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
007:0041 ROUTE RESERVOIR
     *** WARNING: Outflow volume is less than inflow volume.
  Simulation ended on 2018-01-15     at 16:03:01
================================================================================
```

APPENDIX D – PROPOSED CONDITIONS

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

Subject: **NRCS (SCS) Curve Number Determination - Proposed Conditions**
Project: **Loyalist Solar Project**
Site: **Block A**
Project No.: **1335-60220**
Client: **Loyalist Solar LP**
Date: **January 11, 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

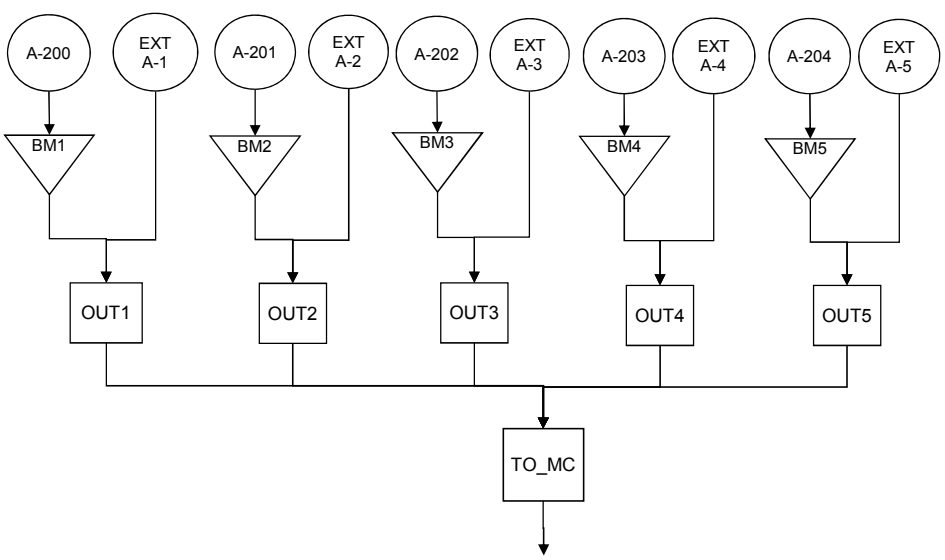
HYDROLOGIC SOIL TYPE (%) - Proposed Conditions								
	Hydrologic Soil Type							
Catchment	A	AB	B	BC	C	CD	D	TOTAL
EXT A-1				100				100
EXT A-2				100				100
EXT A-3				100				100
EXT A-4				100				100
EXT A-5				75			25	100
A-200				20			80	100
A-201				20			80	100
A-202				20			80	100
A-203				75			25	100
A-204							100	100

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Scarified Soil	Wetland	Impervious	Total
EXT A-1	6	10	2	65	15				2	100
EXT A-2	8	10	5	75					2	100
EXT A-3	8	10	10	70					2	100
EXT A-4	23	30	20		25				2	100
EXT A-5	13	85							2	100
A-200			98						2	100
A-201			98						2	100
A-202			98						2	100
A-203			91						9	100
A-204			99						1	100

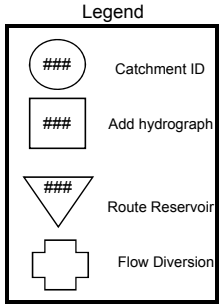
CURVE NUMBER (CN) - Proposed Conditions											
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Gravel	Scarified Soil	Wetland/ Lakes	Impervious	Weighted CN (AMC II)	Weighted CN (AMC III)
EXT A-1	4	7	1	45	12				2	71	86
EXT A-2	5	7	3	52					2	69	84
EXT A-3	5	7	7	49					2	69	84
EXT A-4	15	20	14		20				2	70	85
EXT A-5	9	59							2	70	85
A-200			76						2	78	90
A-201			76						2	78	90
A-202			76						2	78	90
A-203			64						9	73	87
A-204			79						1	80	91

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 based on guidance presented in National Engineering Handbook

Subject: Interim and Proposed Conditions SWMHYMO Schematic
Project: Loyalist Solar Project
Site: Block A
Project No.: 1335-60220
Client: Loyalist Solar LP
Date: 1/15/2018



Discharge to Mud Creek



```
================================================================================
   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO            9      9   =========
                                                         9   9  9   9   # 4730904
        StormWater Management HYdrologic Model            999    999    =========

 ********************************************************************************
 ****************************** SWMHYMO Ver/4.05  *******************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********      based on the principles of HYMO and its successors      *********
 *********                 OTTHYMO-83 and OTTHYMO-89.                    *********
 ********************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.           *********
 *********                  Ottawa,  Ontario: (613) 836-3884            *********
 *********                  Gatineau, Quebec: (819) 243-6858            *********
 *********                  E-Mail: swmhymo@jfsa.com                    *********
 ********************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
 +++++++++                Kitchener            SERIAL#:4730904        +++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ********************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
 *********           Maximum value for ID numbers  :     10            *********
 *********           Max. number of rainfall points: 105408            *********
 *********           Max. number of flow points    : 105408            *********
 ********************************************************************************


 **********************   D E T A I L E D   O U T P U T   **********************
 ********************************************************************************
 *         DATE: 2018-01-15     TIME: 16:09:19     RUN COUNTER: 002128          *
 ********************************************************************************
 * Input   filename: C:\TEMP\Loy\LYBAPR2.dat                                    *
 * Output  filename: C:\TEMP\Loy\LYBAPR2.out                                    *
 * Summary filename: C:\TEMP\Loy\LYBAPR2.sum                                    *
 * User comments:                                                               *
 * 1:_____________________________________________________________________________*
 * 2:_____________________________________________________________________________*
 * 3:_____________________________________________________________________________*
 ********************************************************************************


--------------------------------------------------------------------------------
001:0001----------------------------------------------------------------------
*################################################################################
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*################################################################################
*################################################################################
*#
*#                    Block A - PROPOSED CONDITIONS
*#
*################################################################################
--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   1
          #  1=LYA2.1hr
--------------------------------------------------------------------------------
001:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: Belleville IDF (1-hr 30% AES - 2 Year)
| Ptotal=  22.10 mm|    Comments: Belleville IDF (1-hr 30% AES - 2 Year)
--------------------
            TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
             hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
             .08  23.868 |   .33  29.172 |   .58  26.520 |   .83   7.956
             .17  37.128 |   .42  34.476 |   .67  13.260 |   .92   2.652
             .25  55.692 |   .50  23.868 |   .75  10.608 |  1.00    .000


--------------------------------------------------------------------------------
001:0003----------------------------------------------------------------------
*################################################################################
*################################################################################
*#
*#                              AMC II Conditions
*#
*################################################################################
*################################################################################
--------------------
| DESIGN NASHYD    |   Area    (ha)=   20.73   Curve Number   (CN)=78.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .286 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    4.601
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .208

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

--------------------------------------------------------------------------------
001:0004----------------------------------------------------------------------
*################################################################################
*#                     Route A-200 through slope berms
*################################################################################
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )  |
| OUT<02:(BM1   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    6.000  .6450E+00
                           .000  .6040E+00    |   17.000  .6872E+00


     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .286      .917      4.601
     OUTFLOW<02: (BM1   )       20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )         .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)=   -55.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.9537E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
001:0005----------------------------------------------------------------------
--------------------
| DESIGN NASHYD    |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .123 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    3.413
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .154

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

--------------------------------------------------------------------------------
001:0006----------------------------------------------------------------------
----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:BM1          20.73     .000     .00    .00     .000
                     +ID2 03:EXTA-1       11.83     .123     .92   3.41     .000
                      ==========================================================
                      SUM 05:OUT1         32.56     .123     .92   1.24     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0007----------------------------------------------------------------------
--------------------
| DESIGN NASHYD    |   Area    (ha)=    9.30   Curve Number   (CN)=78.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .125 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    4.601
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .208

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

--------------------------------------------------------------------------------
001:0008----------------------------------------------------------------------
*################################################################################
*#                     Route A-201 through slope berms
*################################################################################
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2547E+00
                           .000  .2385E+00    |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .125      .933      4.601
     OUTFLOW<02: (BM2   )        9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )         .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)=   -56.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.4279E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
001:0009----------------------------------------------------------------------
--------------------
| DESIGN NASHYD    |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .108 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    3.150
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .143

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

--------------------------------------------------------------------------------
001:0010----------------------------------------------------------------------
----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:BM2          9.30      .000     .00    .00     .000
                     +ID2 03:EXTA-2       11.61     .108     .93   3.15     .000
                      ==========================================================
                      SUM 06:OUT2         20.91     .108     .93   1.75     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0011----------------------------------------------------------------------
----------------------
```

```
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number    (CN)=78.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .059 (i)
     TIME TO PEAK    (hrs)=     .950
     RUNOFF VOLUME    (mm)=    4.601
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .208

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

--------------------------------------------------------------------------------
001:0012----------------------------------------------------------------------
*#*************************************************************************
*#                  Route A-202 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )    |
| OUT<02:(BM3   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1297E+00
                           .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .059      .950      4.601
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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.)=.2061E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
001:0013----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number    (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .035 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=    3.150
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .143

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

--------------------------------------------------------------------------------
001:0014----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 02:BM3            4.48      .000     .00    .00     .000
                    +ID2 03:EXTA-3         3.51      .035     .88   3.15     .000
                     ========================================================
                     SUM 07:OUT3           7.99      .035     .88   1.38     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0015----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number    (CN)=73.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .108 (i)
     TIME TO PEAK    (hrs)=     .950
     RUNOFF VOLUME    (mm)=    3.705
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .168

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

--------------------------------------------------------------------------------
001:0016----------------------------------------------------------------------
*#*************************************************************************
*#                  Route A-203 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )    |
| OUT<04:(BM4   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2312E+00
                           .000  .2166E+00    |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )      10.16      .108      .950      3.705
     OUTFLOW<04: (BM4   )      10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )        .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.)=.3764E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
001:0017----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number    (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .056 (i)
     TIME TO PEAK    (hrs)=     .717
     RUNOFF VOLUME    (mm)=    3.278
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .148

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

--------------------------------------------------------------------------------
001:0018----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 01:EXTA-4         4.22      .056     .72   3.28     .000
                    +ID2 04:BM4           10.16      .000     .00    .00     .000
                     ========================================================
                     SUM 08:OUT4          14.38      .056     .72    .96     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0019----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number    (CN)=80.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .102 (i)
     TIME TO PEAK    (hrs)=     .683
     RUNOFF VOLUME    (mm)=    5.046
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .228

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

--------------------------------------------------------------------------------
001:0020----------------------------------------------------------------------
*#*************************************************************************
*#                  Route A-204 through slope berms
*#*************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1016E+00
                           .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .102      .683      5.046
     OUTFLOW<02: (BM5   )       4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )        .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.)=.2392E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
001:0021----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number    (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .166 (i)
     TIME TO PEAK    (hrs)=    1.083
     RUNOFF VOLUME    (mm)=    3.278
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .148

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

--------------------------------------------------------------------------------
001:0022----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 02:BM5            4.74      .000     .00    .00     .000
                    +ID2 03:EXTA-5        21.58      .166    1.08   3.28     .000
                     ========================================================
                     SUM 09:OUT5          26.32      .166    1.08   2.69     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0023----------------------------------------------------------------------
*#*************************************************************************
*#                              TOTAL FLOW TO MUD CREEK
*#*************************************************************************
-----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 05:OUT1          32.56      .123     .92   1.24     .000
                    +ID2 06:OUT2          20.91      .108     .93   1.75     .000
                    +ID3 07:OUT3           7.99      .035     .88   1.38     .000
                    +ID4 08:OUT4          14.38      .056     .72    .96     .000
                    +ID5 09:OUT5          26.32      .166    1.08   2.69     .000
                     ========================================================
                     SUM 01:TO_MC        102.16      .466     .93   1.69     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

```
001:0024----------------------------------------------------------------------
*#####################################################################
*#####################################################################
*#
*#                          AMC III Conditions
*#
*#####################################################################
*#####################################################################
---------------------
| DESIGN NASHYD     |   Area    (ha)=   20.73   Curve Number   (CN)=90.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .539 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    8.692
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .393

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

----------------------------------------------------------------------------
001:0025----------------------------------------------------------------------
*#####################################################################
*#                   Route A-200 through slope berms
*#####################################################################
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )   |
| OUT<02:(BM1   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   6.000  .6450E+00
                           .000  .6040E+00    |  17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73      .539      .900      8.692
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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)=   -54.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1802E+00

      *** WARNING: Outflow volume is less than inflow volume.
----------------------------------------------------------------------------
001:0026----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .247 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=    6.850
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .310

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

----------------------------------------------------------------------------
001:0027----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM1          20.73     .000     .00    .00    .000
                     +ID2 03:EXTA-1       11.83     .247     .90   6.85    .000
                      ==========================================================
                      SUM 05:OUT1         32.56     .247     .90   2.49    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

----------------------------------------------------------------------------
001:0028----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    9.30   Curve Number   (CN)=90.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .235 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    8.692
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .393

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

----------------------------------------------------------------------------
001:0029----------------------------------------------------------------------
*#####################################################################
*#                   Route A-201 through slope berms
*#####################################################################
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )   |
| OUT<02:(BM2   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   2.000  .2547E+00
                           .000  .2385E+00    |   6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .235      .917      8.692
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=   -55.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.8084E-01

      *** WARNING: Outflow volume is less than inflow volume.
----------------------------------------------------------------------------
001:0030----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .211 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    6.152
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .278

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

----------------------------------------------------------------------------
001:0031----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM2           9.30     .000     .00    .00    .000
                     +ID2 03:EXTA-2       11.61     .211     .92   6.15    .000
                      ==========================================================
                      SUM 06:OUT2         20.91     .211     .92   3.42    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

----------------------------------------------------------------------------
001:0032----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    4.48   Curve Number   (CN)=90.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .111 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    8.692
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .393

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

----------------------------------------------------------------------------
001:0033----------------------------------------------------------------------
*#####################################################################
*#                   Route A-202 through slope berms
*#####################################################################
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )   |
| OUT<02:(BM3   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   1.000  .1297E+00
                           .000  .1215E+00    |   3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .111      .933      8.692
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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)=   -56.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.3894E-01

      *** WARNING: Outflow volume is less than inflow volume.
----------------------------------------------------------------------------
001:0034----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .069 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=    6.152
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .278

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

----------------------------------------------------------------------------
001:0035----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM3           4.48     .000     .00    .00    .000
                     +ID2 03:EXTA-3        3.51     .069     .87   6.15    .000
                      ==========================================================
                      SUM 07:OUT3          7.99     .069     .87   2.70    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

----------------------------------------------------------------------------
001:0036----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   10.16   Curve Number   (CN)=87.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .211 (i)
```

```
     TIME TO PEAK     (hrs)=     .933
     RUNOFF VOLUME     (mm)=    7.247
     TOTAL RAINFALL    (mm)=   22.100
     RUNOFF COEFFICIENT   =     .328

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

------------------------------------------------------------------------------
001:0037--------------------------------------------------------------------
*#**************************************************************************
*#                    Route A-203 through slope berms
*#**************************************************************************
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                          .000  .0000E+00     |    2.000  .2312E+00
                          .000  .2166E+00     |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .211      .933      7.247
     OUTFLOW<04: (BM4   )       10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )         .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)=   -56.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.7363E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
001:0038--------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .111 (i)
     TIME TO PEAK    (hrs)=     .700
     RUNOFF VOLUME    (mm)=    6.486
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .293

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

------------------------------------------------------------------------------
001:0039--------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 01:EXTA-4       4.22     .111     .70   6.49    .000
                       +ID2 04:BM4         10.16     .000     .00    .00    .000
                        ==========================================================
                        SUM 08:OUT4        14.38     .111     .70   1.90    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0040--------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.74   Curve Number   (CN)=91.00
| 01:A-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .188 (i)
     TIME TO PEAK    (hrs)=     .667
     RUNOFF VOLUME    (mm)=    9.282
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .420

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

------------------------------------------------------------------------------
001:0041--------------------------------------------------------------------
*#**************************************************************************
*#                    Route A-204 through slope berms
*#**************************************************************************
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )   |
| OUT<02:(BM5   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                          .000  .0000E+00     |    1.000  .1016E+00
                          .000  .9510E-01     |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )        4.74      .188      .667      9.282
     OUTFLOW<02: (BM5   )        4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )         .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)=   -40.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4399E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
001:0042--------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .327 (i)
     TIME TO PEAK    (hrs)=    1.067
     RUNOFF VOLUME    (mm)=    6.486
     TOTAL RAINFALL   (mm)=   22.100
     RUNOFF COEFFICIENT   =     .293

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

------------------------------------------------------------------------------
001:0043--------------------------------------------------------------------
------------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 02:BM5          4.74     .000     .00    .00    .000
                       +ID2 03:EXTA-5      21.58     .327    1.07   6.49    .000
                        ==========================================================
                        SUM 09:OUT5        26.32     .327    1.07   5.32    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0044--------------------------------------------------------------------
*#**************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#**************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 05:OUT1        32.56     .247     .90   2.49    .000
                       +ID2 06:OUT2        20.91     .211     .92   3.42    .000
                       +ID3 07:OUT3         7.99     .069     .87   2.70    .000
                       +ID4 08:OUT4        14.38     .111     .70   1.90    .000
                       +ID5 09:OUT5        26.32     .327    1.07   5.32    .000
                        ==========================================================
                        SUM 01:TO_MC      102.16     .920     .93   3.34    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0045--------------------------------------------------------------------
  ** END OF RUN :   1

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 002
    NSTORM=   1
           #  1=LYA2.12h
------------------------------------------------------------------------------
002:0002--------------------------------------------------------------------
*#**************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   : 4730904
*#**************************************************************************
*#**************************************************************************
*#
*#                     Block A - PROPOSED CONDITIONS
*#
*#**************************************************************************
------------------------------------------------------------------------------
002:0002--------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: Belleville IDF (12-hr 30% AES - 2 Year)
| Ptotal=  42.24 mm|    Comments: Belleville IDF (12-hr 30% AES - 2 Year)
--------------------
            TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
             hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
            1.00   3.960 |   4.00   6.600 |   7.00   1.320 |  10.00    .000
            2.00  11.440 |   5.00   6.160 |   8.00    .440 |  11.00    .000
            3.00   8.800 |   6.00   3.520 |   9.00    .000 |  12.00    .000

------------------------------------------------------------------------------
002:0003--------------------------------------------------------------------
*#**************************************************************************
*#**************************************************************************
*#
*#                            AMC II Conditions
*#
*#**************************************************************************
*#**************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=   20.73   Curve Number   (CN)=78.00
| 01:A-200  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .188 (i)
     TIME TO PEAK    (hrs)=    3.217
     RUNOFF VOLUME    (mm)=   14.769
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .350

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

------------------------------------------------------------------------------
002:0004--------------------------------------------------------------------
*#**************************************************************************
*#                    Route A-200 through slope berms
*#**************************************************************************
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )   |
| OUT<02:(BM1   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                          .000  .0000E+00     |    6.000  .6450E+00
                          .000  .6040E+00     |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
```

```
     INFLOW >01: (A-200 )      20.73      .188     3.217     14.769
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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)=  -193.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.3062E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0005---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .085 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   11.487
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .272

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

-------------------------------------------------------------------------------
002:0006---------------------------------------------------------------------
----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM1           20.73     .000     .00    .00    .000
                    +ID2 03:EXTA-1        11.83     .085    5.07  11.49    .000
                     ==========================================================
                     SUM 05:OUT1          32.56     .085    5.07   4.17    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
002:0007---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=78.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .084 (i)
     TIME TO PEAK    (hrs)=    3.233
     RUNOFF VOLUME    (mm)=   14.769
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .350

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

-------------------------------------------------------------------------------
002:0008---------------------------------------------------------------------
*#########################################################################
*#                    Route A-201 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.000  .2547E+00
                           .000  .2385E+00   |    6.000  .2714E+00

     ROUTING RESULTS           AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .084     3.233     14.769
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=  -194.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1374E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0009---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .078 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   10.718
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .254

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

-------------------------------------------------------------------------------
002:0010---------------------------------------------------------------------
----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM2           9.30      .000     .00    .00    .000
                    +ID2 03:EXTA-2        11.61     .078    5.07  10.72    .000
                     ==========================================================
                     SUM 06:OUT2          20.91     .078    5.07   5.95    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
002:0011---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=78.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .040 (i)
     TIME TO PEAK    (hrs)=    3.250
     RUNOFF VOLUME    (mm)=   14.769
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .350

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

-------------------------------------------------------------------------------
002:0012---------------------------------------------------------------------
*#########################################################################
*#                    Route A-202 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )  |
| OUT<02:(BM3   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    1.000  .1297E+00
                           .000  .1215E+00   |    3.000  .1382E+00

     ROUTING RESULTS           AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .040     3.250     14.769
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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)=  -195.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6617E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0013---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .024 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   10.718
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .254

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

-------------------------------------------------------------------------------
002:0014---------------------------------------------------------------------
----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM3           4.48      .000     .00    .00    .000
                    +ID2 03:EXTA-3        3.51      .024    5.07  10.72    .000
                     ==========================================================
                     SUM 07:OUT3          7.99      .024    5.07   4.71    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
002:0015---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=73.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .077 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   12.323
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .292

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

-------------------------------------------------------------------------------
002:0016---------------------------------------------------------------------
*#########################################################################
*#                    Route A-203 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )  |
| OUT<04:(BM4   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.000  .2312E+00
                           .000  .2166E+00   |    6.000  .2464E+00

     ROUTING RESULTS           AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )      10.16      .077     5.067     12.323
     OUTFLOW<04: (BM4   )      10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )        .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)=  -304.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1252E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0017---------------------------------------------------------------------
```

```
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .030 (i)
     TIME TO PEAK    (hrs)=    5.017
     RUNOFF VOLUME    (mm)=   11.095
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .263

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

------------------------------------------------------------------------------
002:0018----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4         4.22     .030    5.02  11.09    .000
                     +ID2 04:BM4           10.16     .000     .00    .00    .000
                      ==========================================================
                      SUM 08:OUT4          14.38     .030    5.02   3.26    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
002:0019----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=80.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .049 (i)
     TIME TO PEAK    (hrs)=    3.050
     RUNOFF VOLUME    (mm)=   15.922
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .377

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

------------------------------------------------------------------------------
002:0020----------------------------------------------------------------------
*#**************************************************************************
*#                    Route A-204 through slope berms
*#**************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00     |    1.000  .1016E+00
                           .000  .9510E-01     |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .049     3.050     15.922
     OUTFLOW<02: (BM5   )       4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )        .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)=  -183.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.7547E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
002:0021----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .147 (i)
     TIME TO PEAK    (hrs)=    5.117
     RUNOFF VOLUME    (mm)=   11.095
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .263

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

------------------------------------------------------------------------------
002:0022----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM5            4.74     .000     .00    .00    .000
                     +ID2 03:EXTA-5        21.58     .147    5.12  11.09    .000
                      ==========================================================
                      SUM 09:OUT5          26.32     .147    5.12   9.10    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
002:0023----------------------------------------------------------------------
*#**************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#**************************************************************************
-----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 05:OUT1          32.56     .085    5.07   4.17    .000
                     +ID2 06:OUT2          20.91     .078    5.07   5.95    .000
                     +ID3 07:OUT3           7.99     .024    5.07   4.71    .000
                     +ID4 08:OUT4          14.38     .030    5.02   3.26    .000
                     +ID5 09:OUT5          26.32     .147    5.12   9.10    .000
                      ==========================================================
                      SUM 01:TO_MC        102.16     .363    5.07   5.72    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
002:0024----------------------------------------------------------------------
*#**************************************************************************
*#**************************************************************************
*#
*#                          AMC III Conditions
*#
*#**************************************************************************
*#**************************************************************************
---------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=90.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .322 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   24.068
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .570

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

------------------------------------------------------------------------------
002:0025----------------------------------------------------------------------
*#**************************************************************************
*#                    Route A-200 through slope berms
*#**************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )    |
| OUT<02:(BM1   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00     |    6.000  .6450E+00
                           .000  .6040E+00     |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73      .322     3.133     24.068
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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)=  -188.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.4989E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
002:0026----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .152 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   20.219
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .479

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

------------------------------------------------------------------------------
002:0027----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM1           20.73     .000     .00    .00    .000
                     +ID2 03:EXTA-1        11.83     .152    3.17  20.22    .000
                      ==========================================================
                      SUM 05:OUT1          32.56     .152    3.17   7.35    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
002:0028----------------------------------------------------------------------
---------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=90.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .144 (i)
     TIME TO PEAK    (hrs)=    3.150
     RUNOFF VOLUME    (mm)=   24.068
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .570

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

------------------------------------------------------------------------------
002:0029----------------------------------------------------------------------
*#**************************************************************************
*#                    Route A-201 through slope berms
*#**************************************************************************
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )    |
| OUT<02:(BM2   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00     |    2.000  .2547E+00
                           .000  .2385E+00     |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .144     3.150     24.068
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=  -189.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2238E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0030-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .135 (i)
     TIME TO PEAK    (hrs)=    3.200
     RUNOFF VOLUME    (mm)=   18.624
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .441

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

-------------------------------------------------------------------------------
002:0031-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM2           9.30     .000     .00    .00    .000
                      +ID2 03:EXTA-2       11.61     .135    3.20  18.62    .000
                       ==========================================================
                       SUM 06:OUT2          20.91     .135    3.20  10.34    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
002:0032-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.48   Curve Number   (CN)=90.00
| 01:A-202  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .069 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   24.068
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .570

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

-------------------------------------------------------------------------------
002:0033-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )  |
| OUT<02:(BM3   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1297E+00
                           .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .069     3.167     24.068
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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.)=.1078E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0034-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .041 (i)
     TIME TO PEAK    (hrs)=    3.150
     RUNOFF VOLUME    (mm)=   18.624
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .441

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

-------------------------------------------------------------------------------
002:0035-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3           4.48     .000     .00    .00    .000
                      +ID2 03:EXTA-3        3.51     .041    3.15  18.62    .000
                       ==========================================================
                       SUM 07:OUT3           7.99     .041    3.15   8.18    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
002:0036-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   10.16   Curve Number   (CN)=87.00
| 01:A-203  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .135 (i)
     TIME TO PEAK    (hrs)=    3.183
     RUNOFF VOLUME    (mm)=   21.091
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .499

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

-------------------------------------------------------------------------------
002:0037-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )  |
| OUT<04:(BM4   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2312E+00
                           .000  .2166E+00    |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .135     3.183     21.091
     OUTFLOW<04: (BM4   )       10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )         .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)=  -191.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2143E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0038-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .054 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   19.398
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .459

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

-------------------------------------------------------------------------------
002:0039-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4         4.22     .054    3.07  19.40    .000
                      +ID2 04:BM4           10.16     .000     .00    .00    .000
                       ==========================================================
                       SUM 08:OUT4          14.38     .054    3.07   5.69    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
002:0040-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.74   Curve Number   (CN)=91.00
| 01:A-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .080 (i)
     TIME TO PEAK    (hrs)=    3.033
     RUNOFF VOLUME    (mm)=   25.201
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .597

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

-------------------------------------------------------------------------------
002:0041-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-204 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )  |
| OUT<02:(BM5   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1016E+00
                           .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .080     3.033     25.201
     OUTFLOW<02: (BM5   )       4.74      .055     5.233      5.138
    OVERFLOW<04: (OVBM5 )        .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](%)=   68.347
                    TIME SHIFT OF PEAK FLOW         (min)=   132.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9546E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
002:0042-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421
```

```
     PEAK FLOW       (cms)=     .252 (i)
     TIME TO PEAK    (hrs)=    3.400
     RUNOFF VOLUME    (mm)=   19.398
     TOTAL RAINFALL   (mm)=   42.240
     RUNOFF COEFFICIENT   =     .459

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

------------------------------------------------------------------------------
002:0043------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM5          4.74     .055    5.23   5.14    .000
                      +ID2 03:EXTA-5      21.58     .252    3.40  19.40    .000
                       ========================================================
                       SUM 09:OUT5        26.32     .295    5.22  16.83    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
002:0044------------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
-----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 05:OUT1        32.56     .152    3.17   7.35    .000
                      +ID2 06:OUT2        20.91     .135    3.20  10.34    .000
                      +ID3 07:OUT3         7.99     .041    3.15   8.18    .000
                      +ID4 08:OUT4        14.38     .054    3.07   5.69    .000
                      +ID5 09:OUT5        26.32     .295    5.22  16.83    .000
                       ========================================================
                       SUM 01:TO_MC      102.16     .633    5.20  10.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
002:0045------------------------------------------------------------------------
------------------------------------------------------------------------------
002:0002------------------------------------------------------------------------
  ** END OF RUN :   2

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




-------------------
| START            |  Project  dir.: C:\TEMP\Loy\
-------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 003
    NSTORM=   1
          #  1=LYA5.1hr
------------------------------------------------------------------------------
003:0002------------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*************************************************************************
*#*************************************************************************
*#
*#                     Block A - PROPOSED 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 II Conditions
*#
*#*************************************************************************
*#*************************************************************************
--------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=78.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .444 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    7.156
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .256

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

------------------------------------------------------------------------------
003:0004------------------------------------------------------------------------
*#*************************************************************************
*#                     Route A-200 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )    |
| OUT<02:(BM1   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00     |   6.000  .6450E+00
                          .000  .6040E+00     |  17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .444      .917      7.156
     OUTFLOW<02: (BM1   )       20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )         .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)=   -55.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1483E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0005------------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .194 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    5.392
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .193

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

------------------------------------------------------------------------------
003:0006------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM1         20.73     .000     .00    .00    .000
                      +ID2 03:EXTA-1      11.83     .194     .92   5.39    .000
                       ========================================================
                       SUM 05:OUT1        32.56     .194     .92   1.96    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0007------------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=78.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .193 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    7.156
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .256

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

------------------------------------------------------------------------------
003:0008------------------------------------------------------------------------
*#*************************************************************************
*#                     Route A-201 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )    |
| OUT<02:(BM2   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00     |   2.000  .2547E+00
                          .000  .2385E+00     |   6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .193      .933      7.156
     OUTFLOW<02: (BM2   )        9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )         .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)=   -56.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6655E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0009------------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .171 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=    4.994
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .178

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

------------------------------------------------------------------------------
003:0010------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM2          9.30     .000     .00    .00    .000
                      +ID2 03:EXTA-2      11.61     .171     .93   4.99    .000
                       ========================================================
                       SUM 06:OUT2        20.91     .171     .93   2.77    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

```
003:0011-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number    (CN)=78.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .092 (i)
     TIME TO PEAK    (hrs)=     .950
     RUNOFF VOLUME    (mm)=    7.155
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .256

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

-------------------------------------------------------------------------------
003:0012-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )    |
| OUT<02:(BM3   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    1.000  .1297E+00
                            .000  .1215E+00   |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .092      .950      7.155
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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.)=.3206E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
003:0013-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number    (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .056 (i)
     TIME TO PEAK    (hrs)=     .883
     RUNOFF VOLUME    (mm)=    4.994
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .178

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

-------------------------------------------------------------------------------
003:0014-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 02:BM3            4.48      .000     .00    .00     .000
                    +ID2 03:EXTA-3         3.51      .056     .88   4.99     .000
                     ========================================================
                     SUM 07:OUT3           7.99      .056     .88   2.19     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0015-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number    (CN)=73.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .170 (i)
     TIME TO PEAK    (hrs)=     .950
     RUNOFF VOLUME    (mm)=    5.830
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .208

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

-------------------------------------------------------------------------------
003:0016-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )    |
| OUT<04:(BM4   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    2.000  .2312E+00
                            .000  .2166E+00   |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )      10.16      .170      .950      5.830
     OUTFLOW<04: (BM4   )      10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )        .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.)=.5924E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
003:0017-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number    (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .088 (i)
     TIME TO PEAK    (hrs)=     .717
     RUNOFF VOLUME    (mm)=    5.188
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .185

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

-------------------------------------------------------------------------------
003:0018-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 01:EXTA-4         4.22      .088     .72   5.19     .000
                    +ID2 04:BM4           10.16      .000     .00    .00     .000
                     ========================================================
                     SUM 08:OUT4          14.38      .088     .72   1.52     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0019-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number    (CN)=80.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .157 (i)
     TIME TO PEAK    (hrs)=     .667
     RUNOFF VOLUME    (mm)=    7.803
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .279

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

-------------------------------------------------------------------------------
003:0020-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-204 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    1.000  .1016E+00
                            .000  .9510E-01   |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .157      .667      7.803
     OUTFLOW<02: (BM5   )       4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )        .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)=   -40.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.3699E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
003:0021-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number    (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .262 (i)
     TIME TO PEAK    (hrs)=    1.083
     RUNOFF VOLUME    (mm)=    5.188
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .185

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

-------------------------------------------------------------------------------
003:0022-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT5      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 02:BM5            4.74      .000     .00    .00     .000
                    +ID2 03:EXTA-5        21.58      .262    1.08   5.19     .000
                     ========================================================
                     SUM 09:OUT5          26.32      .262    1.08   4.25     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0023-------------------------------------------------------------------------
*#*****************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*****************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                     ID1 05:OUT1          32.56      .194     .92   1.96     .000
                    +ID2 06:OUT2          20.91      .171     .93   2.77     .000
                    +ID3 07:OUT3           7.99      .056     .88   2.19     .000
                    +ID4 08:OUT4          14.38      .088     .72   1.52     .000
                    +ID5 09:OUT5          26.32      .262    1.08   4.25     .000
                     ========================================================
                     SUM 01:TO_MC        102.16      .736     .93   2.67     .000

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

```
--------------------------------------------------------------------------------
003:0024--------------------------------------------------------------------------
*#*************************************************************************
*#*************************************************************************
*#
*#                              AMC III Conditions
*#
*#*************************************************************************
*#*************************************************************************
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number    (CN)=90.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .793 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   12.833
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .458

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

--------------------------------------------------------------------------------
003:0025--------------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-200 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )    |
| OUT<02:(BM1   )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |    6.000  .6450E+00
                            .000  .6040E+00    |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73      .793      .900     12.833
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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)=   -54.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2660E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
003:0026--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number    (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .371 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   10.350
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .370

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

--------------------------------------------------------------------------------
003:0027--------------------------------------------------------------------------
------------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM1          20.73     .000     .00    .00    .000
                      +ID2 03:EXTA-1       11.83     .371     .90  10.35    .000
                       ============================================================
                       SUM 05:OUT1         32.56     .371     .90   3.76    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
003:0028--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number    (CN)=90.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .345 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   12.833
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .458

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

--------------------------------------------------------------------------------
003:0029--------------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-201 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )    |
| OUT<02:(BM2   )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |    2.000  .2547E+00
                            .000  .2385E+00    |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .345      .917     12.833
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=   -55.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1193E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
003:0030--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number    (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .321 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=    9.378
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .335

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

--------------------------------------------------------------------------------
003:0031--------------------------------------------------------------------------
------------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM2          9.30     .000     .00    .00    .000
                      +ID2 03:EXTA-2       11.61    .321     .92   9.38    .000
                       ============================================================
                       SUM 06:OUT2         20.91     .321     .92   5.21    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
003:0032--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number    (CN)=90.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .164 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   12.833
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .458

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

--------------------------------------------------------------------------------
003:0033--------------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-202 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )    |
| OUT<02:(BM3   )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |    1.000  .1297E+00
                            .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .164      .917     12.833
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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)=   -55.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.5749E-01

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
003:0034--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number    (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .105 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=    9.378
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .335

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

--------------------------------------------------------------------------------
003:0035--------------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3          4.48     .000     .00    .00    .000
                      +ID2 03:EXTA-3       3.51     .105     .87   9.38    .000
                       ============================================================
                       SUM 07:OUT3         7.99     .105     .87   4.12    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
003:0036--------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number    (CN)=87.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882
```

```
     PEAK FLOW       (cms)=     .316 (i)
     TIME TO PEAK    (hrs)=     .933
     RUNOFF VOLUME    (mm)=   10.895
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .389

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

------------------------------------------------------------------------------
003:0037----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.000  .2312E+00
                           .000  .2166E+00   |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )      10.16      .316      .933     10.895
     OUTFLOW<04: (BM4   )      10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )        .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)=   -56.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1107E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0038----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .168 (i)
     TIME TO PEAK    (hrs)=     .700
     RUNOFF VOLUME    (mm)=    9.846
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .352

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

------------------------------------------------------------------------------
003:0039----------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXTA-4        4.22     .168     .70   9.85    .000
                      +ID2 04:BM4          10.16     .000     .00    .00    .000
                       ==========================================================
                       SUM 08:OUT4          14.38     .168     .70   2.89    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0040----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=91.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .273 (i)
     TIME TO PEAK    (hrs)=     .650
     RUNOFF VOLUME    (mm)=   13.604
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .486

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

------------------------------------------------------------------------------
003:0041----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-204 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )   |
| OUT<02:(BM5   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    1.000  .1016E+00
                           .000  .9510E-01   |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .273      .650     13.604
     OUTFLOW<02: (BM5   )       4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )        .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)=   -39.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6448E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
003:0042----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .496 (i)
     TIME TO PEAK    (hrs)=    1.067
     RUNOFF VOLUME    (mm)=    9.846
     TOTAL RAINFALL   (mm)=   28.000
     RUNOFF COEFFICIENT   =     .352

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

------------------------------------------------------------------------------
003:0043----------------------------------------------------------------------
------------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM5           4.74     .000     .00    .00    .000
                      +ID2 03:EXTA-5       21.58     .496    1.07   9.85    .000
                       ==========================================================
                       SUM 09:OUT5          26.32     .496    1.07   8.07    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0044----------------------------------------------------------------------
*#*****************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*****************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 05:OUT1          32.56     .371     .90   3.76    .000
                      +ID2 06:OUT2          20.91     .321     .92   5.21    .000
                      +ID3 07:OUT3           7.99     .105     .87   4.12    .000
                      +ID4 08:OUT4          14.38     .168     .70   2.89    .000
                      +ID5 09:OUT5          26.32     .496    1.07   8.07    .000
                       ==========================================================
                       SUM 01:TO_MC        102.16    1.392     .92   5.07    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0045----------------------------------------------------------------------
------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
  ** END OF RUN :   3

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 004
    NSTORM=   1
          #  1=LYA5.12h
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*****************************************************************************
*#*****************************************************************************
*#
*#                     Block A - 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 II Conditions
*#
*#*****************************************************************************
*#*****************************************************************************
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=78.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .303 (i)
     TIME TO PEAK    (hrs)=    3.183
     RUNOFF VOLUME    (mm)=   23.525
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .420

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

------------------------------------------------------------------------------
004:0004----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-200 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )   |
| OUT<02:(BM1   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
```

```
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |   6.000  .6450E+00
                           .000  .6040E+00   |  17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .303     3.183     23.525
     OUTFLOW<02: (BM1   )       20.73      .000      .000      .000
    OVERFLOW<09: (OVBM1 )         .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)=  -191.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4877E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
004:0005-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .135 (i)
     TIME TO PEAK    (hrs)=    3.200
     RUNOFF VOLUME    (mm)=   18.752
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .335

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

-------------------------------------------------------------------------------
004:0006-------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM1          20.73     .000     .00    .00    .000
                      +ID2 03:EXTA-1       11.83     .135    3.20  18.75    .000
                       ===================================================
                       SUM 05:OUT1         32.56     .135    3.20   6.81    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0007-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=78.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .135 (i)
     TIME TO PEAK    (hrs)=    3.200
     RUNOFF VOLUME    (mm)=   23.525
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .420

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

-------------------------------------------------------------------------------
004:0008-------------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-201 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )    |
| OUT<02:(BM2   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |   2.000  .2547E+00
                            .000  .2385E+00   |   6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .135     3.200     23.525
     OUTFLOW<02: (BM2   )       9.30      .000      .000      .000
    OVERFLOW<09: (OVBM2 )        .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)=  -192.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2188E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
004:0009-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .125 (i)
     TIME TO PEAK    (hrs)=    5.067
     RUNOFF VOLUME    (mm)=   17.598
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .314

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

-------------------------------------------------------------------------------
004:0010-------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM2          9.30      .000     .00    .00    .000
                      +ID2 03:EXTA-2       11.61     .125    5.07  17.60    .000
                       ===================================================
                       SUM 06:OUT2         20.91     .125    5.07   9.77    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0011-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=78.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .065 (i)
     TIME TO PEAK    (hrs)=    3.217
     RUNOFF VOLUME    (mm)=   23.526
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .420

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

-------------------------------------------------------------------------------
004:0012-------------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-202 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )    |
| OUT<02:(BM3   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |   1.000  .1297E+00
                            .000  .1215E+00   |   3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .065     3.217     23.526
     OUTFLOW<02: (BM3   )       4.48      .000      .000      .000
    OVERFLOW<09: (OVBM3 )        .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)=  -193.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1054E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
004:0013-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .038 (i)
     TIME TO PEAK    (hrs)=    5.050
     RUNOFF VOLUME    (mm)=   17.598
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .314

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

-------------------------------------------------------------------------------
004:0014-------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3          4.48      .000     .00    .00    .000
                      +ID2 03:EXTA-3       3.51      .038    5.05  17.60    .000
                       ===================================================
                       SUM 07:OUT3         7.99      .038    5.05   7.73    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0015-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=73.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .123 (i)
     TIME TO PEAK    (hrs)=    3.250
     RUNOFF VOLUME    (mm)=   19.990
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .357

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

-------------------------------------------------------------------------------
004:0016-------------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-203 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )    |
| OUT<04:(BM4   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |   2.000  .2312E+00
                            .000  .2166E+00   |   6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )      10.16      .123     3.250     19.990
     OUTFLOW<04: (BM4   )      10.16      .000      .000      .000
    OVERFLOW<09: (OVBM4 )        .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)=  -195.00
                MAXIMUM  STORAGE   USED       (ha.m.)=.2031E+00

     *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
004:0017----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .049 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   18.165
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .325

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

-------------------------------------------------------------------------------
004:0018----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4         4.22     .049    3.07  18.16    .000
                      +ID2 04:BM4           10.16     .000     .00    .00    .000
                       ==========================================================
                       SUM 08:OUT4           14.38     .049    3.07   5.33    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0019----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=80.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .079 (i)
     TIME TO PEAK    (hrs)=    3.050
     RUNOFF VOLUME    (mm)=   25.149
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .449

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

-------------------------------------------------------------------------------
004:0020----------------------------------------------------------------------
*#############################################################################
*#                    Route A-204 through slope berms
*#############################################################################
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |   1.000  .1016E+00
                            .000  .9510E-01    |   3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .079     3.050     25.149
     OUTFLOW<02: (BM5   )       4.74      .051     5.333      5.086
    OVERFLOW<04: (OVBM5 )        .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](%)=   65.372
                    TIME SHIFT OF PEAK FLOW         (min)=   137.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9543E-01

     *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
004:0021----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .236 (i)
     TIME TO PEAK    (hrs)=    5.100
     RUNOFF VOLUME    (mm)=   18.165
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .325

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

-------------------------------------------------------------------------------
004:0022----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM5            4.74     .051    5.33   5.09    .000
                      +ID2 03:EXTA-5        21.58     .236    5.10  18.16    .000
                       ==========================================================
                       SUM 09:OUT5           26.32     .280    5.33  15.81    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0023----------------------------------------------------------------------
*#############################################################################
*#                          TOTAL FLOW TO MUD CREEK
*#############################################################################
-----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 05:OUT1          32.56     .135    3.20   6.81    .000
                       +ID2 06:OUT2          20.91     .125    5.07   9.77    .000
                       +ID3 07:OUT3           7.99     .038    5.05   7.73    .000
                       +ID4 08:OUT4          14.38     .049    3.07   5.33    .000
                       +ID5 09:OUT5          26.32     .280    5.33  15.81    .000
                       ==========================================================
                       SUM 01:TO_MC         102.16     .592    5.32   9.60    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0024----------------------------------------------------------------------
*#############################################################################
*#############################################################################
*#
*#                            AMC III Conditions
*#
*#############################################################################
*#############################################################################
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=90.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .483 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   35.878
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .641

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

-------------------------------------------------------------------------------
004:0025----------------------------------------------------------------------
*#############################################################################
*#                    Route A-200 through slope berms
*#############################################################################
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )    |
| OUT<02:(BM1   )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |   6.000  .6450E+00
                             .000  .6040E+00    |  17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .483     3.117     35.878
     OUTFLOW<02: (BM1   )       20.73      .297     5.650      6.742
    OVERFLOW<09: (OVBM1 )         .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](%)=   61.425
                    TIME SHIFT OF PEAK FLOW         (min)=   152.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6060E+00

     *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
004:0026----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .235 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   30.963
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .553

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

-------------------------------------------------------------------------------
004:0027----------------------------------------------------------------------
-----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM1           20.73     .297    5.65   6.74    .000
                      +ID2 03:EXTA-1        11.83     .235    3.13  30.96    .000
                       ==========================================================
                       SUM 05:OUT1          32.56     .450    5.63  15.54    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0028----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=90.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .216 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   35.878
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .641

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

-------------------------------------------------------------------------------
004:0029----------------------------------------------------------------------
*#############################################################################
*#                    Route A-201 through slope berms
*#############################################################################
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )    |
| OUT<02:(BM2   )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00    |   2.000  .2547E+00
                             .000  .2385E+00    |   6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .216     3.117     35.878
```

```
    OUTFLOW<02: (BM2   )       9.30      .176     5.150     10.350
   OVERFLOW<09: (OVBM2 )        .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](%)=   81.348
                  TIME SHIFT OF PEAK FLOW         (min)=   122.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.2399E+00

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0030----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .212 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   28.846
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .515

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

--------------------------------------------------------------------------------
004:0031----------------------------------------------------------------------
------------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM2           9.30     .176    5.15  10.35    .000
                      +ID2 03:EXTA-2       11.61     .212    3.17  28.85    .000
                       ==========================================================
                       SUM 06:OUT2          20.91     .364    5.15  20.57    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0032----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=90.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .104 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   35.878
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .641

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

--------------------------------------------------------------------------------
004:0033----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |     Requested routing time step =  1.0 min.
|  IN>01:(A-202 )    |
| OUT<02:(BM3   )    |     =========  OUTLFOW STORAGE TABLE  =========
---------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |    1.000  .1297E+00
                            .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .104     3.117      35.878
     OUTFLOW<02: (BM3   )       4.48      .077     5.367       8.819
    OVERFLOW<09: (OVBM3 )        .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](%)=   74.386
                  TIME SHIFT OF PEAK FLOW         (min)=   135.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1221E+00

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0034----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .065 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   28.846
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .515

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

--------------------------------------------------------------------------------
004:0035----------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3           4.48     .077    5.37   8.82    .000
                      +ID2 03:EXTA-3        3.51     .065    3.13  28.85    .000
                       ==========================================================
                       SUM 07:OUT3           7.99     .128    5.37  17.58    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0036----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=87.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .208 (i)
     TIME TO PEAK    (hrs)=    3.150
     RUNOFF VOLUME    (mm)=   32.100
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .574

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

--------------------------------------------------------------------------------
004:0037----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |     Requested routing time step =  1.0 min.
|  IN>01:(A-203 )    |
| OUT<04:(BM4   )    |     =========  OUTLFOW STORAGE TABLE  =========
---------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |    2.000  .2312E+00
                            .000  .2166E+00    |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .208     3.150      32.100
     OUTFLOW<04: (BM4   )       10.16      .181     5.050      10.889
    OVERFLOW<09: (OVBM4 )         .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](%)=   86.694
                  TIME SHIFT OF PEAK FLOW         (min)=   114.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.2179E+00

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0038----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .083 (i)
     TIME TO PEAK    (hrs)=    3.050
     RUNOFF VOLUME    (mm)=   29.879
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .534

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

--------------------------------------------------------------------------------
004:0039----------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4         4.22     .083    3.05  29.88    .000
                      +ID2 04:BM4           10.16     .181    5.05  10.89    .000
                       ==========================================================
                       SUM 08:OUT4          14.38     .252    5.02  16.39    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0040----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=91.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .121 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=   37.276
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .666

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

--------------------------------------------------------------------------------
004:0041----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-204 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |     Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |     =========  OUTLFOW STORAGE TABLE  =========
---------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |    1.000  .1016E+00
                            .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .121     2.083      37.276
     OUTFLOW<02: (BM5   )       4.74      .096     4.050      17.213
    OVERFLOW<04: (OVBM5 )        .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](%)=   79.476
                  TIME SHIFT OF PEAK FLOW         (min)=   118.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.9573E-01

     *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
004:0042----------------------------------------------------------------------
----------------------
```

```
| DESIGN NASHYD      |   Area     (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .395 (i)
     TIME TO PEAK    (hrs)=    3.317
     RUNOFF VOLUME    (mm)=   29.879
     TOTAL RAINFALL   (mm)=   55.968
     RUNOFF COEFFICIENT   =     .534

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

------------------------------------------------------------------------------
004:0043----------------------------------------------------------------------
------------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM5           4.74     .096    4.05  17.21    .000
                      +ID2 03:EXTA-5       21.58     .395    3.32  29.88    .000
                       ========================================================
                       SUM 09:OUT5          26.32     .475    3.85  27.60    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
004:0044----------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 05:OUT1          32.56     .450    5.63  15.54    .000
                      +ID2 06:OUT2          20.91     .364    5.15  20.57    .000
                      +ID3 07:OUT3           7.99     .128    5.37  17.58    .000
                      +ID4 08:OUT4          14.38     .252    5.02  16.39    .000
                      +ID5 09:OUT5          26.32     .475    3.85  27.60    .000
                       ========================================================
                       SUM 01:TO_MC        102.16    1.398    5.62  19.96    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
004:0045----------------------------------------------------------------------
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
  ** END OF RUN :   4

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 005
    NSTORM=   1
          #  1=LYA100.1hr
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*************************************************************************
*#*************************************************************************
*#
*#                     Block A - PROPOSED 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)=   20.73   Curve Number   (CN)=78.00
| 01:A-200  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .981 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   15.885
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .360

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

------------------------------------------------------------------------------
005:0004----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-200 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )  |
| OUT<02:(BM1   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    6.000  .6450E+00
                           .000  .6040E+00    |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73      .981      .900     15.885
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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)=   -54.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.3293E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
005:0005----------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area     (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .444 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   12.400
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .281

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

------------------------------------------------------------------------------
005:0006----------------------------------------------------------------------
------------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM1           20.73     .000     .00    .00    .000
                      +ID2 03:EXTA-1        11.83     .444     .90  12.40    .000
                       ========================================================
                       SUM 05:OUT1          32.56     .444     .90   4.51    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
005:0007----------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area     (ha)=    9.30   Curve Number   (CN)=78.00
| 01:A-201  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .427 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   15.885
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .360

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

------------------------------------------------------------------------------
005:0008----------------------------------------------------------------------
*#*************************************************************************
*#                    Route A-201 through slope berms
*#*************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2547E+00
                           .000  .2385E+00    |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .427      .917     15.885
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=   -55.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1477E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
005:0009----------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area     (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .395 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   11.580
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .263

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

------------------------------------------------------------------------------
005:0010----------------------------------------------------------------------
------------------------
```

ADD HYD (OUT2)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 02:BM2	9.30	.000	.00	.00	.000
	+ID2 03:EXTA-2	11.61	.395	.92	11.58	.000
	SUM 06:OUT2	20.91	.395	.92	6.43	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0011

DESIGN NASHYD 01:A-202 DT= 1.00					
	Area (ha)=	4.48	Curve Number (CN)=	78.00	
	Ia (mm)=	1.500	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	.440			

Unit Hyd Qpeak (cms)= .389

PEAK FLOW (cms)= .202 (i)
TIME TO PEAK (hrs)= .933
RUNOFF VOLUME (mm)= 15.885
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .360

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

005:0012

*# Route A-202 through slope berms

ROUTE RESERVOIR IN>01:(A-202) OUT<02:(BM3)

Requested routing time step = 1.0 min.

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.000	.0000E+00	1.000	.1297E+00
.000	.1215E+00	3.000	.1382E+00

ROUTING RESULTS	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW >01: (A-202)	4.48	.202	.933	15.885
OUTFLOW<02: (BM3)	4.48	.000	.000	.000
OVERFLOW<09: (OVBM3)	.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)= -56.00
MAXIMUM STORAGE USED (ha.m.)=.7117E-01

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

005:0013

DESIGN NASHYD 03:EXTA-3 DT= 1.00					
	Area (ha)=	3.51	Curve Number (CN)=	69.00	
	Ia (mm)=	1.500	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	.370			

Unit Hyd Qpeak (cms)= .362

PEAK FLOW (cms)= .129 (i)
TIME TO PEAK (hrs)= .867
RUNOFF VOLUME (mm)= 11.580
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .263

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

005:0014

ADD HYD (OUT3)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 02:BM3	4.48	.000	.00	.00	.000
	+ID2 03:EXTA-3	3.51	.129	.87	11.58	.000
	SUM 07:OUT3	7.99	.129	.87	5.09	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0015

DESIGN NASHYD 01:A-203 DT= 1.00					
	Area (ha)=	10.16	Curve Number (CN)=	73.00	
	Ia (mm)=	1.500	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	.440			

Unit Hyd Qpeak (cms)= .882

PEAK FLOW (cms)= .385 (i)
TIME TO PEAK (hrs)= .933
RUNOFF VOLUME (mm)= 13.291
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .301

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

005:0016

*# Route A-203 through slope berms

ROUTE RESERVOIR IN>01:(A-203) OUT<04:(BM4)

Requested routing time step = 1.0 min.

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.000	.0000E+00	2.000	.2312E+00
.000	.2166E+00	6.000	.2464E+00

ROUTING RESULTS	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW >01: (A-203)	10.16	.385	.933	13.291
OUTFLOW<04: (BM4)	10.16	.000	.000	.000
OVERFLOW<09: (OVBM4)	.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)= -56.00
MAXIMUM STORAGE USED (ha.m.)=.1350E+00

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

005:0017

DESIGN NASHYD 01:EXTA-4 DT= 1.00					
	Area (ha)=	4.22	Curve Number (CN)=	70.00	
	Ia (mm)=	1.500	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	.230			

Unit Hyd Qpeak (cms)= .701

PEAK FLOW (cms)= .203 (i)
TIME TO PEAK (hrs)= .700
RUNOFF VOLUME (mm)= 11.982
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .272

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

005:0018

ADD HYD (OUT4)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 01:EXTA-4	4.22	.203	.70	11.98	.000
	+ID2 04:BM4	10.16	.000	.00	.00	.000
	SUM 08:OUT4	14.38	.203	.70	3.52	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0019

DESIGN NASHYD 01:A-204 DT= 1.00					
	Area (ha)=	4.74	Curve Number (CN)=	80.00	
	Ia (mm)=	1.500	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	.200			

Unit Hyd Qpeak (cms)= .905

PEAK FLOW (cms)= .342 (i)
TIME TO PEAK (hrs)= .650
RUNOFF VOLUME (mm)= 17.104
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .388

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

005:0020

*# Route A-204 through slope berms

ROUTE RESERVOIR IN>01:(A-204) OUT<02:(BM5)

Requested routing time step = 1.0 min.

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.000	.0000E+00	1.000	.1016E+00
.000	.9510E-01	3.000	.1082E+00

ROUTING RESULTS	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW >01: (A-204)	4.74	.342	.650	17.104
OUTFLOW<02: (BM5)	4.74	.000	.000	.000
OVERFLOW<04: (OVBM5)	.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)= -39.00
MAXIMUM STORAGE USED (ha.m.)=.8107E-01

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

005:0021

DESIGN NASHYD 03:EXTA-5 DT= 1.00					
	Area (ha)=	21.58	Curve Number (CN)=	70.00	
	Ia (mm)=	1.500	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	.580			

Unit Hyd Qpeak (cms)= 1.421

PEAK FLOW (cms)= .603 (i)
TIME TO PEAK (hrs)= 1.067
RUNOFF VOLUME (mm)= 11.982
TOTAL RAINFALL (mm)= 44.100
RUNOFF COEFFICIENT = .272

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

005:0022

ADD HYD (OUT5)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 02:BM5	4.74	.000	.00	.00	.000
	+ID2 03:EXTA-5	21.58	.603	1.07	11.98	.000
	SUM 09:OUT5	26.32	.603	1.07	9.82	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0023

*# TOTAL FLOW TO MUD CREEK

ADD HYD (TO_MC)	ID: NHYD	AREA	QPEAK	TPEAK	R.V.	DWF

```
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 05:OUT1          32.56     .444     .90   4.51    .000
                    +ID2 06:OUT2          20.91     .395     .92   6.43    .000
                    +ID3 07:OUT3           7.99     .129     .87   5.09    .000
                    +ID4 08:OUT4          14.38     .203     .70   3.52    .000
                    +ID5 09:OUT5          26.32     .603    1.07   9.82    .000
                     ==========================================================
                     SUM 01:TO_MC        102.16    1.692     .92   6.18    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0024----------------------------------------------------------------------
*#*****************************************************************************
*#*****************************************************************************
*#
*#                              AMC III Conditions
*#
*#*****************************************************************************
*#*****************************************************************************
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=90.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=    1.574 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=   25.624
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .581

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

--------------------------------------------------------------------------------
005:0025----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-200 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )  |
| OUT<02:(BM1   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |   6.000  .6450E+00
                           .000  .6040E+00   |  17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )      20.73     1.574      .867     25.624
     OUTFLOW<02: (BM1   )      20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )        .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.)=.5312E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0026----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .771 (i)
     TIME TO PEAK    (hrs)=     .867
     RUNOFF VOLUME    (mm)=   21.617
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .490

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

--------------------------------------------------------------------------------
005:0027----------------------------------------------------------------------
----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM1           20.73     .000     .00    .00    .000
                    +ID2 03:EXTA-1        11.83     .771     .87  21.62    .000
                     ==========================================================
                     SUM 05:OUT1          32.56     .771     .87   7.85    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0028----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=90.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .685 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   25.624
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .581

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

--------------------------------------------------------------------------------
005:0029----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-201 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |   2.000  .2547E+00
                           .000  .2385E+00   |   6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )       9.30      .685      .900     25.624
     OUTFLOW<02: (BM2   )       9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )        .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)=   -54.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.2383E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0030----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .678 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   19.947
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .452

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

--------------------------------------------------------------------------------
005:0031----------------------------------------------------------------------
----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM2            9.30      .000     .00    .00    .000
                    +ID2 03:EXTA-2        11.61      .678     .90  19.95    .000
                     ==========================================================
                     SUM 06:OUT2          20.91      .678     .90  11.08    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0032----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=90.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .325 (i)
     TIME TO PEAK    (hrs)=     .900
     RUNOFF VOLUME    (mm)=   25.624
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .581

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

--------------------------------------------------------------------------------
005:0033----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )  |
| OUT<02:(BM3   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |   1.000  .1297E+00
                           .000  .1215E+00   |   3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )       4.48      .325      .900     25.624
     OUTFLOW<02: (BM3   )       4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )        .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)=   -54.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1148E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
005:0034----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .221 (i)
     TIME TO PEAK    (hrs)=     .850
     RUNOFF VOLUME    (mm)=   19.947
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .452

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

--------------------------------------------------------------------------------
005:0035----------------------------------------------------------------------
----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                     ID1 02:BM3            4.48      .000     .00    .00    .000
                    +ID2 03:EXTA-3         3.51      .221     .85  19.95    .000
                     ==========================================================
                     SUM 07:OUT3           7.99      .221     .85   8.76    .000
```

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

---------------------------------------------------------------------------
005:0036-----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=87.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=    1.500  # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .649 (i)
     TIME TO PEAK    (hrs)=     .917
     RUNOFF VOLUME    (mm)=   22.528
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .511

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

---------------------------------------------------------------------------
005:0037-----------------------------------------------------------------------
*#************************************************************************
*#                    Route A-203 through slope berms
*#************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2312E+00
                           .000  .2166E+00    |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )      10.16      .649      .917      22.528
     OUTFLOW<04: (BM4   )      10.16      .095     1.883       1.304
    OVERFLOW<09: (OVBM4 )        .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](%)=   14.642
                  TIME SHIFT OF PEAK FLOW         (min)=    58.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.2173E+00

      *** WARNING: Outflow volume is less than inflow volume.
---------------------------------------------------------------------------
005:0038-----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .351 (i)
     TIME TO PEAK    (hrs)=     .683
     RUNOFF VOLUME    (mm)=   20.758
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .471

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

---------------------------------------------------------------------------
005:0039-----------------------------------------------------------------------
----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXTA-4       4.22     .351     .68  20.76    .000
                      +ID2 04:BM4         10.16     .095    1.88   1.30    .000
                       ==========================================================
                       SUM 08:OUT4         14.38     .351     .68   7.02    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------
005:0040-----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=91.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .533 (i)
     TIME TO PEAK    (hrs)=     .633
     RUNOFF VOLUME    (mm)=   26.798
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .608

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

---------------------------------------------------------------------------
005:0041-----------------------------------------------------------------------
*#************************************************************************
*#                    Route A-204 through slope berms
*#************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )   |
| OUT<02:(BM5   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1016E+00
                           .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .533      .633      26.798
     OUTFLOW<02: (BM5   )       4.74      .335      .917       6.735
    OVERFLOW<04: (OVBM5 )        .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](%)=   62.799
                  TIME SHIFT OF PEAK FLOW         (min)=    17.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.9728E-01

      *** WARNING: Outflow volume is less than inflow volume.
---------------------------------------------------------------------------
005:0042-----------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=    1.041 (i)
     TIME TO PEAK    (hrs)=    1.050
     RUNOFF VOLUME    (mm)=   20.758
     TOTAL RAINFALL   (mm)=   44.100
     RUNOFF COEFFICIENT   =     .471

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

---------------------------------------------------------------------------
005:0043-----------------------------------------------------------------------
----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM5          4.74     .335     .92   6.73    .000
                      +ID2 03:EXTA-5      21.58    1.041    1.05  20.76    .000
                       ==========================================================
                       SUM 09:OUT5         26.32    1.333     .93  18.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------
005:0044-----------------------------------------------------------------------
*#************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#************************************************************************
----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 05:OUT1         32.56     .771     .87   7.85    .000
                      +ID2 06:OUT2         20.91     .678     .90  11.08    .000
                      +ID3 07:OUT3          7.99     .221     .85   8.76    .000
                      +ID4 08:OUT4         14.38     .351     .68   7.02    .000
                      +ID5 09:OUT5         26.32    1.333     .93  18.23    .000
                       ==========================================================
                       SUM 01:TO_MC       102.16    3.251     .92  11.13    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------
005:0045-----------------------------------------------------------------------
---------------------------------------------------------------------------
005:0002-----------------------------------------------------------------------
---------------------------------------------------------------------------
005:0002-----------------------------------------------------------------------
---------------------------------------------------------------------------
005:0002-----------------------------------------------------------------------
---------------------------------------------------------------------------
005:0002-----------------------------------------------------------------------
  ** END OF RUN :   5

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
           #  1=LYA100.12h
---------------------------------------------------------------------------
006:0002-----------------------------------------------------------------------
*#************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#************************************************************************
*#************************************************************************
*#
*#                     Block A - PROPOSED 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)=   20.73   Curve Number   (CN)=78.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .685 (i)
     TIME TO PEAK    (hrs)=    3.133
     RUNOFF VOLUME    (mm)=   51.882
     TOTAL RAINFALL   (mm)=   93.696
```

```
     RUNOFF COEFFICIENT   =     .554

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

--------------------------------------------------------------------------------
006:0004----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-200 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )   |
| OUT<02:(BM1   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00    |    6.000  .6450E+00
                          .000  .6040E+00    |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .685     3.133     51.882
     OUTFLOW<02: (BM1   )       20.73      .597     4.433     22.745
    OVERFLOW<09: (OVBM1 )         .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](%)=   87.244
                   TIME SHIFT OF PEAK FLOW          (min)=    78.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.6081E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
006:0005----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .321 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   43.381
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .463

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

--------------------------------------------------------------------------------
006:0006----------------------------------------------------------------------
------------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM1          20.73     .597    4.43  22.75    .000
                      +ID2 03:EXTA-1       11.83     .321    3.17  43.38    .000
                       ==========================================================
                       SUM 05:OUT1         32.56     .892    5.05  30.24    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0007----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    9.30   Curve Number   (CN)=78.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .306 (i)
     TIME TO PEAK    (hrs)=    3.150
     RUNOFF VOLUME    (mm)=   51.882
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .554

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

--------------------------------------------------------------------------------
006:0008----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-201 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )   |
| OUT<02:(BM2   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00    |    2.000  .2547E+00
                          .000  .2385E+00    |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .306     3.150     51.882
     OUTFLOW<02: (BM2   )        9.30      .272     4.167     26.237
    OVERFLOW<09: (OVBM2 )         .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](%)=   88.775
                   TIME SHIFT OF PEAK FLOW          (min)=    61.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.2407E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
006:0009----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .297 (i)
     TIME TO PEAK    (hrs)=    3.183
     RUNOFF VOLUME    (mm)=   41.200
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .440

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

--------------------------------------------------------------------------------
006:0010----------------------------------------------------------------------
------------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM2          9.30      .272    4.17  26.24    .000
                      +ID2 03:EXTA-2       11.61     .297    3.18  41.20    .000
                       ==========================================================
                       SUM 06:OUT2         20.91     .546    4.17  34.55    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0011----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    4.48   Curve Number   (CN)=78.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .147 (i)
     TIME TO PEAK    (hrs)=    3.167
     RUNOFF VOLUME    (mm)=   51.882
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .554

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

--------------------------------------------------------------------------------
006:0012----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )   |
| OUT<02:(BM3   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00    |    1.000  .1297E+00
                          .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )        4.48      .147     3.167     51.882
     OUTFLOW<02: (BM3   )        4.48      .130     4.317     24.761
    OVERFLOW<09: (OVBM3 )         .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](%)=   88.431
                   TIME SHIFT OF PEAK FLOW          (min)=    69.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.1226E+00

      *** WARNING: Outflow volume is less than inflow volume.
--------------------------------------------------------------------------------
006:0013----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=    3.51   Curve Number   (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .091 (i)
     TIME TO PEAK    (hrs)=    3.150
     RUNOFF VOLUME    (mm)=   41.200
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .440

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

--------------------------------------------------------------------------------
006:0014----------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM3          4.48      .130    4.32  24.76    .000
                      +ID2 03:EXTA-3       3.51      .091    3.15  41.20    .000
                       ==========================================================
                       SUM 07:OUT3         7.99      .213    5.05  31.98    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0015----------------------------------------------------------------------
---------------------
| DESIGN NASHYD     |   Area    (ha)=   10.16   Curve Number   (CN)=73.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .290 (i)
     TIME TO PEAK    (hrs)=    3.183
     RUNOFF VOLUME    (mm)=   45.665
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .487

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

--------------------------------------------------------------------------------
006:0016----------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00    |    2.000  .2312E+00
```

```
                          .000  .2166E+00   |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .290     3.183     45.665
     OUTFLOW<04: (BM4   )       10.16      .265     4.117     24.346
    OVERFLOW<09: (OVBM4 )         .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](%)=    91.420
                    TIME SHIFT OF PEAK FLOW          (min)=    56.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2185E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0017-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .116 (i)
     TIME TO PEAK    (hrs)=    3.067
     RUNOFF VOLUME    (mm)=   42.278
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .451

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

-------------------------------------------------------------------------------
006:0018-------------------------------------------------------------------------
----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXTA-4         4.22     .116    3.07  42.28    .000
                     +ID2 04:BM4           10.16     .265    4.12  24.35    .000
                      ========================================================
                      SUM 08:OUT4          14.38     .369    5.03  29.61    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0019-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=80.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .172 (i)
     TIME TO PEAK    (hrs)=    3.033
     RUNOFF VOLUME    (mm)=   54.594
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .583

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

-------------------------------------------------------------------------------
006:0020-------------------------------------------------------------------------
*#*************************************************************************
*#                      Route A-204 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00     |    1.000  .1016E+00
                           .000  .9510E-01     |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )        4.74      .172     3.033     54.594
     OUTFLOW<02: (BM5   )        4.74      .169     3.117     34.531
    OVERFLOW<04: (OVBM5 )         .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](%)=    98.238
                    TIME SHIFT OF PEAK FLOW          (min)=     5.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9620E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0021-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .546 (i)
     TIME TO PEAK    (hrs)=    3.383
     RUNOFF VOLUME    (mm)=   42.278
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .451

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

-------------------------------------------------------------------------------
006:0022-------------------------------------------------------------------------
----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM5            4.74     .169    3.12  34.53    .000
                     +ID2 03:EXTA-5        21.58     .546    3.38  42.28    .000
                      ========================================================
                      SUM 09:OUT5          26.32     .703    3.17  40.88    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0023-------------------------------------------------------------------------
*#*************************************************************************
*#                          TOTAL FLOW TO MUD CREEK
*#*************************************************************************
----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 05:OUT1          32.56     .892    5.05  30.24    .000
                     +ID2 06:OUT2          20.91     .546    4.17  34.55    .000
                     +ID3 07:OUT3           7.99     .213    5.05  31.98    .000
                     +ID4 08:OUT4          14.38     .369    5.03  29.61    .000
                     +ID5 09:OUT5          26.32     .703    3.17  40.88    .000
                      ========================================================
                      SUM 01:TO_MC        102.16    2.688    5.03  33.91    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0024-------------------------------------------------------------------------
*#*************************************************************************
*#*************************************************************************
*#
*#                            AMC III Conditions
*#
*#*************************************************************************
*#*************************************************************************
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=90.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .956 (i)
     TIME TO PEAK    (hrs)=    2.467
     RUNOFF VOLUME    (mm)=   70.588
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .753

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

-------------------------------------------------------------------------------
006:0025-------------------------------------------------------------------------
*#*************************************************************************
*#                      Route A-200 through slope berms
*#*************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )    |
| OUT<02:(BM1   )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00     |    6.000  .6450E+00
                           .000  .6040E+00     |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .956     2.467     70.588
     OUTFLOW<02: (BM1   )       20.73      .887     3.417     41.452
    OVERFLOW<09: (OVBM1 )         .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](%)=    92.802
                    TIME SHIFT OF PEAK FLOW          (min)=    57.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.6101E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0026-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .489 (i)
     TIME TO PEAK    (hrs)=    3.083
     RUNOFF VOLUME    (mm)=   63.650
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .679

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

-------------------------------------------------------------------------------
006:0027-------------------------------------------------------------------------
----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM1           20.73     .887    3.42  41.45    .000
                     +ID2 03:EXTA-1        11.83     .489    3.08  63.65    .000
                      ========================================================
                      SUM 05:OUT1          32.56    1.347    3.42  49.52    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0028-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=90.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .428 (i)
     TIME TO PEAK    (hrs)=    3.050
     RUNOFF VOLUME    (mm)=   70.588
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .753

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

-------------------------------------------------------------------------------
006:0029-------------------------------------------------------------------------
*#*************************************************************************
```

```
*#                    Route A-201 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR   |     Requested routing time step =  1.0 min.
|  IN>01:(A-201 )   |
| OUT<02:(BM2   )   |     =========  OUTLFOW STORAGE TABLE  =========
--------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   2.000  .2547E+00
                           .000  .2385E+00    |   6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .428     3.050     70.588
     OUTFLOW<02: (BM2   )        9.30      .418     3.267     44.943
    OVERFLOW<09: (OVBM2 )         .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](%)=   97.622
                    TIME SHIFT OF PEAK FLOW         (min)=    13.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2419E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0030---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .453 (i)
     TIME TO PEAK    (hrs)=    3.117
     RUNOFF VOLUME    (mm)=   60.466
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .645

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

-------------------------------------------------------------------------------
006:0031---------------------------------------------------------------------
----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:BM2           9.30      .418    3.27  44.94    .000
                     +ID2 03:EXTA-2       11.61      .453    3.12  60.47    .000
                      ===================================================
                      SUM 06:OUT2         20.91      .865    3.25  53.56    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0032---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=90.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .206 (i)
     TIME TO PEAK    (hrs)=    3.050
     RUNOFF VOLUME    (mm)=   70.588
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .753

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

-------------------------------------------------------------------------------
006:0033---------------------------------------------------------------------
*#########################################################################
*#                    Route A-202 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR   |     Requested routing time step =  1.0 min.
|  IN>01:(A-202 )   |
| OUT<02:(BM3   )   |     =========  OUTLFOW STORAGE TABLE  =========
--------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   1.000  .1297E+00
                           .000  .1215E+00    |   3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )        4.48      .206     3.050     70.588
     OUTFLOW<02: (BM3   )        4.48      .197     3.367     43.468
    OVERFLOW<09: (OVBM3 )         .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](%)=   95.398
                    TIME SHIFT OF PEAK FLOW         (min)=    19.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1231E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0034---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .138 (i)
     TIME TO PEAK    (hrs)=    3.083
     RUNOFF VOLUME    (mm)=   60.466
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .645

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

-------------------------------------------------------------------------------
006:0035---------------------------------------------------------------------
----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 02:BM3           4.48      .197    3.37  43.47    .000
                     +ID2 03:EXTA-3        3.51      .138    3.08  60.47    .000
                      ===================================================
                      SUM 07:OUT3          7.99      .328    3.35  50.94    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0036---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=87.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .430 (i)
     TIME TO PEAK    (hrs)=    3.100
     RUNOFF VOLUME    (mm)=   65.310
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .697

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

-------------------------------------------------------------------------------
006:0037---------------------------------------------------------------------
*#########################################################################
*#                    Route A-203 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR   |     Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |     =========  OUTLFOW STORAGE TABLE  =========
--------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   2.000  .2312E+00
                           .000  .2166E+00    |   6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .430     3.100     65.310
     OUTFLOW<04: (BM4   )       10.16      .428     3.200     43.991
    OVERFLOW<09: (OVBM4 )         .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](%)=   99.383
                    TIME SHIFT OF PEAK FLOW         (min)=    6.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2197E+00

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0038---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .175 (i)
     TIME TO PEAK    (hrs)=    2.117
     RUNOFF VOLUME    (mm)=   62.036
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .662

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

-------------------------------------------------------------------------------
006:0039---------------------------------------------------------------------
----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                     (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 01:EXTA-4         4.22      .175    2.12  62.04    .000
                     +ID2 04:BM4           10.16      .428    3.20  43.99    .000
                      ===================================================
                      SUM 08:OUT4          14.38      .593    3.18  49.29    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0040---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=91.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .252 (i)
     TIME TO PEAK    (hrs)=    2.067
     RUNOFF VOLUME    (mm)=   72.454
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .773

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

-------------------------------------------------------------------------------
006:0041---------------------------------------------------------------------
*#########################################################################
*#                    Route A-204 through slope berms
*#########################################################################
--------------------
| ROUTE RESERVOIR   |     Requested routing time step =  1.0 min.
|  IN>01:(A-204 )   |
| OUT<02:(BM5   )   |     =========  OUTLFOW STORAGE TABLE  =========
--------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |   1.000  .1016E+00
                           .000  .9510E-01    |   3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )        4.74      .252     2.067     72.454
     OUTFLOW<02: (BM5   )        4.74      .225     3.033     52.391
    OVERFLOW<04: (OVBM5 )         .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](%)=   89.435
                  TIME SHIFT OF PEAK FLOW         (min)=    58.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.9656E-01

     *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
006:0042---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .842 (i)
     TIME TO PEAK    (hrs)=    3.217
     RUNOFF VOLUME    (mm)=   62.036
     TOTAL RAINFALL   (mm)=   93.696
     RUNOFF COEFFICIENT   =     .662

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

-------------------------------------------------------------------------------
006:0043---------------------------------------------------------------------
------------------------
| ADD HYD (OUT5      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM5           4.74     .225    3.03  52.39    .000
                      +ID2 03:EXTA-5       21.58     .842    3.22  62.04    .000
                       ========================================================
                       SUM 09:OUT5          26.32    1.061    3.10  60.30    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0044---------------------------------------------------------------------
*#*****************************************************************************
*#                              TOTAL FLOW TO MUD CREEK
*#*****************************************************************************
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 05:OUT1          32.56    1.347    3.42  49.52    .000
                      +ID2 06:OUT2          20.91     .865    3.25  53.56    .000
                      +ID3 07:OUT3           7.99     .328    3.35  50.94    .000
                      +ID4 08:OUT4          14.38     .593    3.18  49.29    .000
                      +ID5 09:OUT5          26.32    1.061    3.10  60.30    .000
                       ========================================================
                       SUM 01:TO_MC        102.16    4.088    3.40  53.20    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
006:0045---------------------------------------------------------------------
-------------------------------------------------------------------------------
006:0002---------------------------------------------------------------------
-------------------------------------------------------------------------------
006:0002---------------------------------------------------------------------
-------------------------------------------------------------------------------
006:0002---------------------------------------------------------------------
-------------------------------------------------------------------------------
006:0002---------------------------------------------------------------------
-------------------------------------------------------------------------------
006:0002---------------------------------------------------------------------
  ** END OF RUN :   6

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




--------------------
| START            |  Project  dir.: C:\TEMP\Loy\
--------------------  Rainfall dir.: C:\TEMP\Loy\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 007
    NSTORM=   1
          #  1=25mm.4hr
-------------------------------------------------------------------------------
007:0002---------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [Loyalist Solar - Block A]    Project Number: [133560220]
*#  Date        : 2018-01-15
*#  Modeller    : [B.Weersink]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#*****************************************************************************
*#*****************************************************************************
*#
*#                      Block A - PROPOSED CONDITIONS
*#
*#*****************************************************************************
-------------------------------------------------------------------------------
007:0002---------------------------------------------------------------------
--------------------
| 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
-------------------------------------------------------------------------------
007:0003---------------------------------------------------------------------
*#*****************************************************************************
*#*****************************************************************************
*#
*#                              AMC II Conditions
*#
*#*****************************************************************************
*#*****************************************************************************
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=78.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .251 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=    5.805
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .232

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

-------------------------------------------------------------------------------
007:0004---------------------------------------------------------------------
*#*****************************************************************************
*#                      Route A-200 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )    |
| OUT<02:(BM1    )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    6.000  .6450E+00
                            .000  .6040E+00   |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------             (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .251     2.100      5.805
     OUTFLOW<02: (BM1   )       20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )         .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)=  -126.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1203E+00

     *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
007:0005---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=71.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .107 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=    4.340
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .174

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

-------------------------------------------------------------------------------
007:0006---------------------------------------------------------------------
------------------------
| ADD HYD (OUT1      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 02:BM1           20.73     .000     .00    .00    .000
                      +ID2 03:EXTA-1        11.83     .107    2.10   4.34    .000
                       ========================================================
                       SUM 05:OUT1          32.56     .107    2.10   1.58    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0007---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=78.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .109 (i)
     TIME TO PEAK    (hrs)=    2.133
     RUNOFF VOLUME    (mm)=    5.805
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .232

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

-------------------------------------------------------------------------------
007:0008---------------------------------------------------------------------
*#*****************************************************************************
*#                      Route A-201 through slope berms
*#*****************************************************************************
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )    |
| OUT<02:(BM2    )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    2.000  .2547E+00
                            .000  .2385E+00   |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------             (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .109     2.133      5.805
     OUTFLOW<02: (BM2   )        9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )         .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)=  -128.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.5398E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
007:0009-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   11.61   Curve Number   (CN)=69.00
| 03:EXTA-2 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .094 (i)
     TIME TO PEAK    (hrs)=    2.117
     RUNOFF VOLUME    (mm)=    4.013
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .161

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

-------------------------------------------------------------------------------
007:0010-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM2           9.30     .000     .00    .00    .000
                      +ID2 03:EXTA-2       11.61     .094    2.12   4.01    .000
                       ==========================================================
                       SUM 06:OUT2         20.91     .094    2.12   2.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0011-------------------------------------------------------------------------
--------------------
| DESIGN NASHYD      |   Area     (ha)=    4.48   Curve Number   (CN)=78.00
| 01:A-202  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .052 (i)
     TIME TO PEAK    (hrs)=    2.133
     RUNOFF VOLUME    (mm)=    5.805
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .232

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

-------------------------------------------------------------------------------
007:0012-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-202 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )    |
| OUT<02:(BM3   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00    |    1.000  .1297E+00
                           .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     ---------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )        4.48      .052     2.133      5.805
     OUTFLOW<02: (BM3   )        4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )         .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)=  -128.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2600E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
007:0013-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    3.51   Curve Number   (CN)=69.00
| 03:EXTA-3 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .031 (i)
     TIME TO PEAK    (hrs)=    2.050
     RUNOFF VOLUME    (mm)=    4.013
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .161

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

-------------------------------------------------------------------------------
007:0014-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3           4.48     .000     .00    .00    .000
                      +ID2 03:EXTA-3        3.51     .031    2.05   4.01    .000
                       ==========================================================
                       SUM 07:OUT3          7.99     .031    2.05   1.76    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0015-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   10.16   Curve Number   (CN)=73.00
| 01:A-203  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .094 (i)
     TIME TO PEAK    (hrs)=    2.150
     RUNOFF VOLUME    (mm)=    4.702
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .188

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

-------------------------------------------------------------------------------
007:0016-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-203 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )    |
| OUT<04:(BM4   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00    |    2.000  .2312E+00
                           .000  .2166E+00    |    6.000  .2464E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     ---------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .094     2.150      4.702
     OUTFLOW<04: (BM4   )       10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )         .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)=  -129.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4778E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
007:0017-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.22   Curve Number   (CN)=70.00
| 01:EXTA-4 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .052 (i)
     TIME TO PEAK    (hrs)=    1.867
     RUNOFF VOLUME    (mm)=    4.172
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .167

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

-------------------------------------------------------------------------------
007:0018-------------------------------------------------------------------------
------------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4        4.22     .052    1.87   4.17    .000
                      +ID2 04:BM4          10.16     .000     .00    .00    .000
                       ==========================================================
                       SUM 08:OUT4         14.38     .052    1.87   1.22    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
007:0019-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    4.74   Curve Number   (CN)=80.00
| 01:A-204  DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .099 (i)
     TIME TO PEAK    (hrs)=    1.817
     RUNOFF VOLUME    (mm)=    6.348
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .254

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

-------------------------------------------------------------------------------
007:0020-------------------------------------------------------------------------
*#*****************************************************************************
*#                    Route A-204 through slope berms
*#*****************************************************************************
--------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )    |
| OUT<02:(BM5   )    |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00    |    1.000  .1016E+00
                           .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
     ---------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )        4.74      .099     1.817      6.348
     OUTFLOW<02: (BM5   )        4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )         .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.)=.3009E-01

      *** WARNING: Outflow volume is less than inflow volume.
-------------------------------------------------------------------------------
007:0021-------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=   21.58   Curve Number   (CN)=70.00
| 03:EXTA-5 DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421
```

```
     PEAK FLOW       (cms)=     .146 (i)
     TIME TO PEAK    (hrs)=    2.333
     RUNOFF VOLUME    (mm)=    4.173
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .167

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

------------------------------------------------------------------------------
007:0022------------------------------------------------------------------------
----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM5           4.74     .000     .00    .00    .000
                     +ID2 03:EXTA-5       21.58     .146    2.33   4.17    .000
                      ========================================================
                      SUM 09:OUT5          26.32     .146    2.33   3.42    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0023------------------------------------------------------------------------
*#############################################################################
*#                          TOTAL FLOW TO MUD CREEK
*#############################################################################
-----------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 05:OUT1          32.56     .107    2.10   1.58    .000
                     +ID2 06:OUT2          20.91     .094    2.12   2.23    .000
                     +ID3 07:OUT3           7.99     .031    2.05   1.76    .000
                     +ID4 08:OUT4          14.38     .052    1.87   1.22    .000
                     +ID5 09:OUT5          26.32     .146    2.33   3.42    .000
                      ========================================================
                      SUM 01:TO_MC        102.16     .403    2.13   2.15    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0024------------------------------------------------------------------------
*#############################################################################
*#############################################################################
*#
*#                             AMC III Conditions
*#
*#############################################################################
*#############################################################################
----------------------
| DESIGN NASHYD      |   Area    (ha)=   20.73   Curve Number   (CN)=90.00
| 01:A-200  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .410

     Unit Hyd Qpeak  (cms)=    1.931

     PEAK FLOW       (cms)=     .482 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=   10.677
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .427

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

------------------------------------------------------------------------------
007:0025------------------------------------------------------------------------
*#############################################################################
*#                    Route A-200 through slope berms
*#############################################################################
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-200 )  |
| OUT<02:(BM1   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    6.000  .6450E+00
                           .000  .6040E+00    |   17.000  .6872E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-200 )       20.73      .482     2.083     10.677
     OUTFLOW<02: (BM1   )       20.73      .000      .000       .000
    OVERFLOW<09: (OVBM1 )         .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)=  -125.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2213E+00

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
007:0026------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.83   Curve Number   (CN)=86.00
| 03:EXTA-1 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .400

     Unit Hyd Qpeak  (cms)=    1.130

     PEAK FLOW       (cms)=     .219 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=    8.516
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .341

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

------------------------------------------------------------------------------
007:0027------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT1      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM1           20.73     .000     .00    .00    .000
                     +ID2 03:EXTA-1        11.83     .219    2.08   8.52    .000
                      ========================================================
                      SUM 05:OUT1          32.56     .219    2.08   3.09    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0028------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    9.30   Curve Number   (CN)=90.00
| 01:A-201  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .430

     Unit Hyd Qpeak  (cms)=     .826

     PEAK FLOW       (cms)=     .209 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=   10.677
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .427

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

------------------------------------------------------------------------------
007:0029------------------------------------------------------------------------
*#############################################################################
*#                    Route A-201 through slope berms
*#############################################################################
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-201 )  |
| OUT<02:(BM2   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    2.000  .2547E+00
                           .000  .2385E+00    |    6.000  .2714E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-201 )        9.30      .209     2.100     10.677
     OUTFLOW<02: (BM2   )        9.30      .000      .000       .000
    OVERFLOW<09: (OVBM2 )         .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)=  -126.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9930E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
007:0030------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   11.61   Curve Number   (CN)=84.00
| 03:EXTA-2 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .420

     Unit Hyd Qpeak  (cms)=    1.056

     PEAK FLOW       (cms)=     .186 (i)
     TIME TO PEAK    (hrs)=    2.100
     RUNOFF VOLUME    (mm)=    7.683
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .307

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

------------------------------------------------------------------------------
007:0031------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT2      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:BM2           9.30     .000     .00    .00    .000
                     +ID2 03:EXTA-2       11.61     .186    2.10   7.68    .000
                      ========================================================
                      SUM 06:OUT2          20.91     .186    2.10   4.27    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0032------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.48   Curve Number   (CN)=90.00
| 01:A-202  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .389

     PEAK FLOW       (cms)=     .099 (i)
     TIME TO PEAK    (hrs)=    2.117
     RUNOFF VOLUME    (mm)=   10.677
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .427

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

------------------------------------------------------------------------------
007:0033------------------------------------------------------------------------
*#############################################################################
*#                    Route A-202 through slope berms
*#############################################################################
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  1.0 min.
|  IN>01:(A-202 )  |
| OUT<02:(BM3   )  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |    1.000  .1297E+00
                           .000  .1215E+00    |    3.000  .1382E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-202 )        4.48      .099     2.117     10.677
     OUTFLOW<02: (BM3   )        4.48      .000      .000       .000
    OVERFLOW<09: (OVBM3 )         .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)=  -127.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4784E-01

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

```
------------------------------------------------------------------------------
007:0034------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    3.51   Curve Number   (CN)=84.00
| 03:EXTA-3 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .370

     Unit Hyd Qpeak  (cms)=     .362

     PEAK FLOW       (cms)=     .061 (i)
     TIME TO PEAK    (hrs)=    2.033
     RUNOFF VOLUME    (mm)=    7.683
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .307

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

------------------------------------------------------------------------------
007:0035------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT3      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM3           4.48     .000     .00    .00    .000
                      +ID2 03:EXTA-3        3.51     .061    2.03   7.68    .000
                       ========================================================
                       SUM 07:OUT3          7.99     .061    2.03   3.38    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0036------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   10.16   Curve Number   (CN)=87.00
| 01:A-203  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .882

     PEAK FLOW       (cms)=     .187 (i)
     TIME TO PEAK    (hrs)=    2.133
     RUNOFF VOLUME    (mm)=    8.987
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .359

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

------------------------------------------------------------------------------
007:0037------------------------------------------------------------------------
*#############################################################################
*#                     Route A-203 through slope berms
*#############################################################################
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-203 )   |
| OUT<04:(BM4   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00    |    2.000  .2312E+00
                            .000  .2166E+00    |    6.000  .2464E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-203 )       10.16      .187     2.133      8.987
     OUTFLOW<04: (BM4   )       10.16      .000      .000       .000
    OVERFLOW<09: (OVBM4 )         .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)=  -128.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9130E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
007:0038------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.22   Curve Number   (CN)=85.00
| 01:EXTA-4 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .230

     Unit Hyd Qpeak  (cms)=     .701

     PEAK FLOW       (cms)=     .106 (i)
     TIME TO PEAK    (hrs)=    1.850
     RUNOFF VOLUME    (mm)=    8.083
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .323

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

------------------------------------------------------------------------------
007:0039------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT4      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXTA-4        4.22     .106    1.85   8.08    .000
                      +ID2 04:BM4          10.16     .000     .00    .00    .000
                       ========================================================
                       SUM 08:OUT4         14.38     .106    1.85   2.37    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0040------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=    4.74   Curve Number   (CN)=91.00
| 01:A-204  DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .200

     Unit Hyd Qpeak  (cms)=     .905

     PEAK FLOW       (cms)=     .189 (i)
     TIME TO PEAK    (hrs)=    1.817
     RUNOFF VOLUME    (mm)=   11.358
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .454

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

------------------------------------------------------------------------------
007:0041------------------------------------------------------------------------
*#############################################################################
*#                     Route A-204 through slope berms
*#############################################################################
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(A-204 )   |
| OUT<02:(BM5   )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00    |    1.000  .1016E+00
                            .000  .9510E-01    |    3.000  .1082E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (A-204 )       4.74      .189     1.817     11.358
     OUTFLOW<02: (BM5   )       4.74      .000      .000       .000
    OVERFLOW<04: (OVBM5 )        .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.)=.5384E-01

      *** WARNING: Outflow volume is less than inflow volume.
------------------------------------------------------------------------------
007:0042------------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area    (ha)=   21.58   Curve Number   (CN)=85.00
| 03:EXTA-5 DT= 1.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .580

     Unit Hyd Qpeak  (cms)=    1.421

     PEAK FLOW       (cms)=     .291 (i)
     TIME TO PEAK    (hrs)=    2.317
     RUNOFF VOLUME    (mm)=    8.083
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .323

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

------------------------------------------------------------------------------
007:0043------------------------------------------------------------------------
-----------------------
| ADD HYD (OUT5      ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 02:BM5           4.74     .000     .00    .00    .000
                      +ID2 03:EXTA-5       21.58     .291    2.32   8.08    .000
                       ========================================================
                       SUM 09:OUT5         26.32     .291    2.32   6.63    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0044------------------------------------------------------------------------
*#############################################################################
*#                          TOTAL FLOW TO MUD CREEK
*#############################################################################
------------------------
| ADD HYD (TO_MC     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 05:OUT1         32.56     .219    2.08   3.09    .000
                      +ID2 06:OUT2         20.91     .186    2.10   4.27    .000
                      +ID3 07:OUT3          7.99     .061    2.03   3.38    .000
                      +ID4 08:OUT4         14.38     .106    1.85   2.37    .000
                      +ID5 09:OUT5         26.32     .291    2.32   6.63    .000
                       ========================================================
                       SUM 01:TO_MC       102.16     .807    2.12   4.16    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
007:0045------------------------------------------------------------------------
------------------------------------------------------------------------------
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------------------------------------------------------------------------
      FINISH
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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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Note. This manuscript was submitted on August 12, 2010; approved on October 20, 2011; published online on October 24, 2011. Discussion period open until October 1, 2013; separate discussions must be submitted for individual papers. This paper is part of the ***Journal of Hydrologic Engineering***, Vol. 18, No. 5, May 1, 2013. © ASCE, ISSN 1084-0699/2013/5-536-541/$25.00.

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.

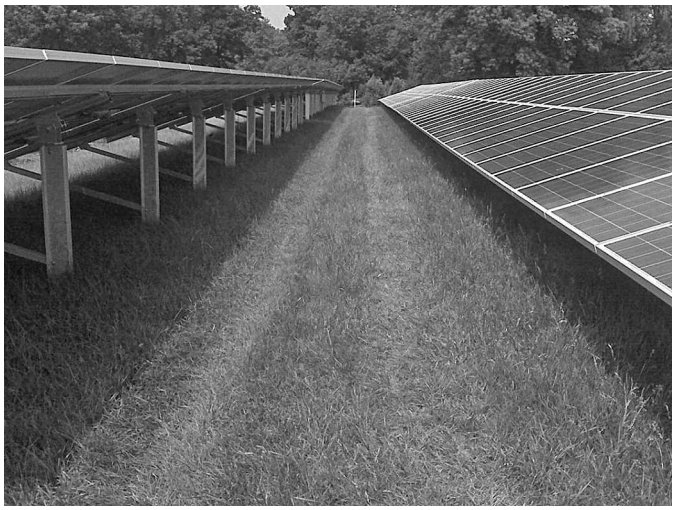

Fig. 1. Maintenance or "spacer" section between two rows of solar panels (photo by John E. Showler, reprinted with permission)

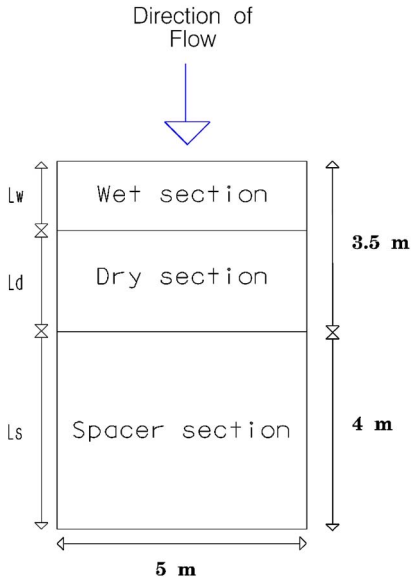

Fig. 2. Wet, dry, and spacer sections of a single cell with lengths *Lw*, *Ls*, and *Ld* with the solar panel covering the dry section

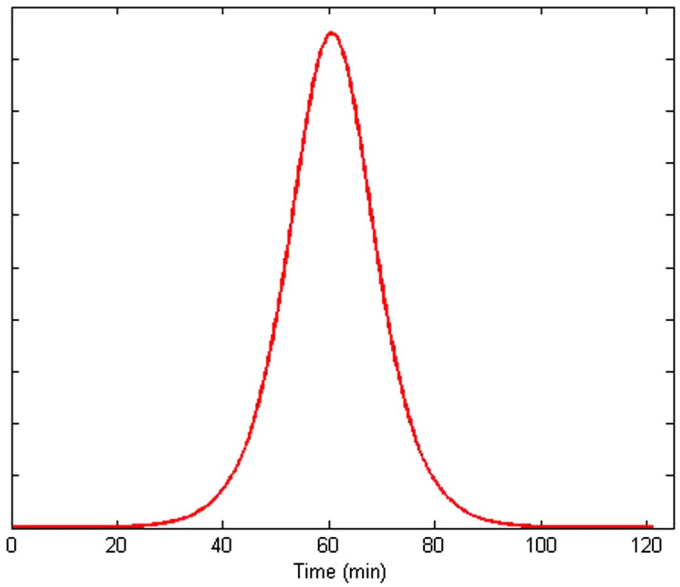

Fig. 3. Dimensionless hyetograph of 2-h Type II storm

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

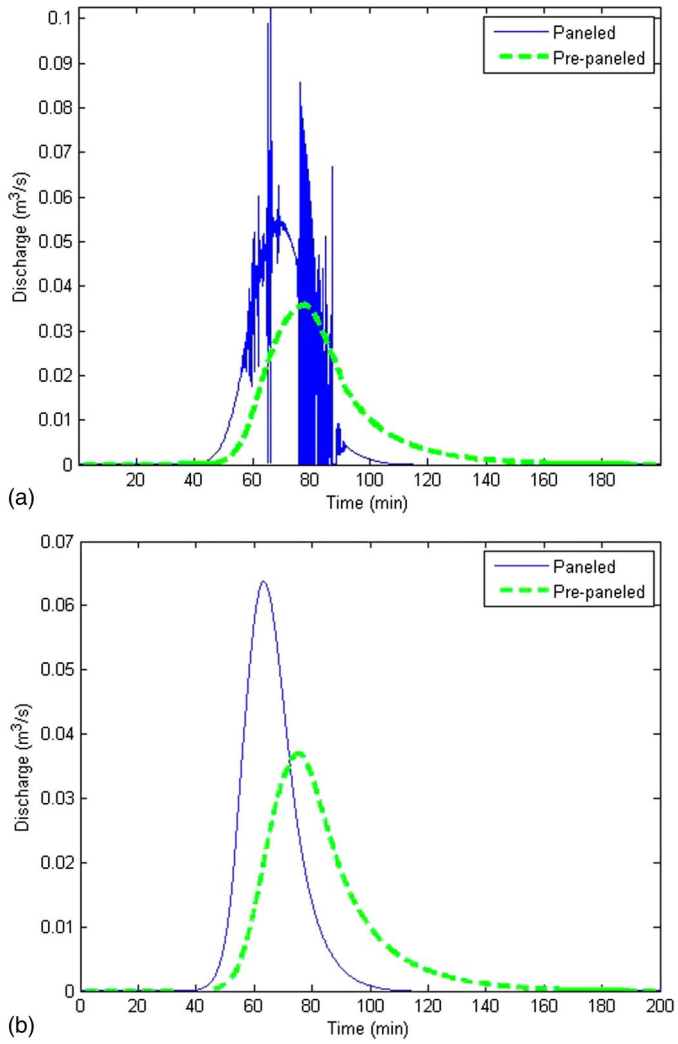

Fig. 4. Hydrograph with time increment of (a) 12 s; (b) 3 s with Manning's n for bare ground

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

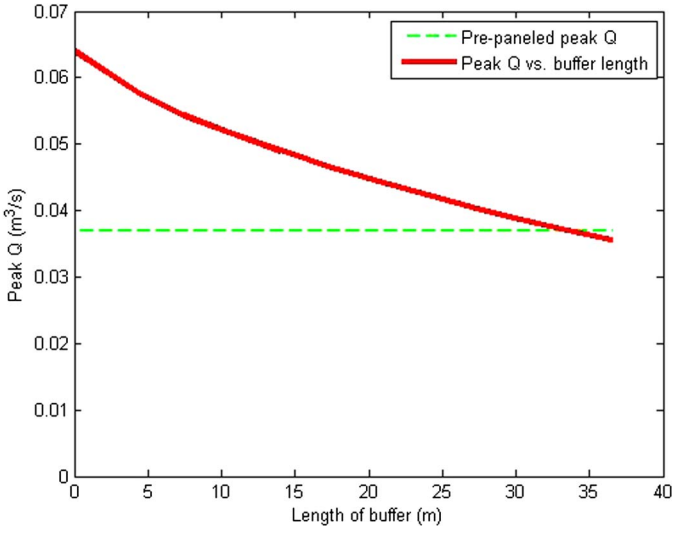

Fig. 6. Peak discharge over gravel compared with buffer length

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.

Acknowledgments

The authors appreciate the photographs (Figs. 1 and 5) of Ortho Clinical Diagnostics, 1001 Route 202, North Raritan, New Jersey, 08869, provided by John E. Showler, Environmental Scientist, New Jersey Department of Agriculture. The extensive comments of reviewers resulted in an improved paper.

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Effects of tillage on soil microrelief, surface depression storage and soil water storage

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Received 20 November 2002; received in revised form 2 September 2003; accepted 4 September 2003

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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doi:10.1016/j.still.2003.09.002

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-

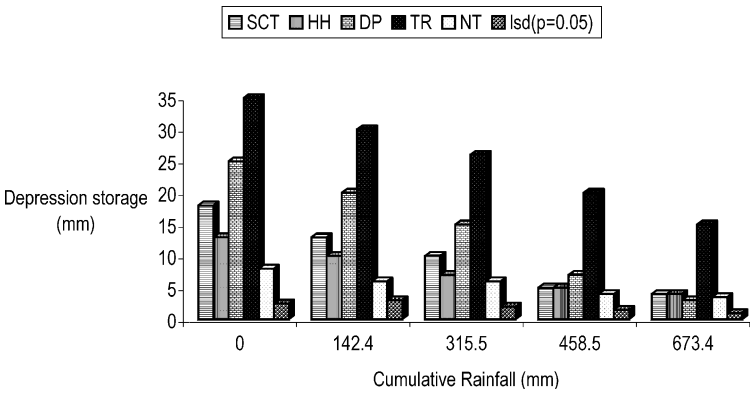

Fig. 1. The influence of rainfall on depressional storage for the five tillage methods.

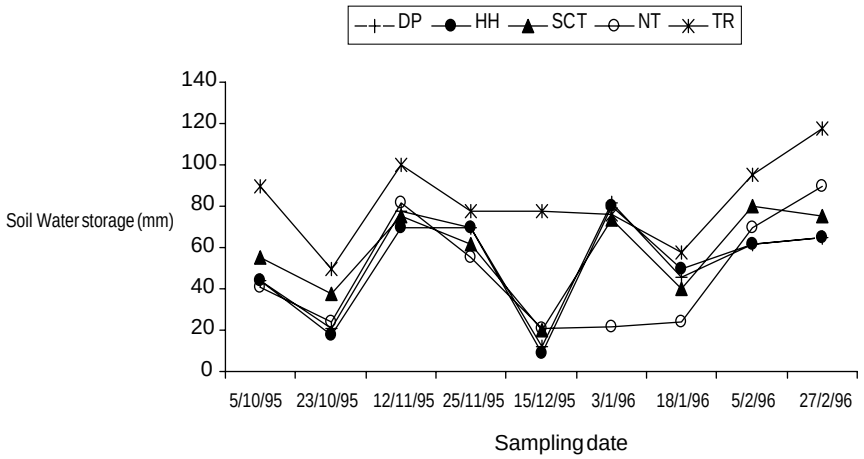

Fig. 2. Soil water content at different sampling times for the five tillage methods.

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

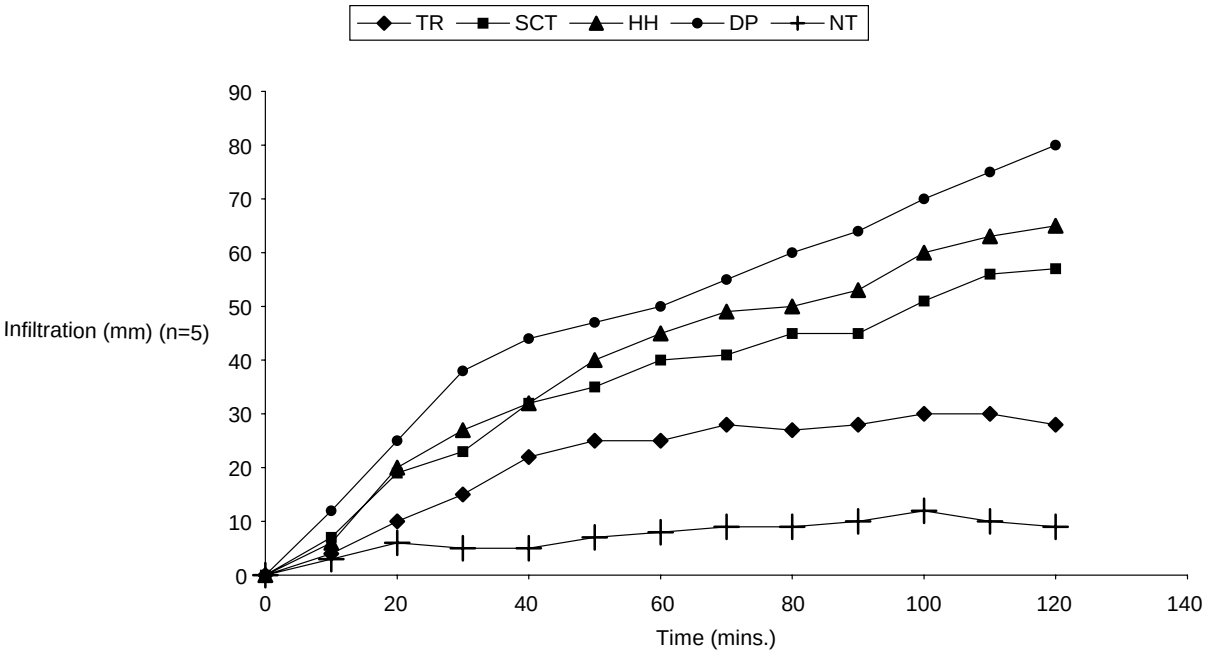

Fig. 3. Cumulative infiltration for the five tillage treatments after the tillage operations.

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

The author is indebted to the Department of Agricultural Engineering and Land Planning of Sokoine University of Agriculture for accommodating the study under the SACCAR/GTZ programme.

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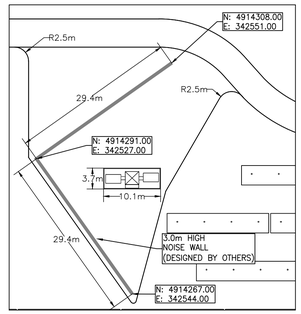
DRAWINGS

Drawing No. C-011 Block A Site Plan
Drawing No. C-051 Block A Existing Conditions, Clearing, Grubbing & Fencing Plan
Drawing No. C-201 Block A Access Road Plan & Profiles (7 sheets)
Drawing No. C-401 Block A Grading Plan (6 sheets)
Drawing No. C-500 General Details & Notes (2 sheets)
Drawing No. C-601 Block A Sedimentation and Erosion Control Plan (6 sheets)
Drawing No. C-650 Sedimentation and Erosion Control Details



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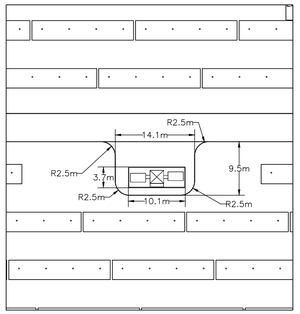

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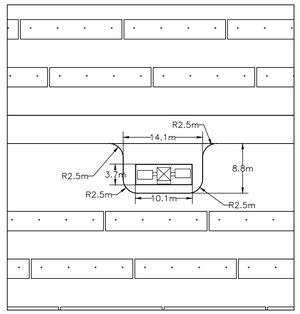

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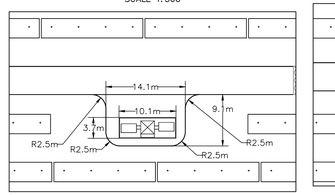

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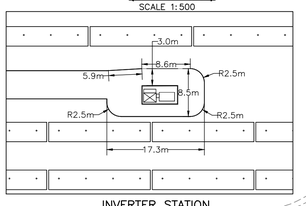

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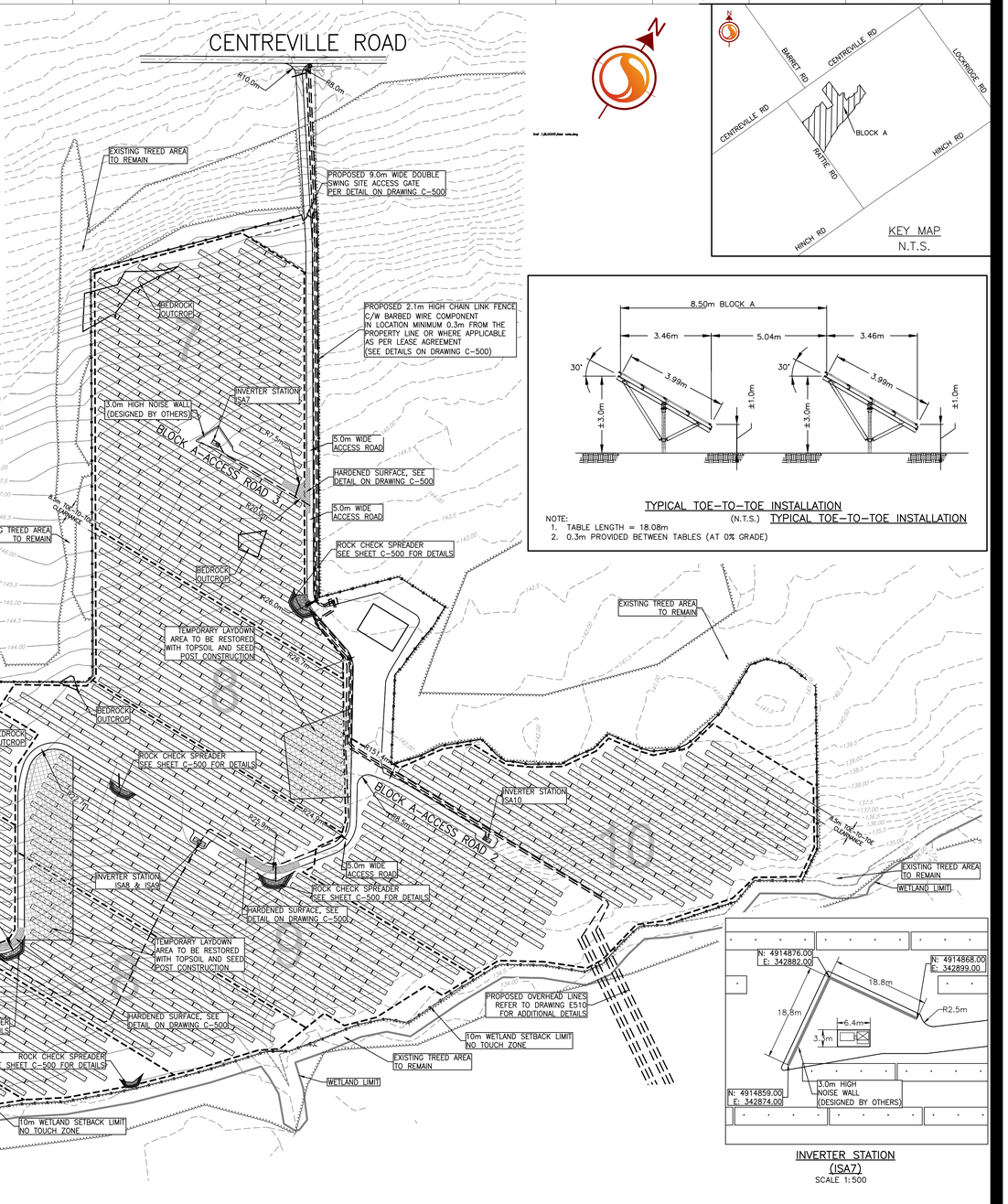
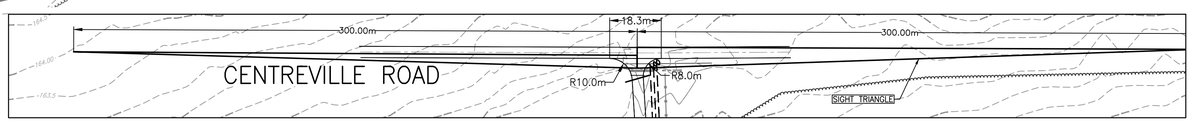


KEY MAP
N.T.S.

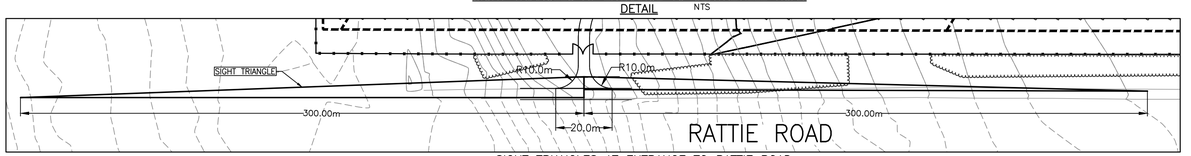
TYPICAL TOE-TO-TOE INSTALLATION
(N.T.S.) TYPICAL TOE-TO-TOE INSTALLATION

NOTE:
1. TABLE LENGTH = 18.08m
2. 0.3m PROVIDED BETWEEN TABLES (AT 0% GRADE)

INVERTER STATION
(ISA7)
SCALE 1:500



SIGHT TRIANGLES AT ENTRANCE TO CENTREVILLE ROAD
DETAIL NTS



SIGHT TRIANGLES AT ENTRANCE TO RATTIE ROAD
DETAIL NTS

10
BLOCK NUMBER

SITE STATISTICS	
BLOCK	AREA (ha)
1	4.5
2	4.5
3	4.4
4	4.2
5	4.5
6	4.6
7	4.4
8	4.2
9	4.5
10	5.1

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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.
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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 COMPLETED IN ACCORDANCE WITH OPSS 804.
16. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED	EXISTING
FENCE	
	EX. CONTOUR 185.0
	LIDAR CONTOUR 184.5
TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
	TREE LINE
SOLAR ARRAY BLOCK DELINEATOR	
SWALE	
CULVERT	
SLOPE (3:1 UNLESS NOTED OTHERWISE)	
INVERTER STATION	
SOLAR PANEL TABLE	
AC CABLE TRENCH	
DC CABLE TRENCH	
PROPOSED FILL AREA	
HARDENED SURFACE REFER TO C-500 FOR DETAILS	
POTENTIAL ROCK OUTCROP LOCATION	
10m SETBACK LIMIT NO TOUCH ZONE	
WETLAND BOUNDARY	
ROCK CHECK SPREADER	

B.	ISSUED FOR TENDER	MALM	DS	18.01.16
A.	ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21
Revision		By	Appd.	YY.MM.DD
File Name: 133560220_R-SP-Block A.dwg		KC	DS	KC	17.11.09
		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 A
SITE PLAN

Project No. 133560220
Scale 1:2000 (0 20 60 100m)
Drawing No. C-011
Sheet 1 of 1
Revision A

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2018/01/16 7:24 PM BY: AHASSOUL, Mohamed

ORIGINAL SHEET - ARCH D

CENTREVILLE ROAD

RATTIE ROAD

EXISTING CULVERT TO REMAIN

EXISTING CULVERT TO BE REMOVED AND DISPOSED OF OFF-SITE AS PER OPSS 201

DETAIL-1 THIS SHEET

EXISTING FENCE TO REMAIN

PROPOSED 9.0m WIDE DOUBLE SWING SITE ACCESS GATE PER DETAIL ON DRAWING C-500

EXISTING TREED AREA TO REMAIN

POTENTIAL BEDROCK OUTCROP LOCATION

EXISTING TREED AREA TO BE CLEARED, GRUBBED AND REMOVED OFF SITE PER OPSS 201

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 DETAILSS ON DRAWING C-500)

TEMPORARY LAYDOWN AREA TOPSOIL REMOVAL AS REQUIRED AREA TO BE RESTORED WITH TOPSOIL AND SEED POST CONSTRUCTION

WETLAND LIMIT

10m WETLAND SETBACK LIMIT NO TOUCH ZONE

EXISTING VEGETATION TO REMAIN UNDISTURBED

TREE CLEARING TO BE LIMITED TO PROVIDE ADEQUATE CONSTRUCTION AREA & TO PROVIDE ELECTRICAL SAFETY CLEARANCES 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.

DETAIL-1
CULVERT REMOVAL
SCALE 1:750

KEY MAP
N.T.S.

BLOCK A

BARRET RD, CENTREVILLE RD, LOCKRIDGE RD, CENTREVILLE RD, RATTIE RD, HINCH RD, HINCH RD

Xref: \BLOCKS\lidar note.dwg

NOTE:

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Notes

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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.
12. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
13. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
14. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
15. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
16. ALL SEEDING TO BE COMPLETED IN ACCORDANCE WITH OPSS 804.
17. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED	EXISTING
	FENCE
	EX. CONTOUR 295.5
	LIDAR CONTOUR 184.5
	TREE LINE
	EX. WETLAND LIMIT
	NO TOUCH LIMIT
	EXISTING TREED AREA TO BE CLEARED, GRUBBED AND DISPOSED OF OFF-SITE
	TOPSOIL CLEARING LIMITS
	REMOVALS
	OVERLAND FLOW DIRECTION
	POTENTIAL ROCK OUTCROP LOCATION

B.	ISSUED FOR TENDER	MALM	DS	18.01.16
A.	ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-DP-BLOCK_A.dwg	KC	DS	KC	17.11.28
	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 A
EXISTING CONDITIONS, CLEARING, GRUBBING AND FENCING PLAN

Project No.	Scale	
133560220	1:2000	0 20 60 100m
Drawing No.	Sheet	Revision
C-051	1 of 1	A

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2018/01/16 7:25 PM By: AMAgboola, Mohamed

ORIGINAL SHEET - ARCH D

NOISE WALL CAN BE TEMPORARILY REMOVED FOR POST CONSTRUCTION ACCESS TO INVERTER STATIONS.

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.)

NOTE:

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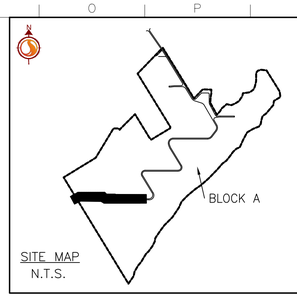
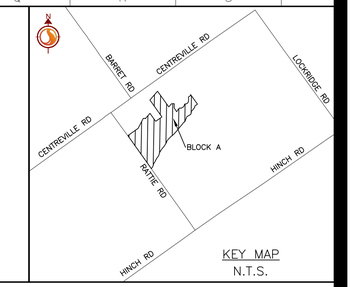
THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE STORM WATER MANAGEMENT PLAN DATED JANUARY 16, 2018.

FOR ACCESS ROAD TYPICAL CROSS-SECTION REFER TO DRAWING C-500.

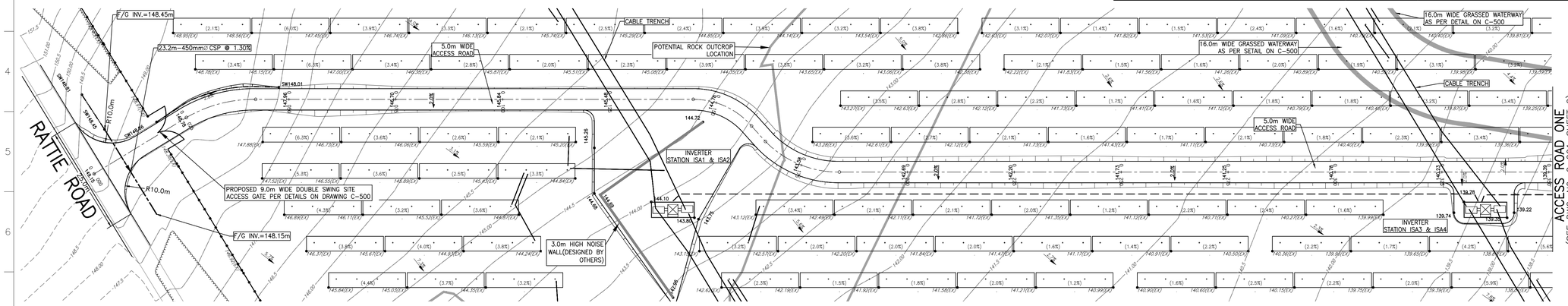
REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS AND DETAIL OF TRENCHING



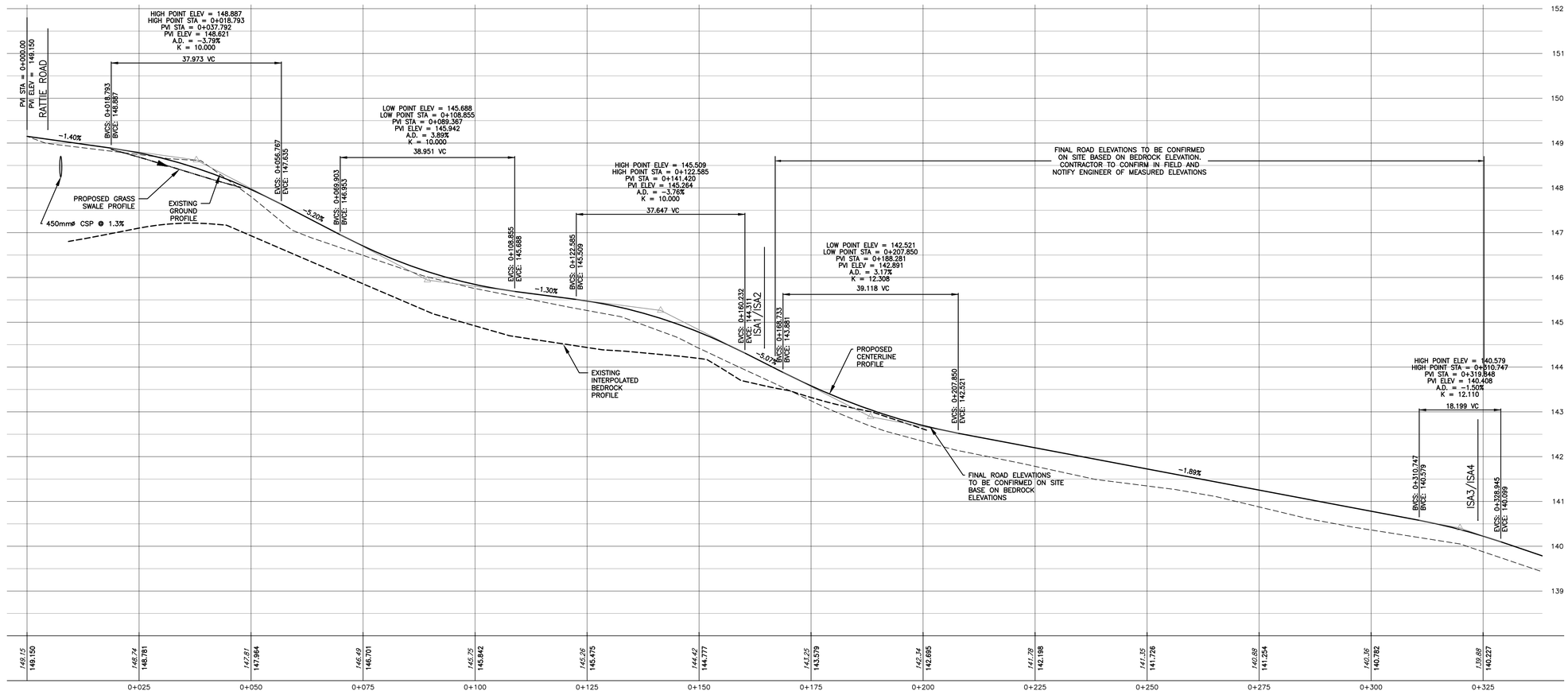
SITE MAP
N.T.S.



KEY MAP
N.T.S.



BLOCK A – ACCESS ROAD ONE



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PCL CONSTRUCTION LEADERS

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Legend

PROPOSED	EXISTING
187.00 ELEVATION	185.19 (EX)
FENCE	
EX. CONTOUR	185.0
LIDAR CONTOUR	184.5
TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
PROPOSED FILL AREA	
TREE LINE	
2.0% GRADE	
SWALE	
CULVERT	
EXISTING INTERPOLATED BEDROCK	
SLOPE (3:1 UNLESS NOTED OTHERWISE)	
ROCK SPREADER SWALE	
AC CABLE TRENCH	
DC CABLE TRENCH	
POTENTIAL ROCK OUTCROP LOCATION	
HARDENED SURFACE	
GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
ROCK CHECK DAM (RCD)	
DIVERSION BERM	

Revision	By	Appd.	YY.MM.DD
B. ISSUED FOR TENDER	MALM	DS	18.01.16
A. ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21

File Name: 133560220_C-ST-BLOCK_A.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	KC	DS	KC	17.11.09

Permit-Seal

Client/Project

LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title

BLOCK A ACCESS ROAD ONE
PLAN & PROFILE
STA 0+000 - 0+325

Project No.	Scale		
133560220	1:500H 0 5 15 25m 1:50V 0 0.5 1.5 2.5m		
Drawing No.	Sheet		Revision
C-201	1 of 7		A

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2018/01/16 7:29 PM By: Al-Hajjaj, Mohamed

ORIGINAL SHEET - ARCH D

NOISE WALL CAN BE TEMPORARILY REMOVED FOR POST CONSTRUCTION ACCESS TO INVERTER STATIONS

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.)

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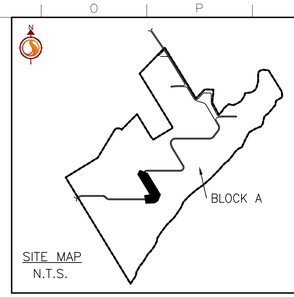
REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS AND DETAIL OF TRENCHING



SITE MAP
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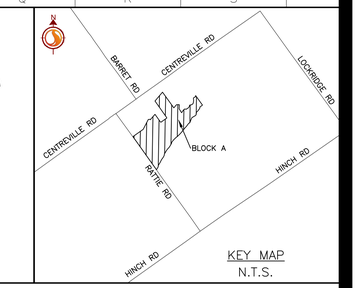
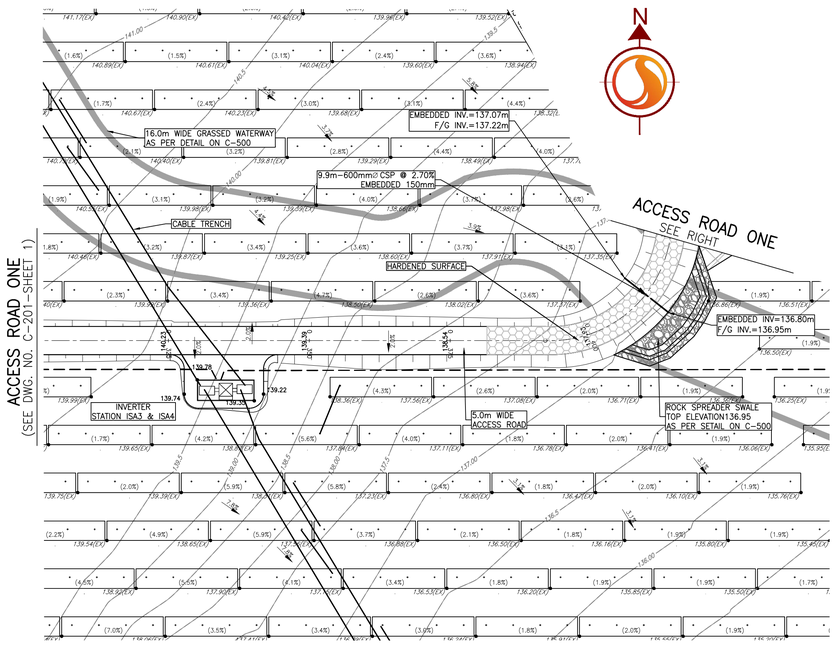


KEY MAP
N.T.S.



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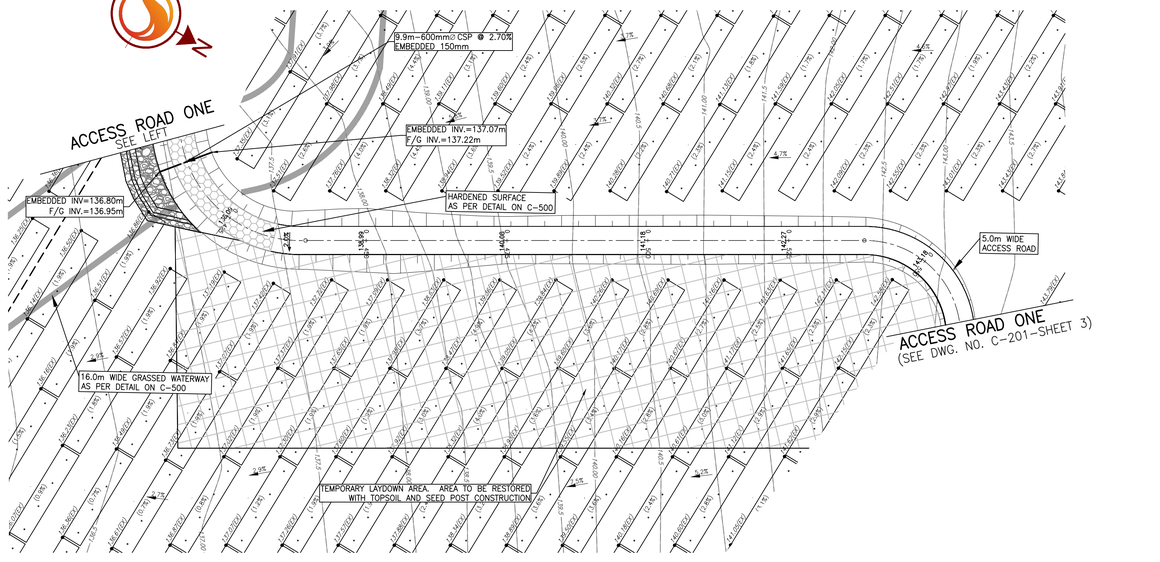

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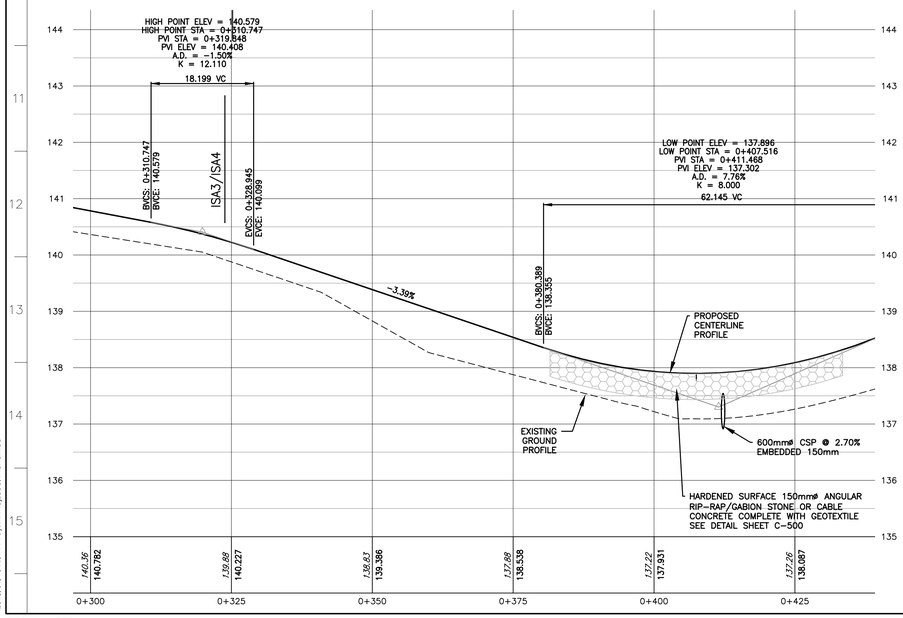

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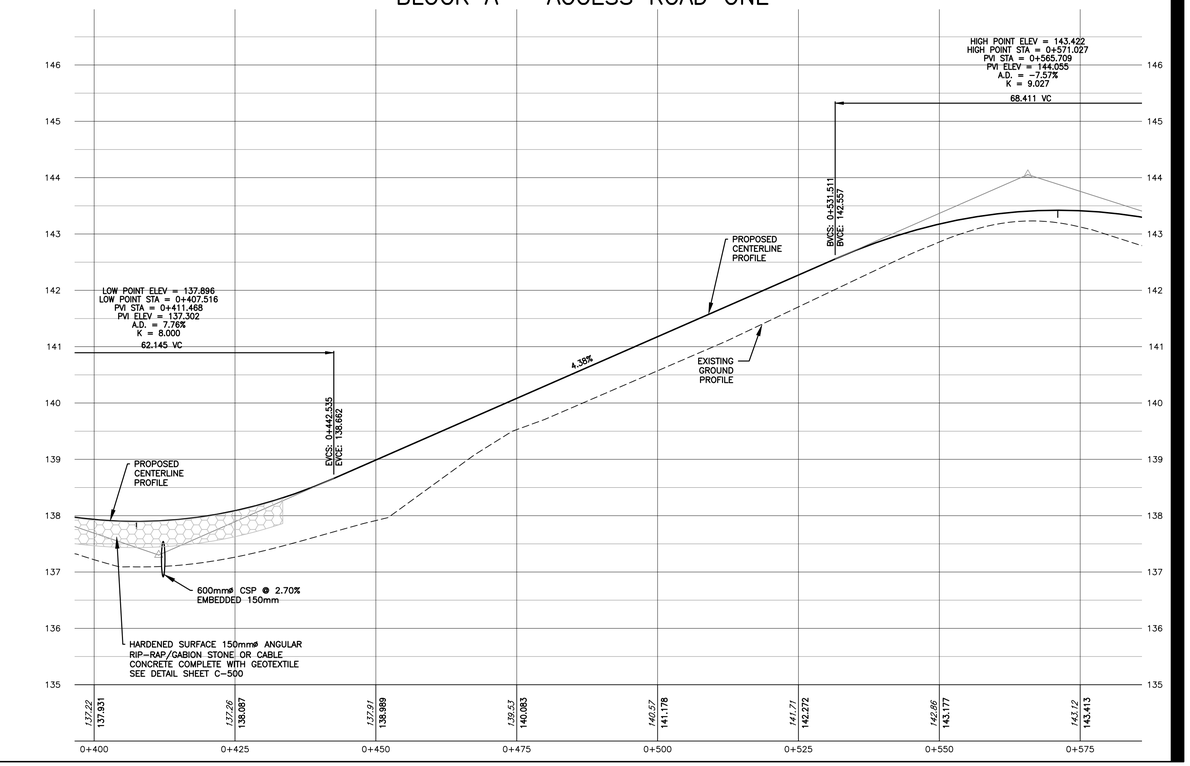

Legend

PROPOSED	EXISTING
187.00 ELEVATION	185.19 (EX)
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LIDAR CONTOUR	184.5
TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
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POTENTIAL ROCK OUTCROP LOCATION	
HARDENED SURFACE	
GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
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DIVERSION BERM	

Revision	By	Appd.	
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A. ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21

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Permit-Seal

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County of Lennox and Addington, Ontario

Title
BLOCK A ACCESS ROAD ONE
PLAN & PROFILE
STA. 0+325 -0+575

Project No.	Scale	
133560220	1:500H 0 5 15 25m 1:50V 0 0.5 1.5 2.5m	
Drawing No.	Sheet	Revision
C-201	2 of 7	A

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2018/01/16 7:31 PM By: AMajstorski, Mohamed

ORIGINAL SHEET - ARCH D

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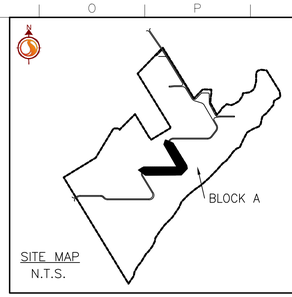

SITE MAP
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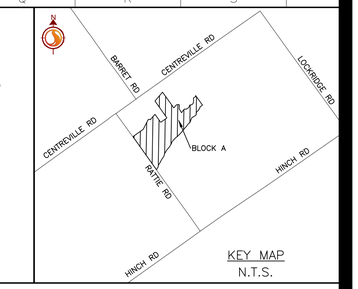
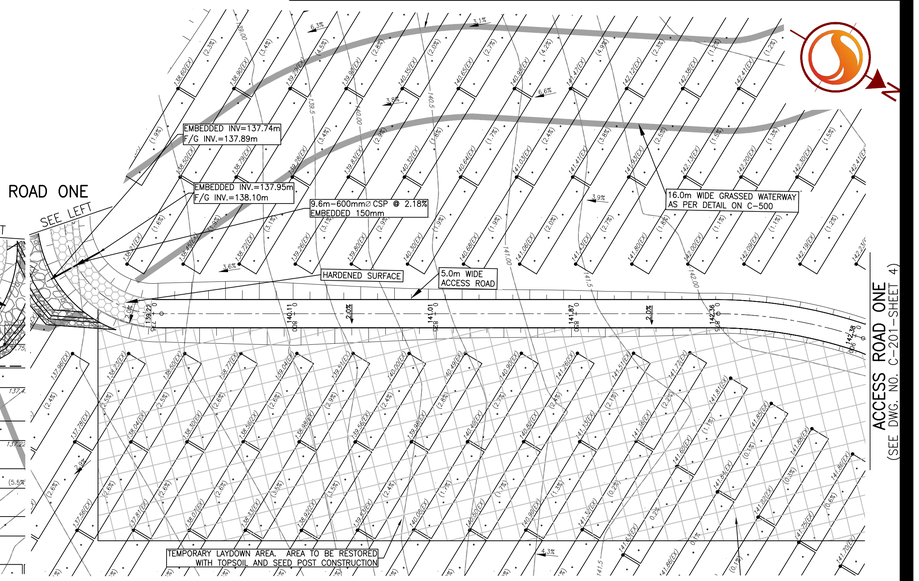


KEY MAP
N.T.S.

BLOCK A – ACCESS ROAD ONE



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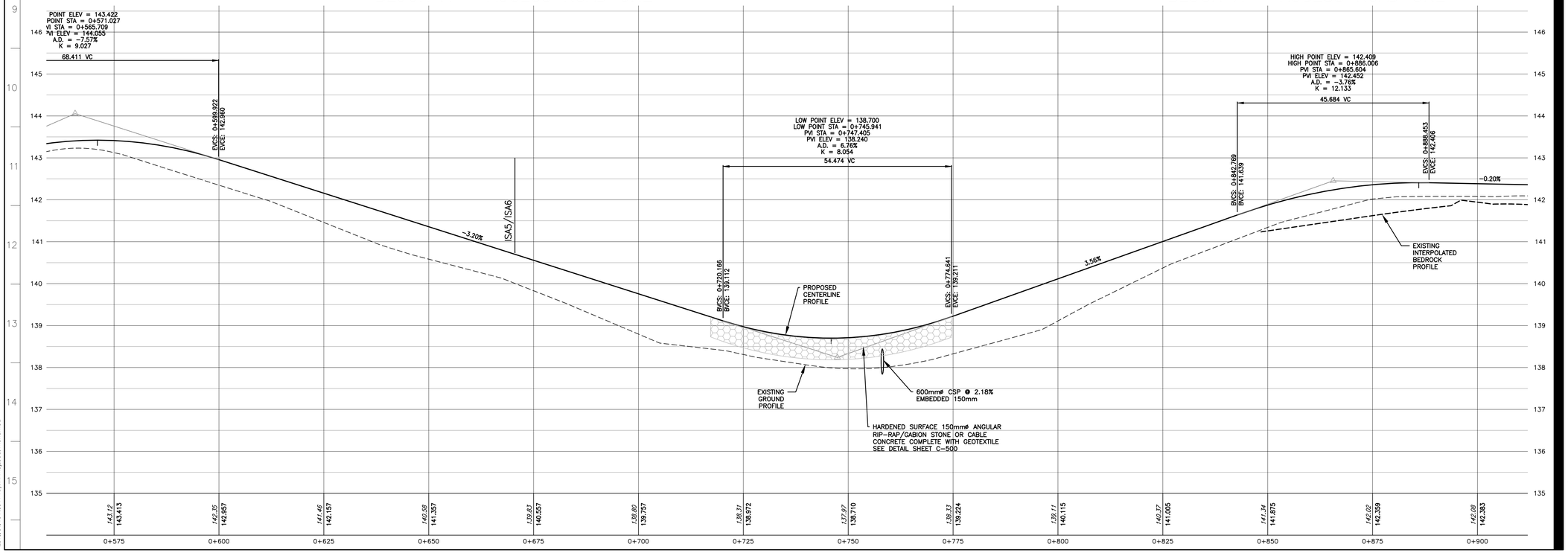

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187.00	ELEVATION	185.19 (EX)
	FENCE	
	EX. CONTOUR	185.0
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Revision	By	Appd.	YY.MM.DD
B. ISSUED FOR TENDER	MALM	DS	18.01.16
A. ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21

File Name: 133560220_C-ST-BLOCK_A.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	KC	DS	KC	17.11.09

Permit-Seal

Client/Project

LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title

BLOCK A ACCESS ROAD ONE
PLAN & PROFILE
STA. 0+575 - 0+900

Project No.	Scale	
133560220	1:500H	0 5 15 25m
	1:50V	0 0.5 1.5 2.5m
Drawing No.	Sheet	Revision
C-201	3 of 7	A

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2018/01/16 7:53 PM By: AAhlqvist, Mohamed

ORIGINAL SHEET - ARCH D

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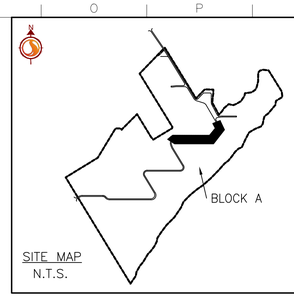
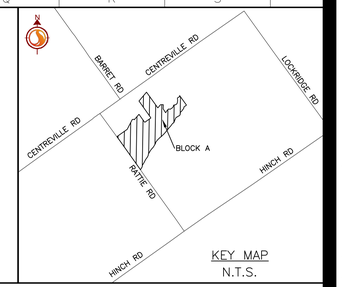
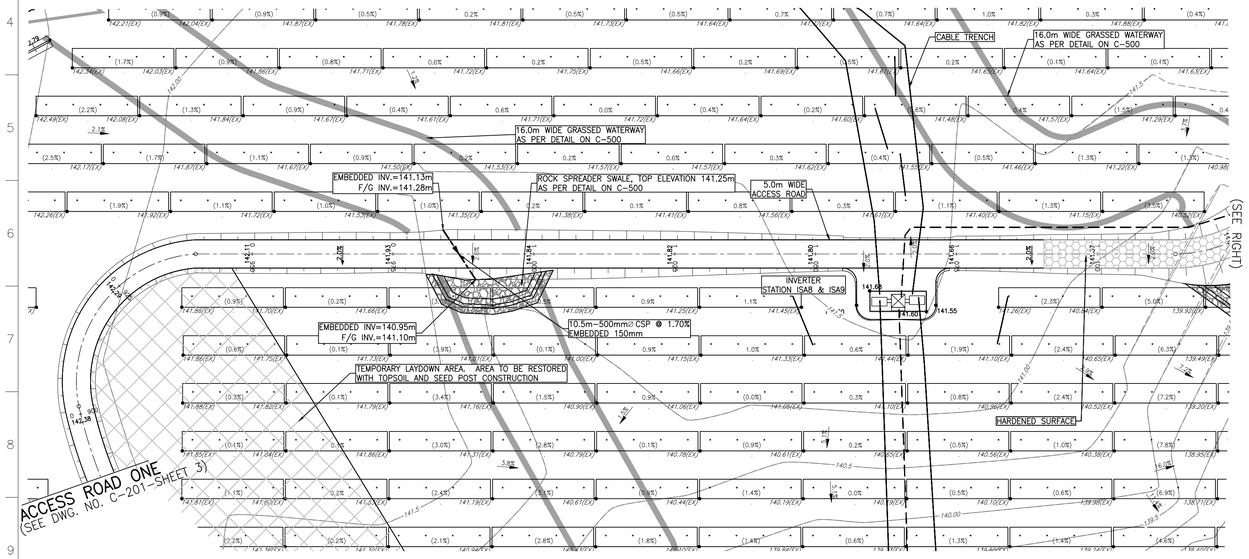
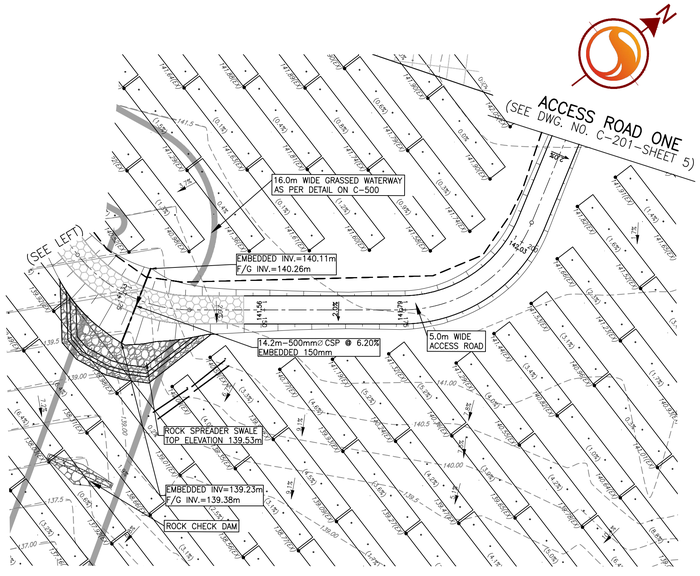


SITE MAP
N.T.S.

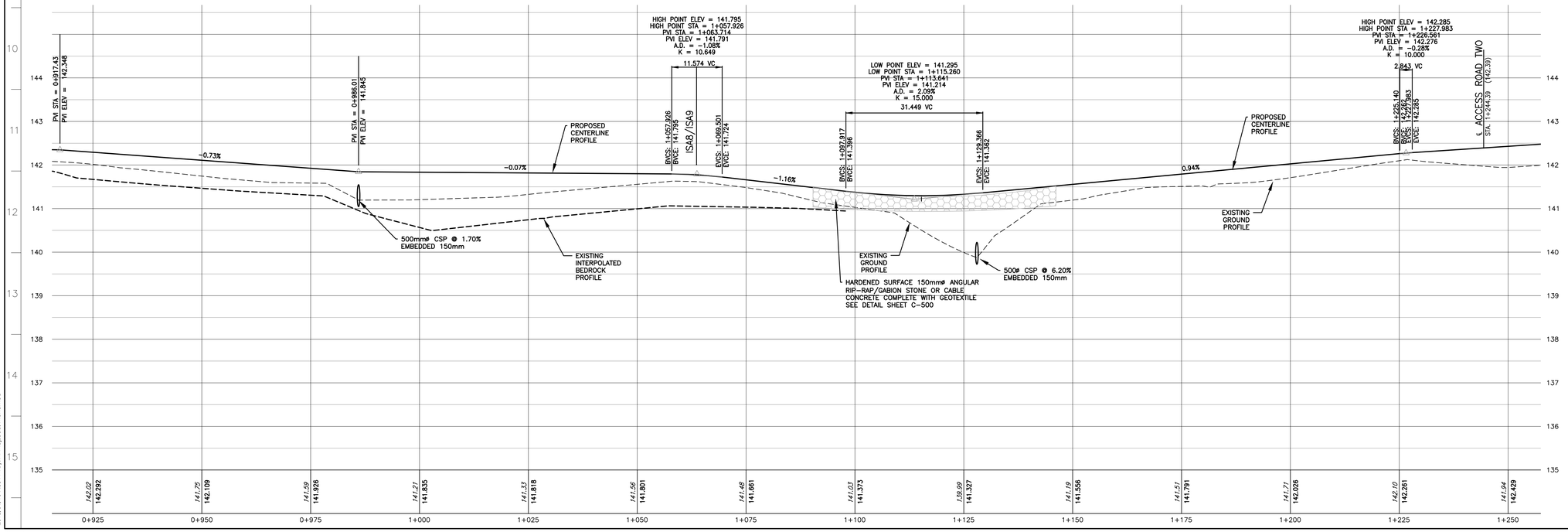


KEY MAP
N.T.S.





BLOCK A – ACCESS ROAD ONE



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2018/01/16 7:33 PM BY: AHAGBOLA, MOHAMED

ORIGINAL SHEET - ARCH D

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Legend

PROPOSED	EXISTING
187.00	185.19 (EX) — ELEVATION
	FENCE
	185.0 — EX. CONTOUR
	184.5 — LIDAR CONTOUR
	TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)
	PROPOSED FILL AREA
	TREE LINE
2.0%	GRADE
	SWALE
	CULVERT
	EXISTING INTERPOLATED BEDROCK
	SLOPE (3:1 UNLESS NOTED OTHERWISE)
	ROCK SPREADER SWALE
	AC CABLE TRENCH
	DC CABLE TRENCH
	POTENTIAL ROCK OUTCROP LOCATION
	HARDENED SURFACE
	GRASSED WATERWAY (SEE C-500 FOR DETAILS)
	ROCK CHECK DAM (RCD)
	DIVERSION BERM

Revision	By	Appd.	YY.MM.DD
B. ISSUED FOR TENDER	MALM	DS	18.01.16
A. ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21

File Name: 133560220_C-ST-BLOCK_A.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	KC	DS	KC	17.11.09

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK A ACCESS ROAD ONE
PLAN & PROFILE
STA. 0+925 - 1+225

Project No. 133560220

Scale 1:500H 0 5 15 25m; 1:50V 0 0.5 1.5 2.5m

Drawing No. C-201

Sheet 4 of 7

Revision A

NOISE WALL CAN BE TEMPORARILY REMOVED FOR POST CONSTRUCTION ACCESS TO INVERTER STATIONS

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.)

NOTE:

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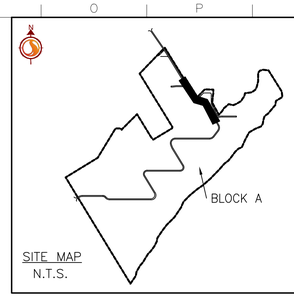
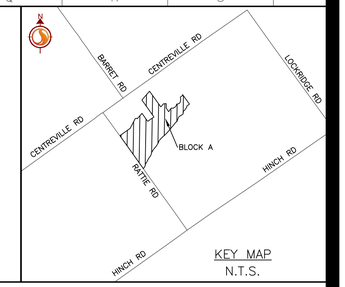
FOR ACCESS ROAD TYPICAL CROSS-SECTION REFER TO DRAWING C-500.

REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS OF TRENCHING



SITE MAP
N.T.S.



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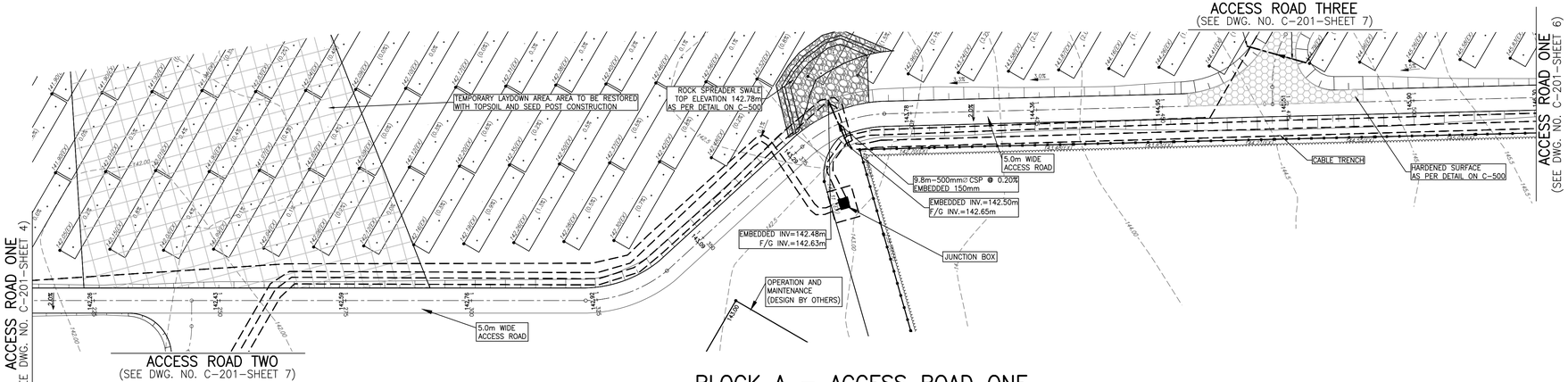
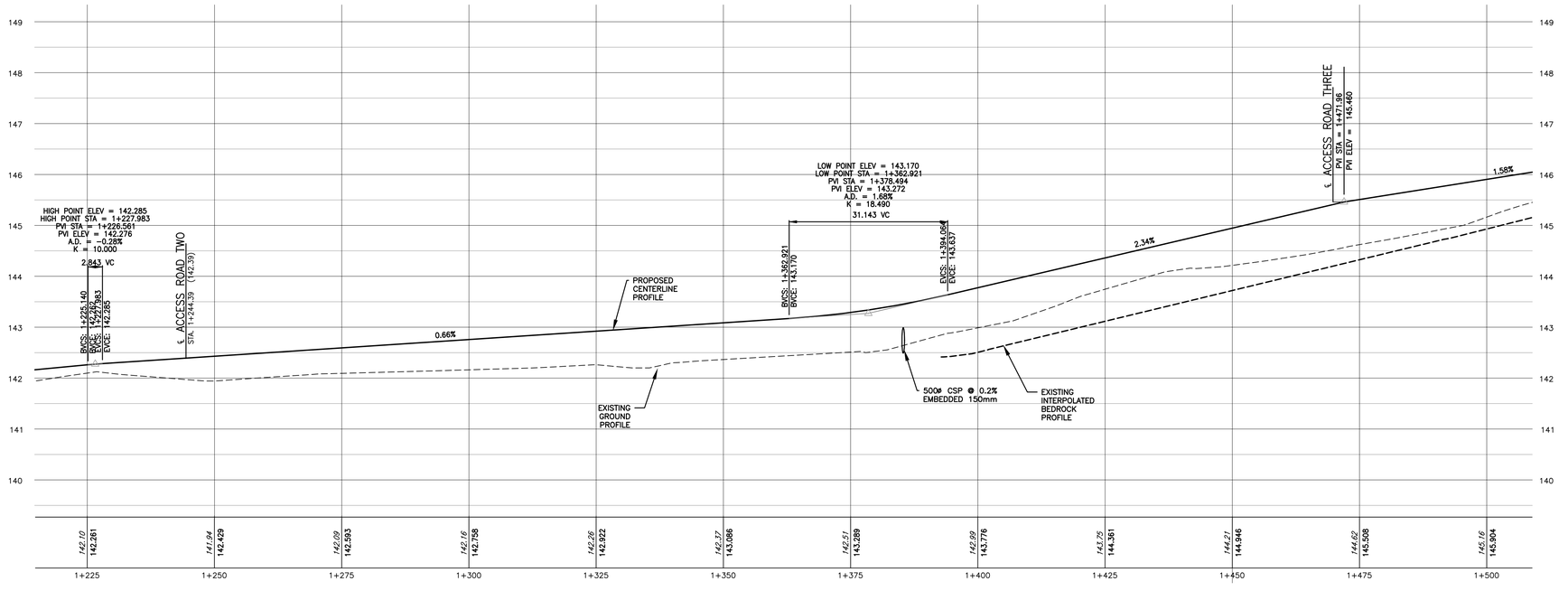


BLOCK A – ACCESS ROAD ONE



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Legend

PROPOSED		EXISTING
87.00	ELEVATION	185.19 (EX)
	FENCE	
	EX. CONTOUR	185.0
	LIDAR CONTOUR	184.5
	TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
	PROPOSED FILL AREA	
	TREE LINE	
2.0%	GRADE	
	SWALE	
	CULVERT	
	EXISTING INTERPOLATED BEDROCK	
	SLOPE (3:1 UNLESS NOTED OTHERWISE)	
	ROCK SPREADER SWALE	
	AC CABLE TRENCH	
	DC CABLE TRENCH	
	POTENTIAL ROCK OUTCROP LOCATION	
	HARDENED SURFACE	
	GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
	ROCK CHECK DAM (RCD)	
	DIVERSION BERM	

B.	ISSUED FOR TENDER	MALM	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-ST-BLOCK_A.dwg	KC	DS	KC	17.11.09
	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 A ACCESS ROAD ONE
PLAN & PROFILE
STA. 1+225 - 1+575

Project No. 133560220

Scale 1:500H 0 5 15 25m; 1:50V 0 0.5 1.5 2.5m

Drawing No. C-201

Sheet 5 of 7

Revision A

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2018/01/16 7:39 PM By: AHMEDOUB, Mohamed

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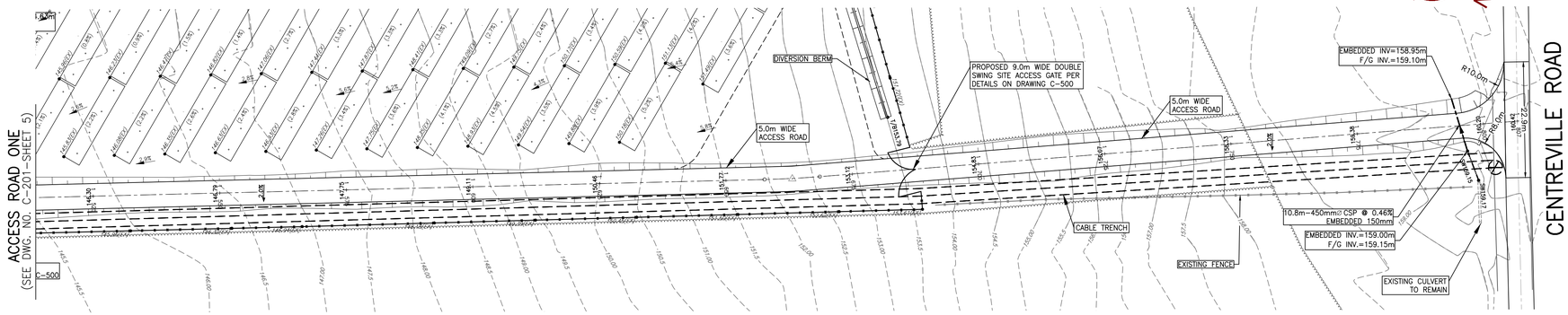
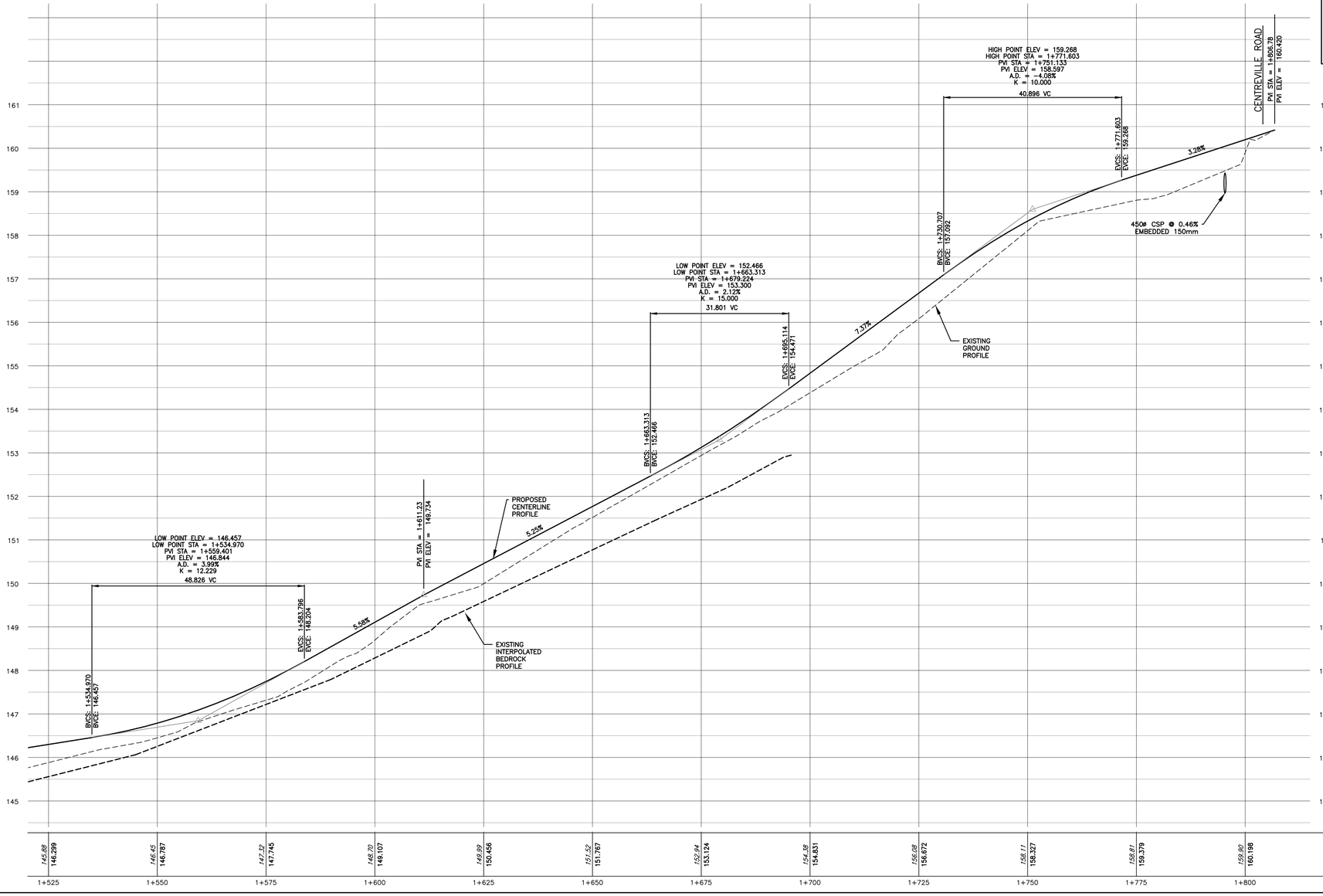
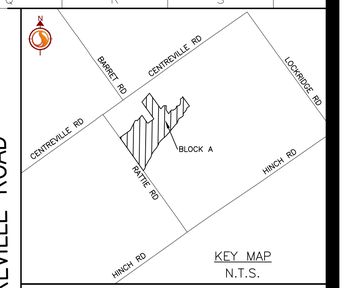


BLOCK A – ACCESS ROAD ONE





KEY MAP
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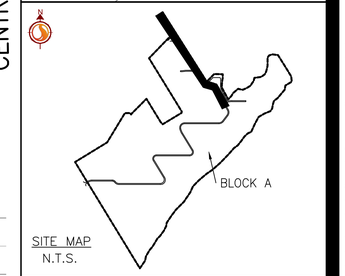

SITE MAP
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Legend

PROPOSED		EXISTING
187.00	ELEVATION	185.19 (EX)
	FENCE	
	EX. CONTOUR	185.0
	LIDAR CONTOUR	184.5
	TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
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	DIVERSION BERM	

Revision	By	Appd.	YY.MM.DD
B. ISSUED FOR TENDER	MALM	DS	18.01.16
A ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21

File Name: 133560220_C-ST-BLOCK_A.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	KC	DS	KC	17.11.09

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK A ACCESS ROAD ONE
PLAN & PROFILE
STA 1+525 TO 1+800

Project No. 133560220

Scale 1:500H 1:50V

Drawing No. C-201

Sheet 6 of 7

Revision A

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2018/01/16 7:37 PM By: AlMajbob, Mohamed

ORIGINAL SHEET - ARCH D

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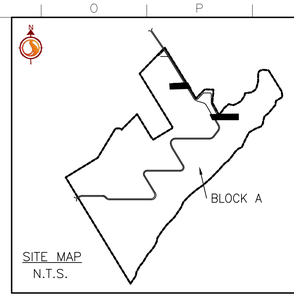

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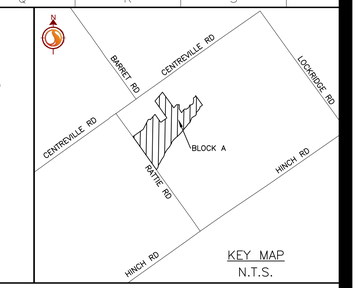

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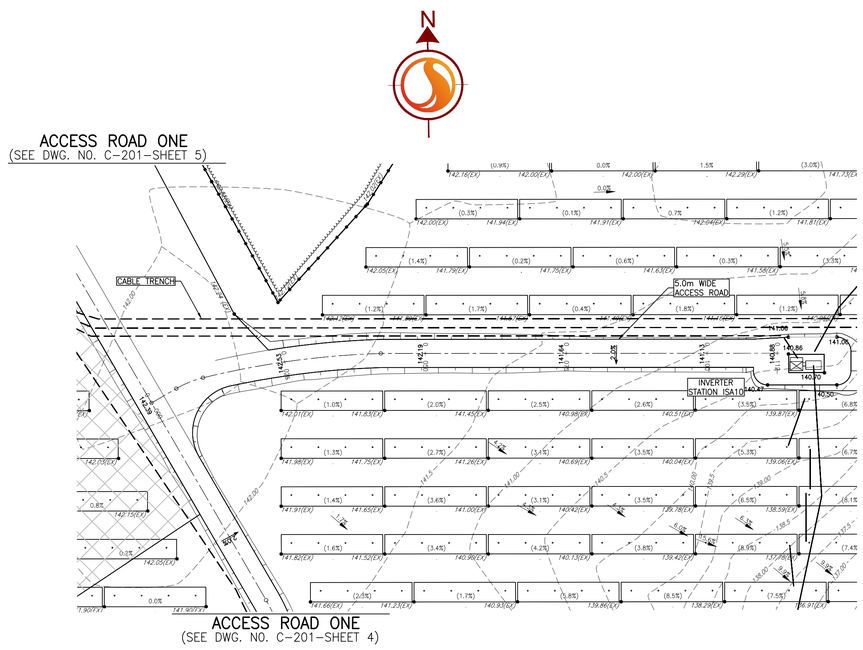
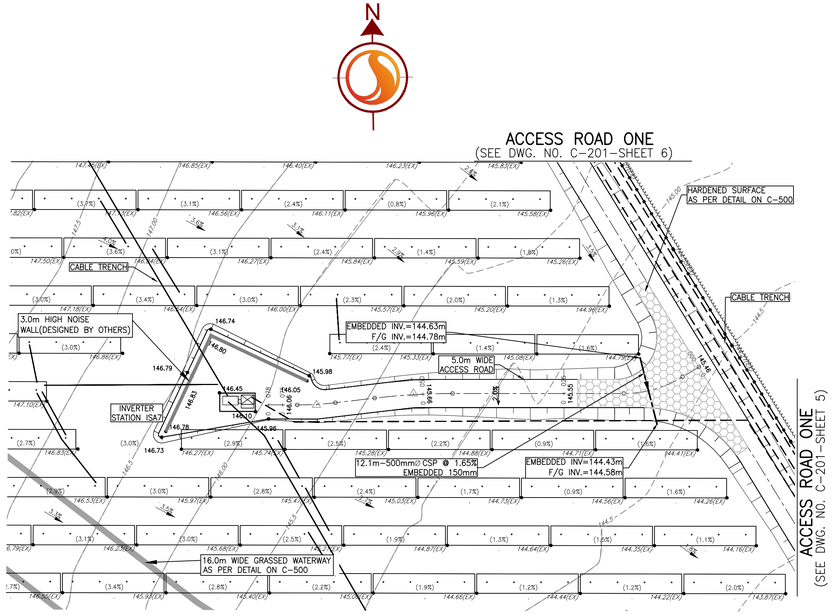
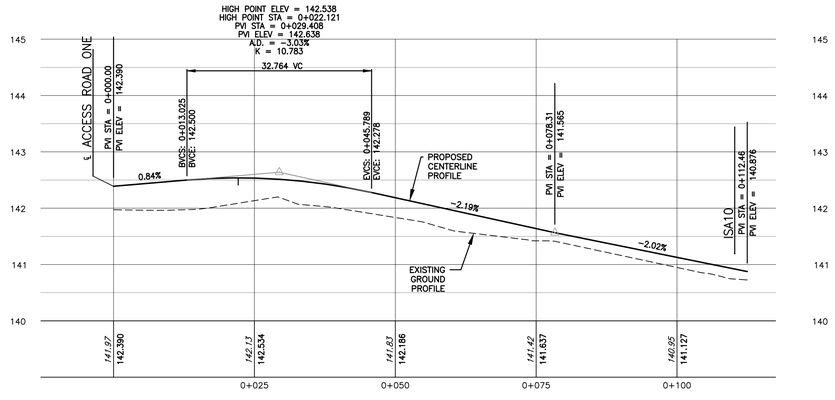
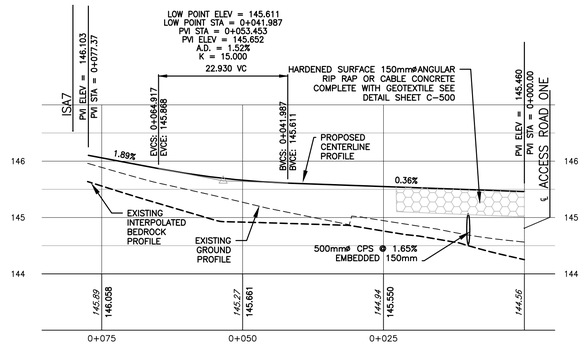


BLOCK A – ACCESS ROAD TWO



BLOCK A – ACCESS ROAD THREE





BLOCK A – ACCESS ROAD TWO & THREE
PLAN & PROFILE
STA. 0+000 - 0+113 & 0+000 - 0+078

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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 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.
12. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
13. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
14. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
15. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
16. ALL SEEDING TO BE COMPLETED IN ACCORDANCE WITH OPSS 804.
17. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED		EXISTING
187.00	ELEVATION	185.19 (EX)
	FENCE	
	EX. CONTOUR	185.0
	LIDAR CONTOUR	184.5
	TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
	PROPOSED FILL AREA	
	TREE LINE	
2.0%	GRADE	
	SWALE	
	CULVERT	
	EXISTING INTERPOLATED BEDROCK	
	SLOPE (3:1 UNLESS NOTED OTHERWISE)	
	ROCK SPREADER SWALE	
	AC CABLE TRENCH	
	DC CABLE TRENCH	
	POTENTIAL ROCK OUTCROP LOCATION	
	HARDENED SURFACE	
	GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
	ROCK CHECK DAM (RCD)	
	DIVERSION BERM	

Revision		By	Appd.	YY.MM.DD
B.	ISSUED FOR TENDER	MALM	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21

File Name: 133560220_C-ST-BLOCK_A.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	KC	DS	KC	17.11.09

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK A ACCESS ROAD TWO & THREE
PLAN & PROFILE
STA. 0+000 - 0+113 & 0+000 - 0+078

Project No. 133560220

Scale 1:500H 0 5 15 25m; 1:50V 0 0.5 1.5 2.5m

Drawing No. C-201

Sheet 7 of 7

Revision A

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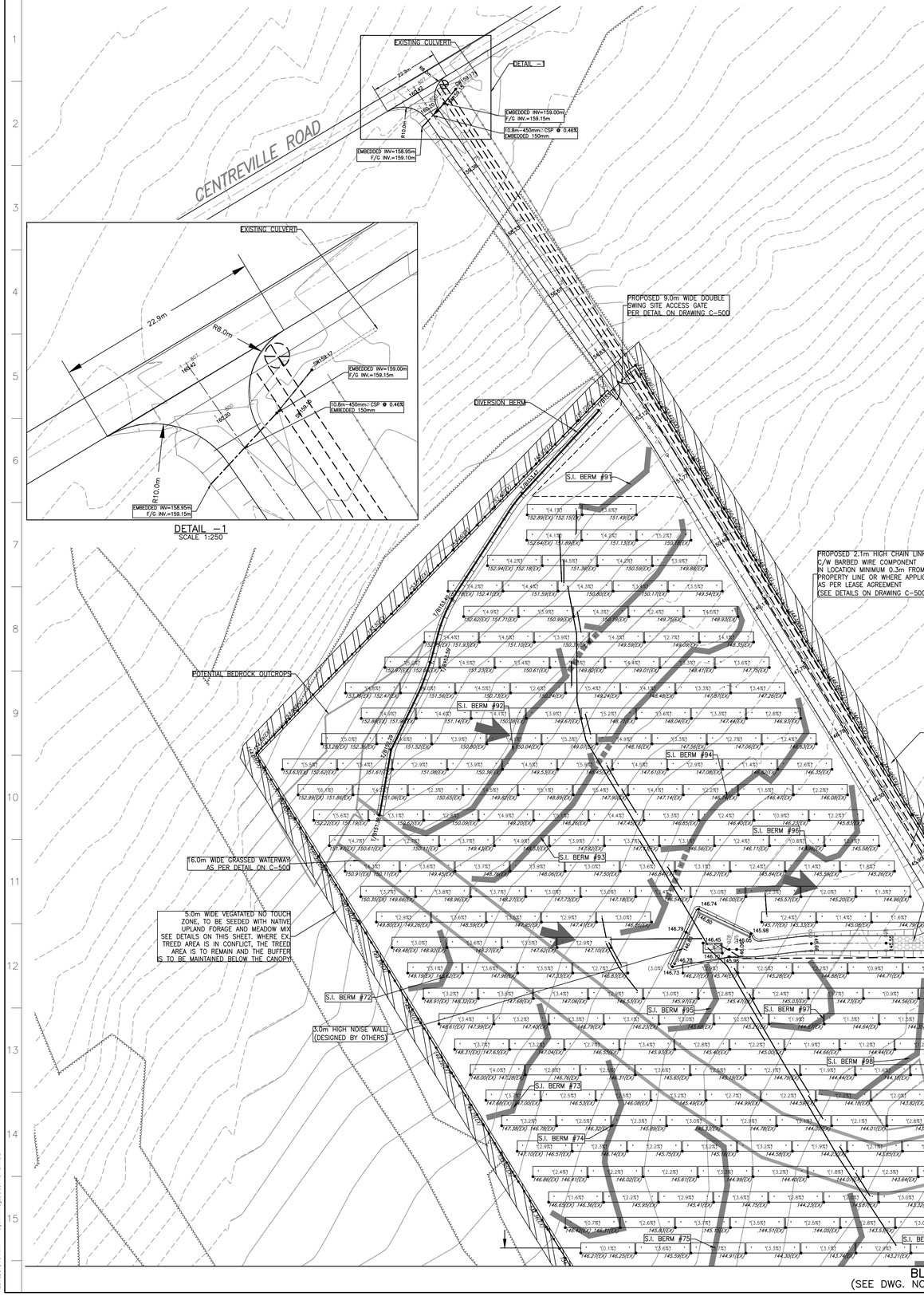
ORIGINAL SHEET - ARCH D



SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	178.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.8	145.8
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	108.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	103.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

NOTE:
LIDAR HAS BEEN USED TO ILLUSTRATE EXTERNAL SITE DRAINAGE PATTERN. CONTRACTOR IS RESPONSIBLE TO REVIEW ONSITE ELEVATIONS PRIOR TO COMMENCEMENT OF ANY WORK ONSITE AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER OF RECORD

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE STORM WATER MANAGEMENT PLAN. DATED JANUARY 16, 2018

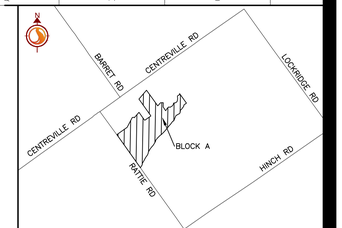
GRADING NOTE:
FOR SLOPE INTERRUPTION BERMS SEE GRADING TABLE ON THIS PAGE AND DETAILS ON SHEET C–500 FOR GRADING & CONSTRUCTION DETAILS

REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS AND DETAIL OF TRENCHING

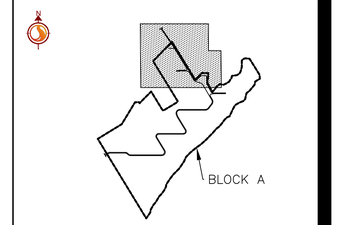
EXISTING EXPOSED BEDROCK FRACTURE INFILLING TO BE MINIMIZED IF REQUIRED, FILL TO BE OF COARSE GRANULAR MATERIAL. REFER TO HYDROGEOLOGICAL ASSESSMENT (2017, HARDEN ENVIRONMENTAL SERVICES LTD.)

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS IS 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.

2.0% (2.0%)
EAST FACING TABLE WEST FACING TABLE
TABLE SLOPING DETAIL
NTS



KEY MAP
N.T.S.



SITE MAP
N.T.S.

N

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10. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
11. 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.
12. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
13. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
14. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
15. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B–B.
16. ALL SEEDING TO BE COMPLETED IN ACCORDANCE WITH OPSS 804.
17. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED / EXISTING

- ELEVATION 167.00 / 165.19(EX)
- FENCE
- EX. CONTOUR 185.0
- LIDAR CONTOUR 184.5
- TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)
- 5.0M WIDE VEGETATIVE BUFFER
- TREE LINE
- GRADE 2.0%
- SWALE
- CULVERT
- SLOPE (3:1 UNLESS NOTED OTHERWISE)
- ROCK SPREADER SWALE
- AC CABLE TRENCH
- DC CABLE TRENCH
- POTENTIAL BEDROCK OUTCROPS
- TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK
- OVERLAND FLOW DIRECTION
- SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET C–500)
- GRASSED WATERWAY (SEE C–500 FOR DETAILS)
- DIVERSION BERM
- HARDENED SURFACE
- ROCK CHECK DAM

B. ISSUED FOR TENDER	MALM	DS	18.01.16
A. ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21
Revision	By	Appd.	YY.MM.DD
File Name: 133560220_C-GP-BLOCK_A.dwg	KC	DS	KC	17.11.09
	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 A
GRADING PLAN

Project No.	Scale	Sheet	Revision
133560220	1:750 (0, 7.5, 22.5, 37.5m)		
Drawing No.			
C-401		1 of 6	A

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2018/01/16 7:41 PM By: AAmajoud, Mohamed

ORIGINAL SHEET - ARCH D

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	179.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.8
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	123.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

NOTE:
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GRADING NOTE:
FOR SLOPE INTERRUPTION BERMS SEE GRADING TABLE ON THIS PAGE AND DETAILS ON SHEET C-500 FOR GRADING & CONSTRUCTION DETAILS

2.0% (2.0%)
EAST FACING TABLE WEST FACING TABLE
TABLE SLOPING DETAIL
NTS

REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS DETAIL 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.)

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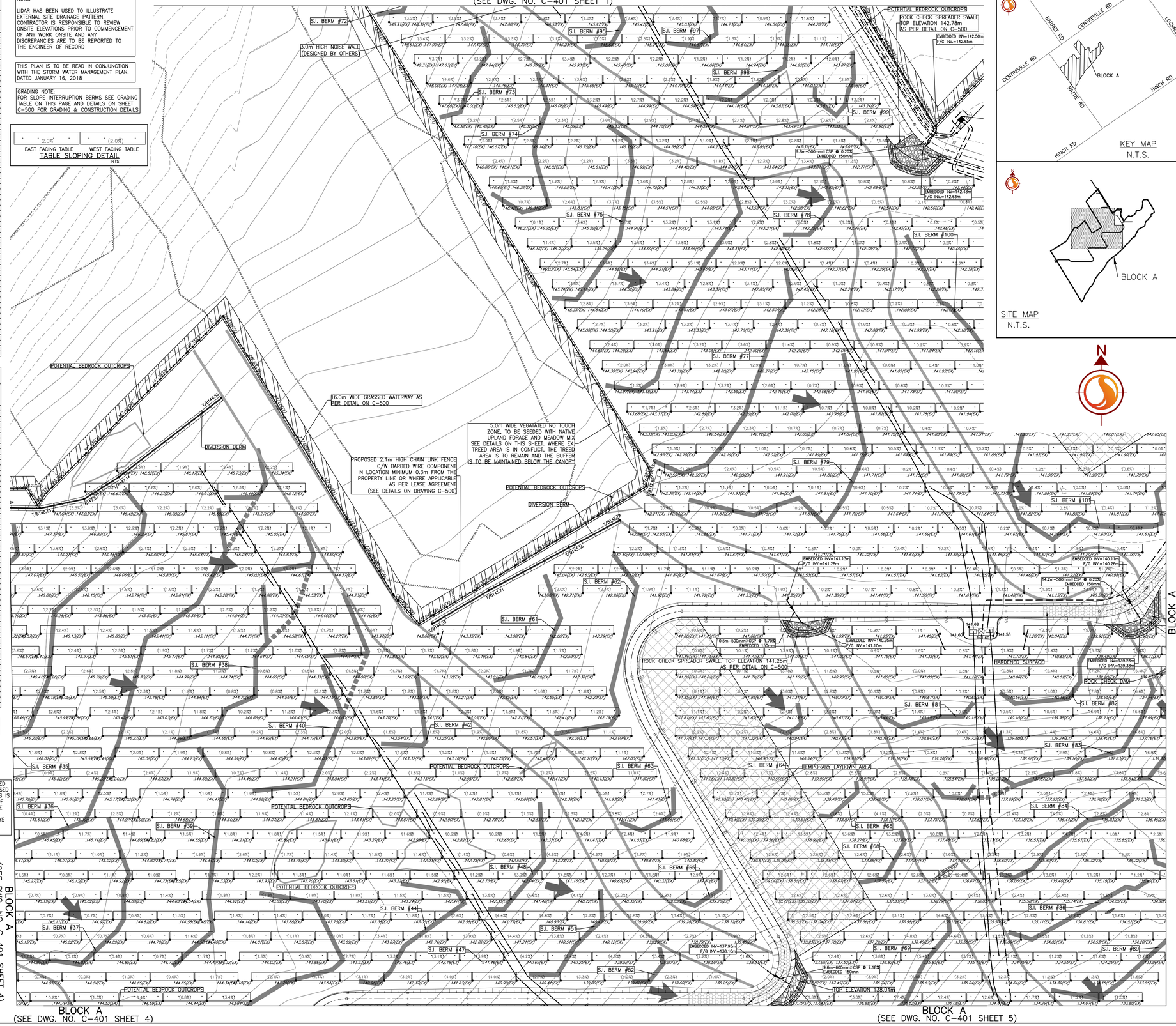

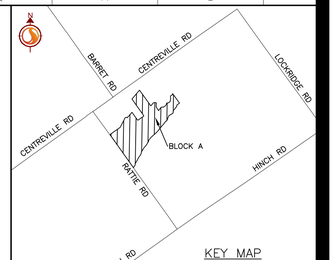

KEY MAP
N.T.S.

SITE MAP
N.T.S.

N

Legend

PROPOSED 187.00	EXISTING 185.19(EX)
ELEVATION	
FENCE	
EX. CONTOUR	185.0
LIDAR CONTOUR	184.5
TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
5.0M WIDE VEGETATIVE BUFFER	
TREE LINE	
2.0% GRADE	
SWALE	
CULVERT	
SLOPE (3:1 UNLESS NOTED OTHERWISE)	
ROCK SPREADER SWALE	
AC CABLE TRENCH	
DC CABLE TRENCH	
POTENTIAL BEDROCK OUTCROPS	
TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK	
OVERLAND FLOW DIRECTION	
SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET C-500)	
GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
DIVERSION BERM	
HARDENED SURFACE	
ROCK CHECK DAM	

B.	ISSUED FOR TENDER	MALM	DS 18.01.16
A.	ISSUED FOR CLIENT REVIEW	KC	DS 17.12.21
Revision		By	Appd. YY.MM.DD

File Name: 133560220_C-GP-BLOCK_A.dwg KC Dwn. DS Chkd. KC Dsgn. 17.11.09 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 A
GRADING PLAN

Project No. 133560220
Scale 1:750 (0, 7.5, 22.5, 37.5m)
Drawing No. C-401
Sheet 2 of 6
Revision A

Stantec
Stantec Consulting Ltd.
300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com
PCL CONSTRUCTION LEADERS

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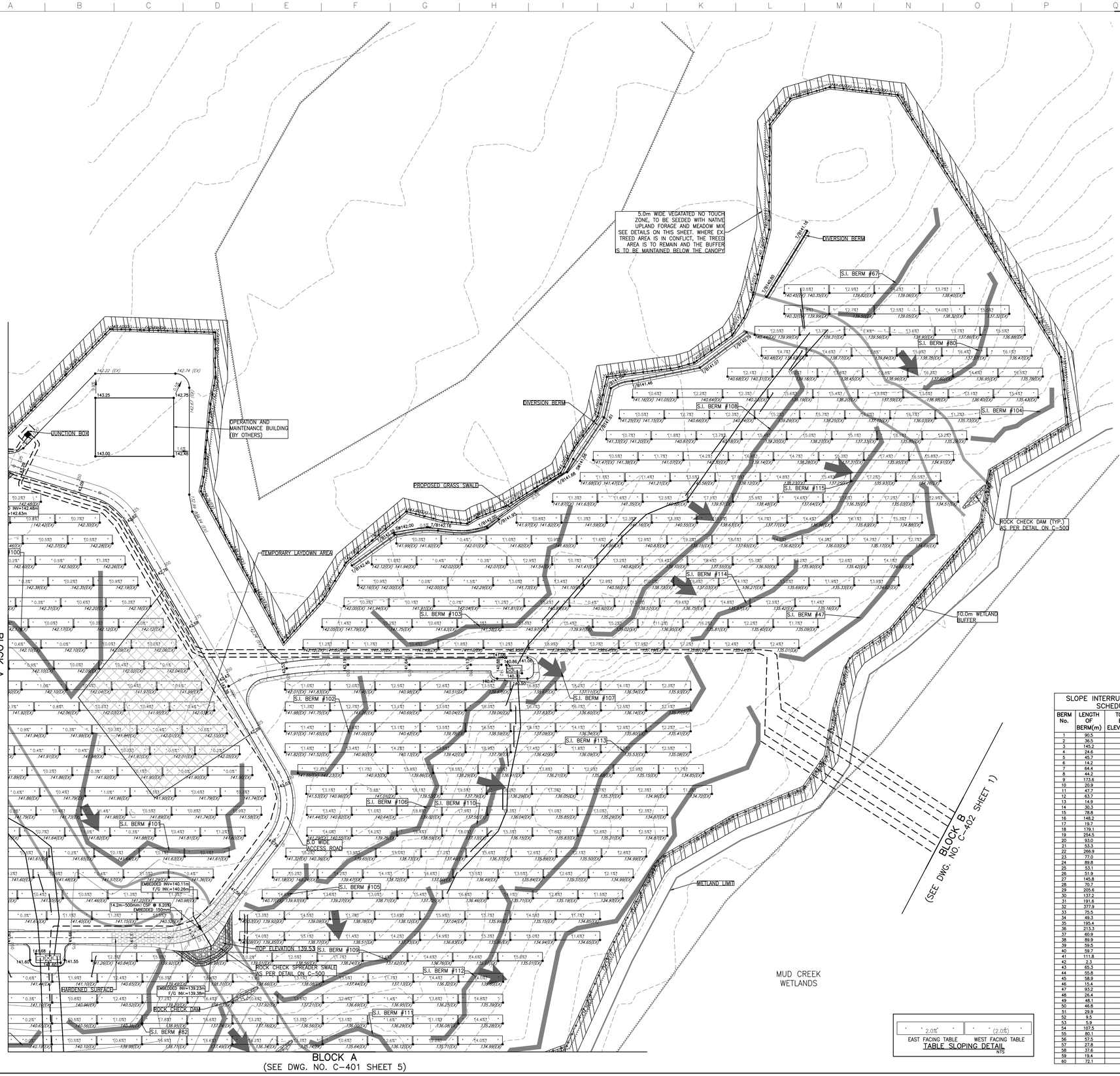
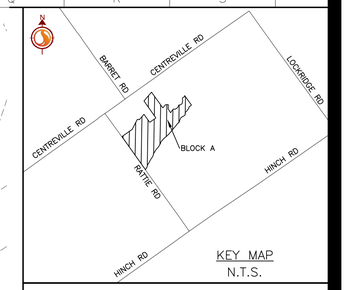
7. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY.
8. THE CONTRACTOR IS TO BE RESPONSIBLE FOR ALL DRAINAGE AND MEASURES TO CONTROL WATER. THE SITE IS TO BE FINE GRADED/LEVELED LEAVING THE SITE IN A NEAT APPEARANCE SUCH THAT POSITIVE DRAINAGE IS ACHIEVED EVERYWHERE PRIOR TO THE INSTALLATION OF SOLAR PANELS.
9. CONSTRUCTION TURNING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
10. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
11. 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.
12. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
13. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL 'A' TO BE USED IN ACCORDANCE WITH OPSS 1010.
14. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
15. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
16. ALL SEEDING TO BE COMPLETED IN ACCORDANCE WITH OPSS 804.
17. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

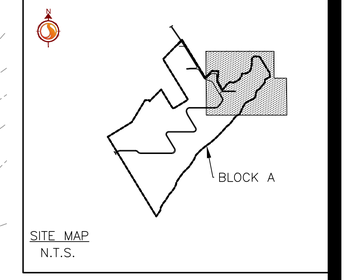
V:\01814\active\133560220\design\drawing_file\civil_block_A\sheet_files\133560220_C-GP-BLOCK_A.dwg
2018/01/16 7:42 PM By: Mahboob, Mohamed

ORIGINAL SHEET - ARCH D





KEY MAP
N.T.S.



SITE MAP
N.T.S.

NOTE:
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2.0% (2.0%)
EAST FACING TABLE WEST FACING TABLE
TABLE SLOPING DETAIL
NTS

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	179.1	140.9	140.9
19	254.5	140.1	140.1
20	83.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	48.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	123.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

Stantec

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Legend

PROPOSED		EXISTING
167.00	ELEVATION	165.19(EX)
	FENCE	
	EX. CONTOUR	185.0
	LIDAR CONTOUR	184.5
	TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
	5.0M WIDE VEGETATIVE BUFFER	
	TREE LINE	
2.0%	GRADE	
	SWALE	
	CULVERT	
	SLOPE (3:1 UNLESS NOTED OTHERWISE)	
	ROCK SPREADER SWALE	
	AC CABLE TRENCH	
	DC CABLE TRENCH	
	POTENTIAL BEDROCK OUTCROPS	
	TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK	
	OVERLAND FLOW DIRECTION	
	SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET C-500)	
	GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
	DIVERSION BERM	
	HARDENED SURFACE	
	ROCK CHECK DAM	

B.	ISSUED FOR TENDER	MALM	DS	18.01.16
A.	ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-GP-BLOCK_A.dwg	KC	DS	KC	17.11.09
	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 A
GRADING PLAN

Project No.	Scale				
133560220	1:750	0	7.5	22.5	37.5m
Drawing No.	Sheet		Revision		
C-401	3 of 6		A		

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ORIGINAL SHEET - ARCH D

SLOPE INTERRUPTION BERM SCHEDULE			
BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	179.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	73.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	28.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE			
BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	204.4	152.3	152.3
92	134.4	150.7	150.7
93	133.9	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	21.4	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	46.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

NOTE:
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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 AND DETAIL 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.)

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS IS 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.

2.0%	(2.0%)
EAST FACING TABLE	WEST FACING TABLE

TABLE SLOPING DETAIL
NTS

BLOCK A
(SEE DWG. NO. C-401 SHEET 2)

BLOCK A
(SEE DWG. NO. C-401 SHEET 5)

BLOCK A
(SEE DWG. NO. C-401 SHEET 6)

DIVERSION BERM

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)

6.0m WIDE GRASSED WATERWAY AS PER DETAIL ON C-500

5.0m WIDE VEGATATED NO TOUCH ZONE, TO BE SEEDED WITH NATIVE UPLAND FORAGE AND MEADOW MIX SEE DETAILS ON THIS SHEET. WHERE EX. TREED AREA IS IN CONFLICT, THE TREED AREA IS TO REMAIN AND THE BUFFER IS TO BE MAINTAINED BELOW THE CANOPY

PROPOSED 9.0m WIDE DOUBLE SWING SITE ACCESS GATE PER DETAIL ON DRAWING C-500

450mmø CSP CONTRACTOR TO FIELD FIT CULVERT AND DITCH TO BE REGRADED TO ACCOMMODATE POSITIVE DRAINAGE

3.0m HIGH NOISE WALL (DESIGNED BY OTHERS)

5.0 WIDE ACCESS ROAD

S.I. BERM #1
S.I. BERM #2
S.I. BERM #3
S.I. BERM #4
S.I. BERM #5
S.I. BERM #6
S.I. BERM #7
S.I. BERM #8
S.I. BERM #9
S.I. BERM #10
S.I. BERM #11
S.I. BERM #12
S.I. BERM #13
S.I. BERM #14
S.I. BERM #15
S.I. BERM #16
S.I. BERM #17
S.I. BERM #19
S.I. BERM #22
S.I. BERM #26
S.I. BERM #34
S.I. BERM #35
S.I. BERM #36
S.I. BERM #37
S.I. BERM #38
S.I. BERM #39
S.I. BERM #40
S.I. BERM #41
S.I. BERM #43
S.I. BERM #45
S.I. BERM #46
S.I. BERM #47
S.I. BERM #49
S.I. BERM #50
S.I. BERM #53
S.I. BERM #54

POTENTIAL BEDROCK OUTCROPS

TEMPORARY LAYDOWN AREA

HARDENED SURFACE

ROCK CHECK SPREADER SWALE AS PER DETAIL ON C-500

EMBEDDED INV=137.07m
F/G INV.=137.22m

EMBEDDED INV=136.80m
F/G INV.=136.95m

900mm CSP @ 2.0%
EMBEDDED 150mm

TOP ELEVATION

RATTIE ROAD

SW148.0

SW148.5

SW148.6

SW148.7

SW148.8

SW148.9

SW149.0

SW149.1

SW149.2

SW149.3

SW149.4

SW149.5

SW149.6

SW149.7

SW149.8

SW149.9

SW150.0

SW150.1

SW150.2

SW150.3

SW150.4

SW150.5

SW150.6

SW150.7

SW150.8

SW150.9

SW151.0

SW151.1

SW151.2

SW151.3

SW151.4

SW151.5

SW151.6

SW151.7

SW151.8

SW151.9

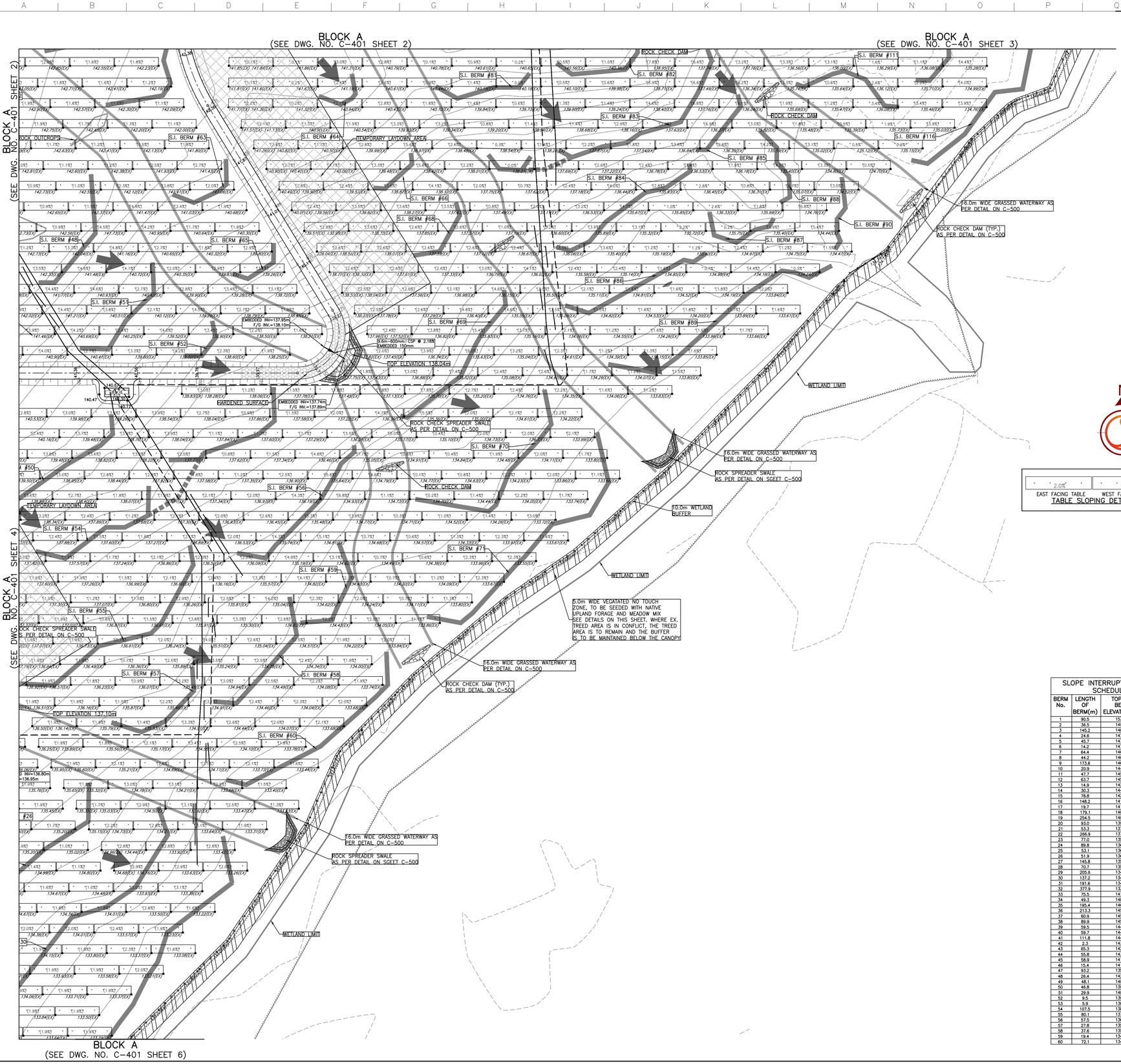
SW152.0

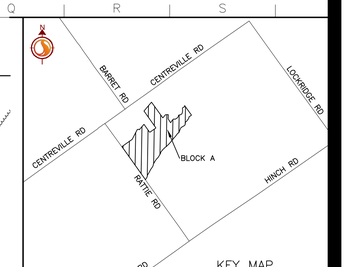
SW152.1

SW152.2

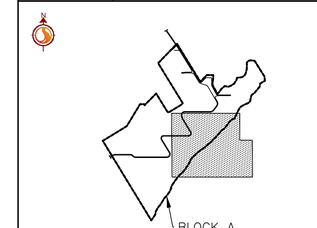
SW152.3

SW152.4





KEY MAP
N.T.S.



SITE MAP
N.T.S.

EAST FACING TABLE (2.0%) WEST FACING TABLE
TABLE SLOPING DETAIL
NTS

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	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	179.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.6	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	123.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

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 AND RECEIVED OCTOBER 24, 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.
2. EXISTING VEGETATION INFORMATION IS APPROXIMATE, PROVIDED FROM AERIAL IMAGERY. CONTRACTOR TO CONFIRM ALL TREE & SHRUB LOCATION ON SITE.
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THIS SET PREPARED BY STANTEC CONSULTING LTD.
4. 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.
5. 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).
6. 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.
7. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY.
8. 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.
9. CONSTRUCTION TURNING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
10. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
11. ALL AREAS WITHIN THE PROPOSED LIMITS OF 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.
12. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201.
13. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
14. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
15. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
16. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
17. ALL SEEDING TO BE COMPLETED IN ACCORDANCE WITH OPSS 804.
18. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED 187.00	EXISTING 185.19(EX)
ELEVATION	
FENCE	
EX. CONTOUR	185.0
LIDAR CONTOUR	184.5
TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
5.0M WIDE VEGETATIVE BUFFER	
TREE LINE	
2.0% GRADE	
SWALE	
CULVERT	
SLOPE (3:1 UNLESS NOTED OTHERWISE)	
ROCK SPREADER SWALE	
AC CABLE TRENCH	
DC CABLE TRENCH	
POTENTIAL BEDROCK OUTCROPS	
TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK	
OVERLAND FLOW DIRECTION	
SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET C-500)	
GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
DIVERSION BERM	
HARDENED SURFACE	
ROCK CHECK DAM	

B.	ISSUED FOR TENDER	MALM	DS	18.01.16
A.	ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-GP-BLOCK_A.dwg	KC	DS	KC	17.11.09
	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 A
GRADING PLAN

Project No. 133560220

Scale 1:750 (0 7.5 22.5 37.5m)

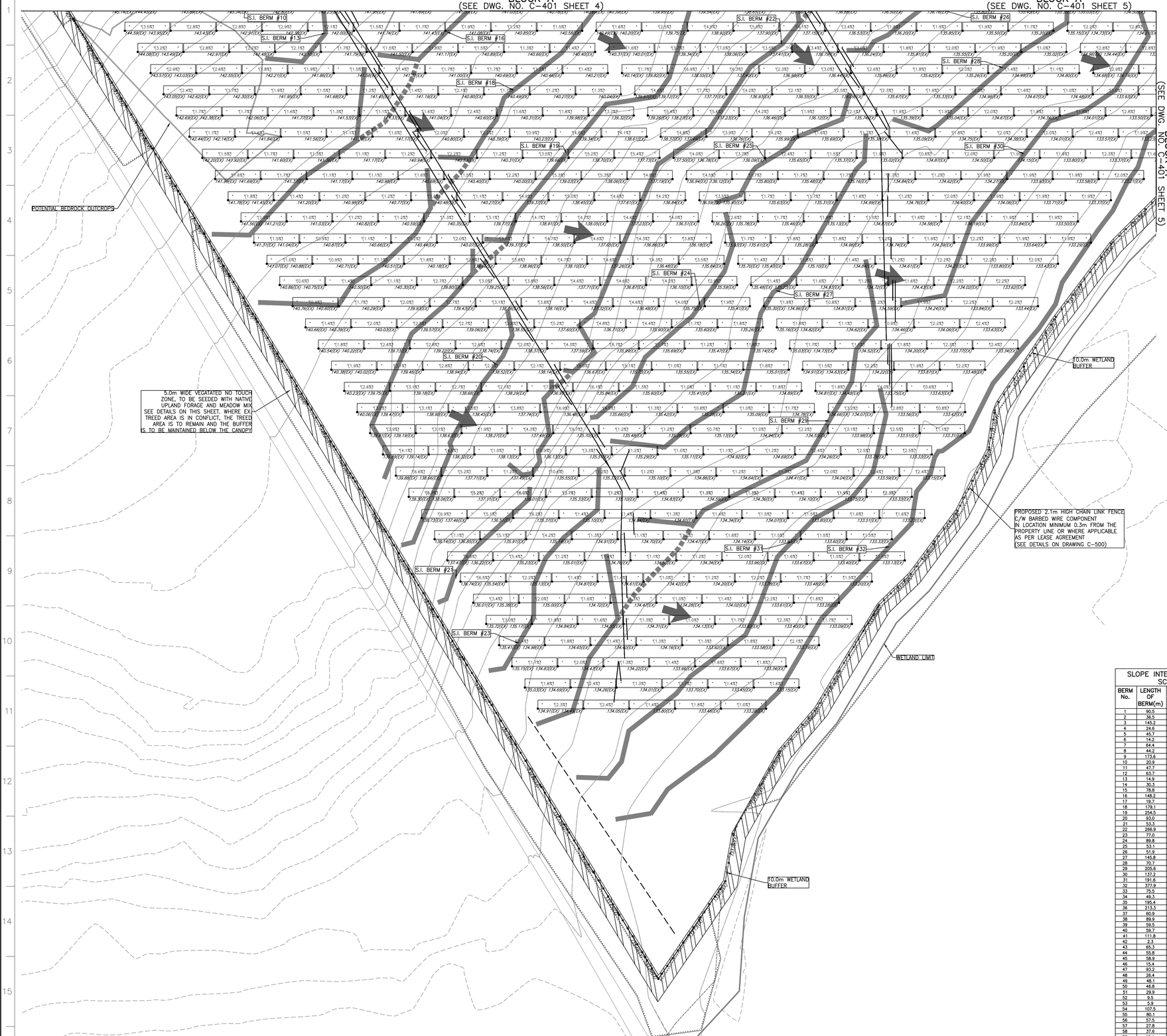
Drawing No. C-401

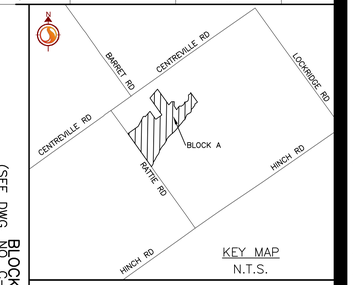
Sheet 5 of 6

Revision A

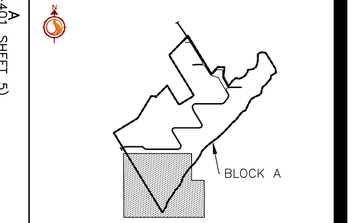
V:\01614\active\133560220\design\drawing\BA\civil_block_A\sheet_files\133560220_C-GP-BLOCK_A.dwg
2018/01/16 7:43 PM By: AHaqbacak, Mohamed

ORIGINAL SHEET - ARCH D





KEY MAP
N.T.S.



SITE MAP
N.T.S.

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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.)

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS IS 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.

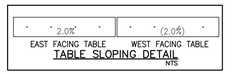

TABLE SLOPING DETAIL
NTS

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	179.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.8	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.0	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	82.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	123.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	130.3	130.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

Legend

PROPOSED 187.00	EXISTING 185.19(EX)
ELEVATION	
FENCE	
EX. CONTOUR	185.0
LIDAR CONTOUR	184.5
TEMPORARY LAYDOWN AREA (MATERIAL STRUCTURE TO BE DETERMINED ON SITE)	
5.0M WIDE VEGETATIVE BUFFER	
TREE LINE	
2.0% GRADE	
SWALE	
CULVERT	
SLOPE (3:1 UNLESS NOTED OTHERWISE)	
ROCK SPREADER SWALE	
AC CABLE TRENCH	
DC CABLE TRENCH	
POTENTIAL BEDROCK OUTCROPS	
TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK	
OVERLAND FLOW DIRECTION	
SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET C-500)	
GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
DIVERSION BERM	
HARDENED SURFACE	
ROCK CHECK DAM	

Notes

1. TOPOGRAPHIC INFORMATION CONDUCTED BY LESLIE M. HIGGINSON AND RECEIVED OCTOBER 24, 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.
2. EXISTING VEGETATION INFORMATION IS APPROXIMATE, PROVIDED FROM AERIAL IMAGERY. CONTRACTOR TO CONFIRM ALL TREE & SHRUB LOCATION ON SITE.
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THIS SET PREPARED BY STANTEC CONSULTING LTD.
4. 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.
5. 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).
6. 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.
7. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY.
8. 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.
9. CONSTRUCTION FENCING RADIUS LIMITS IDENTIFY AREAS WHERE ADDITIONAL ROAD WIDTH IS REQUIRED TO ALLOW FOR ADEQUATE CLEARANCE FOR CONSTRUCTION VEHICLES.
10. CULVERTS ARE TO BE INSTALLED AS PER OPSD 802.010. SOIL TYPE TO BE CONFIRMED ON SITE FOR DETERMINATION OF TRENCH WIDTH.
11. 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.
12. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
13. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
14. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
15. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
16. ALL SEEDING TO BE COMPLETED IN ACCORDANCE WITH OPSS 804.
17. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Revision	By	Appd.	YY.MM.DD
B. ISSUED FOR TENDER	MALM	DS	18.01.16
A. ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21

File Name: 133560220_C-GP-BLOCK_A.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	KC	DS	KC	17.11.09

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK A
GRADING PLAN

Project No. 133560220

Scale 1:750 (0, 7.5, 22.5, 37.5m)

Drawing No. C-401

Sheet 6 of 6

Revision A

Stantec
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www.stantec.com

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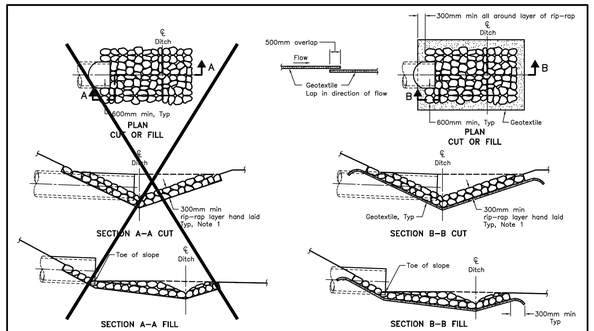
2018/01/16 7:54 PM By: AHMadzadi, Mohamed

ORIGINAL SHEET - ARCH D



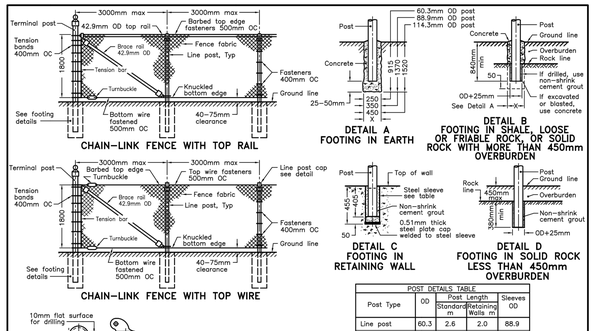
TYPE A – WITHOUT GEOTEXTILE

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



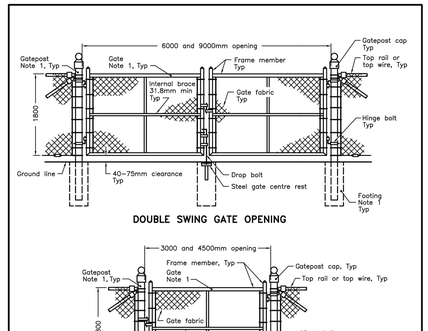
NOTE:
A Fence as viewed from the roadway.
B All dimensions are in millimetres unless otherwise shown.

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

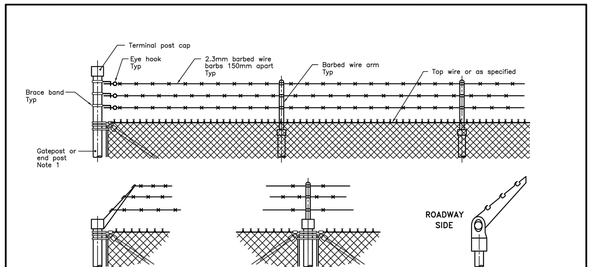
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2005	Rev 1
FENCE, CHAIN–LINK INSTALLATION – ROADWAY		
		OPSD – 972.130

* 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.

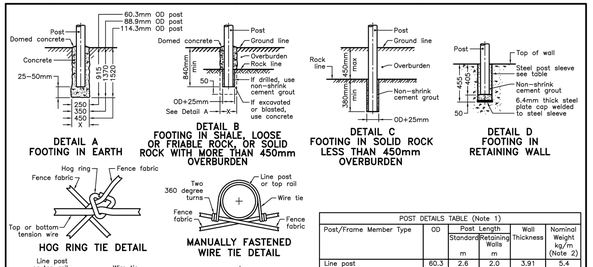
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 2
FENCE, CHAIN–LINK COMPONENT – GATE		
		OPSD 972.102



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.

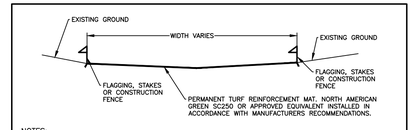


POST DETAILS TABLE (Note 1)

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

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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

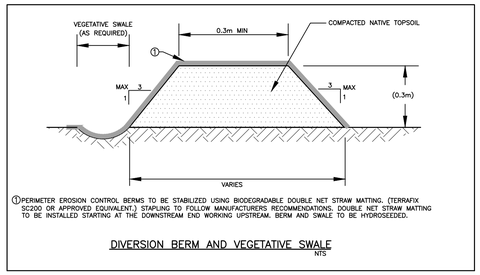
54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
GENERAL DETAILS AND NOTES

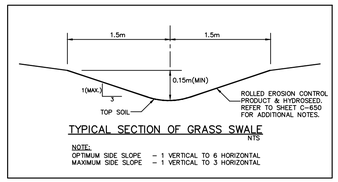
Project No.	Scale	
133560220	AS NOTED	
Drawing No.	Sheet	Revision
C-500	1 of 2	G

ORIGINAL SHEET - ARCH D



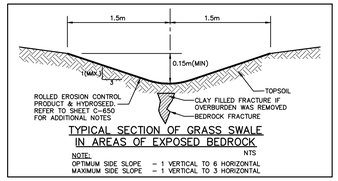
①PERIMETER EROSION CONTROL BERMS TO BE STABILIZED USING BIODEGRADABLE DOUBLE NET STRAW MATTING. (TERRAFIX SC200 OR APPROVED EQUIVALENT.) STAPLING TO FOLLOW MANUFACTURERS RECOMMENDATIONS. DOUBLE NET STRAW MATTING TO BE INSTALLED STARTING AT THE DOWNSTREAM END WORKING UPSTREAM. BERM AND SWALE TO BE HYDROSEEDED.

DIVERSION BERM AND VEGETATIVE SWALE
NTS



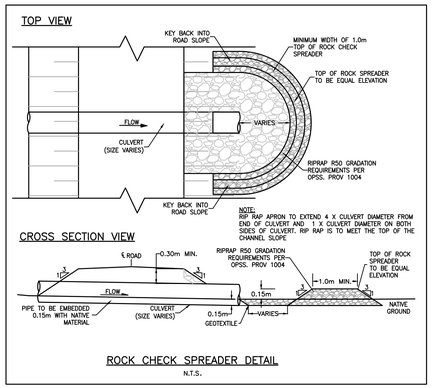
TYPICAL SECTION OF GRASS SWALE
NTS

NOTE:
OPTIMUM SIDE SLOPE – 1 VERTICAL TO 6 HORIZONTAL
MAXIMUM SIDE SLOPE – 1 VERTICAL TO 3 HORIZONTAL

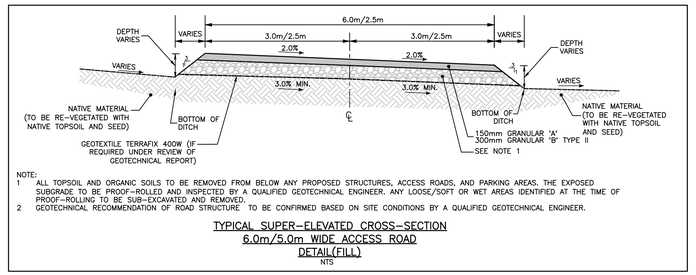


TYPICAL SECTION OF GRASS SWALE IN AREAS OF EXPOSED BEDROCK
NTS

NOTE:
OPTIMUM SIDE SLOPE – 1 VERTICAL TO 6 HORIZONTAL
MAXIMUM SIDE SLOPE – 1 VERTICAL TO 3 HORIZONTAL

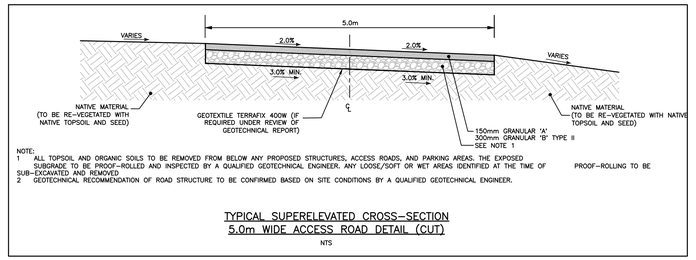


ROCK CHECK SPREADER DETAIL
N.T.S.



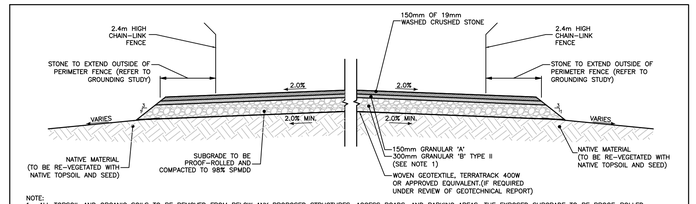
NOTE:
1 ALL TOPSOIL AND ORGANIC SOILS TO BE REMOVED FROM BELOW ANY PROPOSED STRUCTURES, ACCESS ROADS, AND PARKING AREAS. THE EXPOSED SUBGRADE TO BE PROOF-ROLLED AND INSPECTED BY A QUALIFIED GEOTECHNICAL ENGINEER. ANY LOOSE/SOFT OR WET AREAS IDENTIFIED AT THE TIME OF PROOF-ROLLING TO BE SUB-EXCAVATED 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



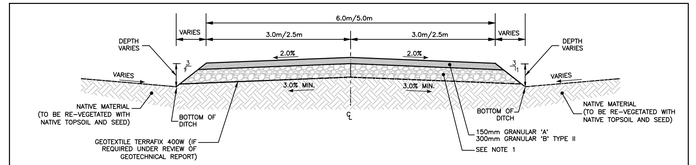
NOTE:
1 ALL TOPSOIL AND ORGANIC SOILS TO BE REMOVED FROM BELOW ANY PROPOSED STRUCTURES, ACCESS ROADS, AND PARKING AREAS. THE EXPOSED SUBGRADE TO BE PROOF-ROLLED AND INSPECTED BY A QUALIFIED GEOTECHNICAL ENGINEER. ANY LOOSE/SOFT OR WET AREAS IDENTIFIED AT THE TIME OF PROOF-ROLLING TO BE SUB-EXCAVATED 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.

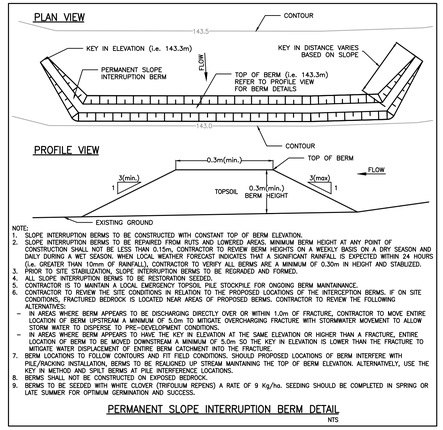
TYPICAL CROSS-SECTION 6.0m/5.0m WIDE ACCESS ROAD DETAIL (FILL)
NTS

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.

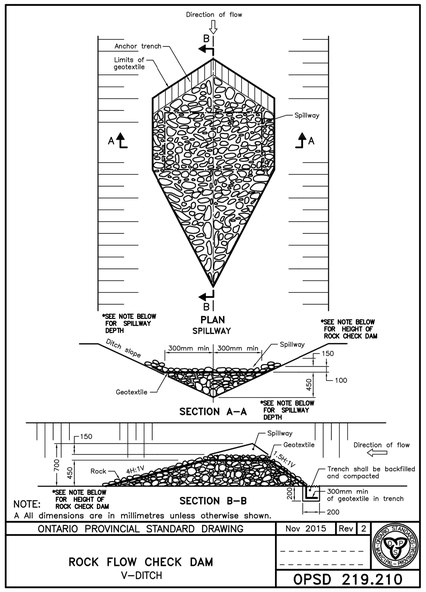
AREA GRADING NOTES

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.

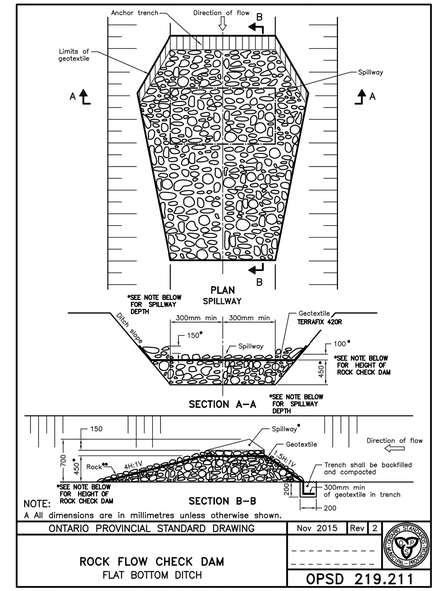
PERMANENT SLOPE INTERRUPTION BERM DETAIL
NTS



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

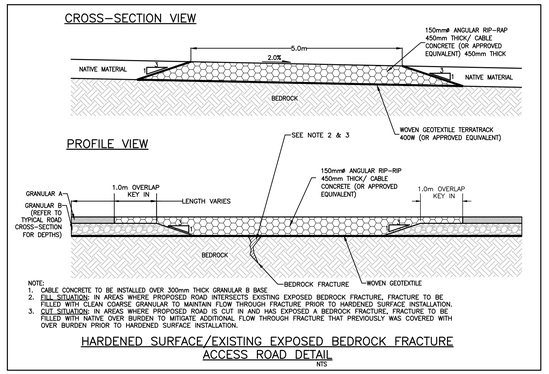
*THE 550mm HEIGHT OF ROCK CHECK DAM TO VARY PER SITE AND TO SUIT LOCAL CONDITIONS. THIS VARIANCE IS NOTED ON ENGINEER DRAWINGS AS HEIGHT OF DAM. SPILLWAY DEPTH ALSO NOTED ON THE ENGINEER DRAWINGS.
**RIP RAP TO BE IN ACCORDANCE WITH OPSS 1004
RIP RAP R50 GRADATION



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 AND DETAILS 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 TO BE PERFORMED AGAIN AT END OF CONSTRUCTION PRIOR TO RESTORATION SEEDING.

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS IS 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.

NOTE:

LIDAR HAS BEEN USED TO ILLUSTRATE EXTERNAL SITE DRAINAGE PATTERN. CONTRACTOR IS RESPONSIBLE TO REVIEW ONSITE ELEVATIONS PRIOR TO COMMENCEMENT OF ANY WORK ONSITE AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER OF RECORD

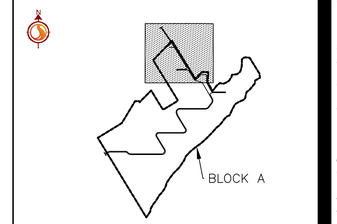
SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	178.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.3
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.8	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	123.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

KEY MAP
N.T.S.



SITE MAP
N.T.S.

IMPLEMENTATION SCHEDULE AND DETAILS FOR EROSION AND SEDIMENTATION CONTROL MEASURES

CONSTRUCTION	EROSION AND SEDIMENT CONTROL MEASURES
PRE-CONSTRUCTION	– EXISTING VEGETATION AND/OR CROP RESIDUE 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 5.0m WIDE VEGETATED BUFFER
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 DAILY 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. TO BE COMPLETED WITH A CHISEL PLOW TO A MINIMUM DEPTH OF 150mm. – INSTALL GRASSED WATERWAY
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 AND WETLANDS IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THESE NATURAL FEATURES. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN 30m OF THE WATERCOURSES OR WETLANDS AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON 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:
ONTARIO SEED COMPANY
PHONE: 519-888-0557 or 1-800-465-5849
FAX: 519-866-0605

BLOCK A
(SEE DWG. NO. C-401 SHEET 2)

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 AND RECEIVED OCTOBER 20, 2017. TOPOGRAPHIC SURVEY IS UTM 18. LIDAR INFORMATION CONDUCTED BY TILLOCH 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 LOCATION 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 208. 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 COMPLETED IN ACCORDANCE WITH OPSS 804.
16. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED	EXISTING
FENCE	
	TOPOGRAPHIC SURVEY CONTOUR
	LIDAR CONTOUR
HEAVY DUTY SILT FENCE (SEE DETAILS ON SHEET C-650)	
SWALE	
CULVERT	
ROCK CHECK DAMS (SEE DETAILS ON SHEET C-650)	
OVERLAND FLOW DIRECTION	
SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET 1 C-604)	
TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK	
5.0M WIDE VEGETATIVE BUFFER	
HARDENED SURFACE	
AC CABLE TRENCH	
DC CABLE TRENCH	
POTENTIAL ROCK OUTCROP LOCATIONS	
GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
DIVERSION BERM	
ROCK SPREADER SWALE	

Revision	By	Appd.	
B ISSUED FOR TENDER	MALM	DS	18.01.16
A ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21

File Name: 133560220_C-EC-BLOCK_A.dwg	Dwn.	Chkd.	Dsgn.	
	KC	DS	KC	17.11.30

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK A
SEDIMENTATION AND EROSION CONTROL PLAN

Project No.	Scale	Revision
133560220	1:750 (0, 7.5, 22.5, 37.5m)	
Drawing No.	Sheet	
C-601	1 of 6	B

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2018/01/16 5:44 PM By: Santos, Dan

ORIGINAL SHEET - ARCH D

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	179.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	123.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.3	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

NOTE:

LIDAR HAS BEEN USED TO ILLUSTRATE EXTERNAL SITE DRAINAGE PATTERN. CONTRACTOR IS RESPONSIBLE TO REVIEW ONSITE ELEVATIONS PRIOR TO COMMENCEMENT OF ANY WORK ONSITE AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER OF RECORD

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%
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APPLICATION:
SOW SEED MIX AT RATE OF 25kg/ha WITH A NURSE CROP OF ANNUAL RYE GRASS, SEEDED AT A RATE OF 22kg/ha

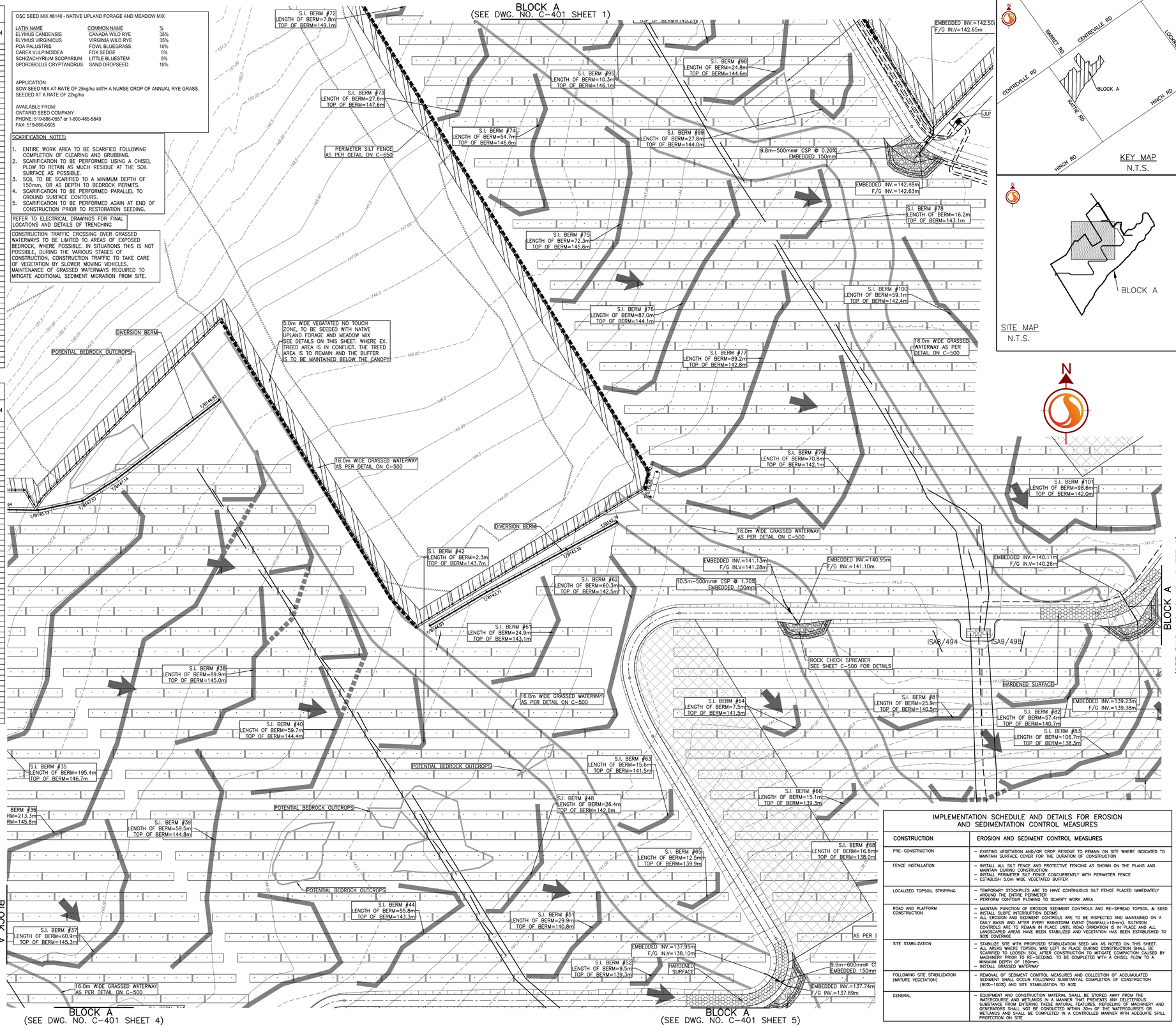
AVAILABLE FROM:
ONTARIO SEED COMPANY
PHONE: 519-886-0557 or 1-800-465-5849
FAX: 519-866-0605

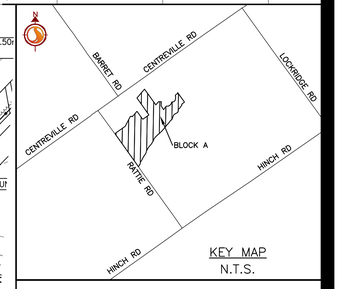
SCARIFICATION NOTES:

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 PERFORMED AGAIN AT END OF CONSTRUCTION PRIOR TO RESTORATION SEEDING.

REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS AND DETAILS OF TRENCHING

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS IS 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.





KEY MAP
N.T.S.

SITE MAP
N.T.S.

IMPLEMENTATION SCHEDULE AND DETAILS FOR EROSION AND SEDIMENTATION CONTROL MEASURES

CONSTRUCTION	EROSION AND SEDIMENT CONTROL MEASURES
PRE-CONSTRUCTION	– EXISTING VEGETATION AND/OR CROP RESIDUE 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 5.0m WIDE VEGETATED BUFFER
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 DAILY 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. TO BE COMPLETED WITH A CHISEL PLOW TO A MINIMUM DEPTH OF 150mm. – INSTALL GRASSED WATERWAY
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 AND WETLANDS IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THESE NATURAL FEATURES. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN 30m OF THE WATERCOURSES OR WETLANDS AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE

Legend

PROPOSED	EXISTING
FENCE	
TOPOGRAPHIC SURVEY CONTOUR	295.5
LIDAR CONTOUR	295.5
HEAVY DUTY SILT FENCE (SEE DETAILS ON SHEET C-650)	
SWALE	
CULVERT	
ROCK CHECK DAMS (SEE DETAILS ON SHEET C-650)	
OVERLAND FLOW DIRECTION	
SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET 1 C-604)	
TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK	
5.0M WIDE VEGETATIVE BUFFER	
HARDENED SURFACE	
AC CABLE TRENCH	
DC CABLE TRENCH	
POTENTIAL ROCK OUTCROP LOCATIONS	
GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
DIVERSION BERM	
ROCK SPREADER SWALE	

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 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.
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11. CLEARING AND GRUBBING AND REMOVALS TO BE COMPLETED IN ACCORDANCE WITH OPSS 201.
12. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
13. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 208. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
14. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
15. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
16. ALL SEEDING TO BE COMPLETED IN ACCORDANCE WITH OPSS 804.
17. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Stantec

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PCL
CONSTRUCTION LEADERS

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Revision	By	Appd.	YY.MM.DD
B ISSUED FOR TENDER	MALM	DS	18.01.16
A ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21

File Name: 133560220_C-EC-BLOCK_A.dwg	Dwn. KC	Chkd. DS	Dsgn. KC	YY.MM.DD 17.11.30

Permit-Seal

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK A
SEDIMENTATION AND EROSION CONTROL PLAN

Project No.	Scale
133560220	1:750 (0, 7.5, 22.5, 37.5m)
Drawing No.	Sheet / Revision
C-601	2 of 6 / B

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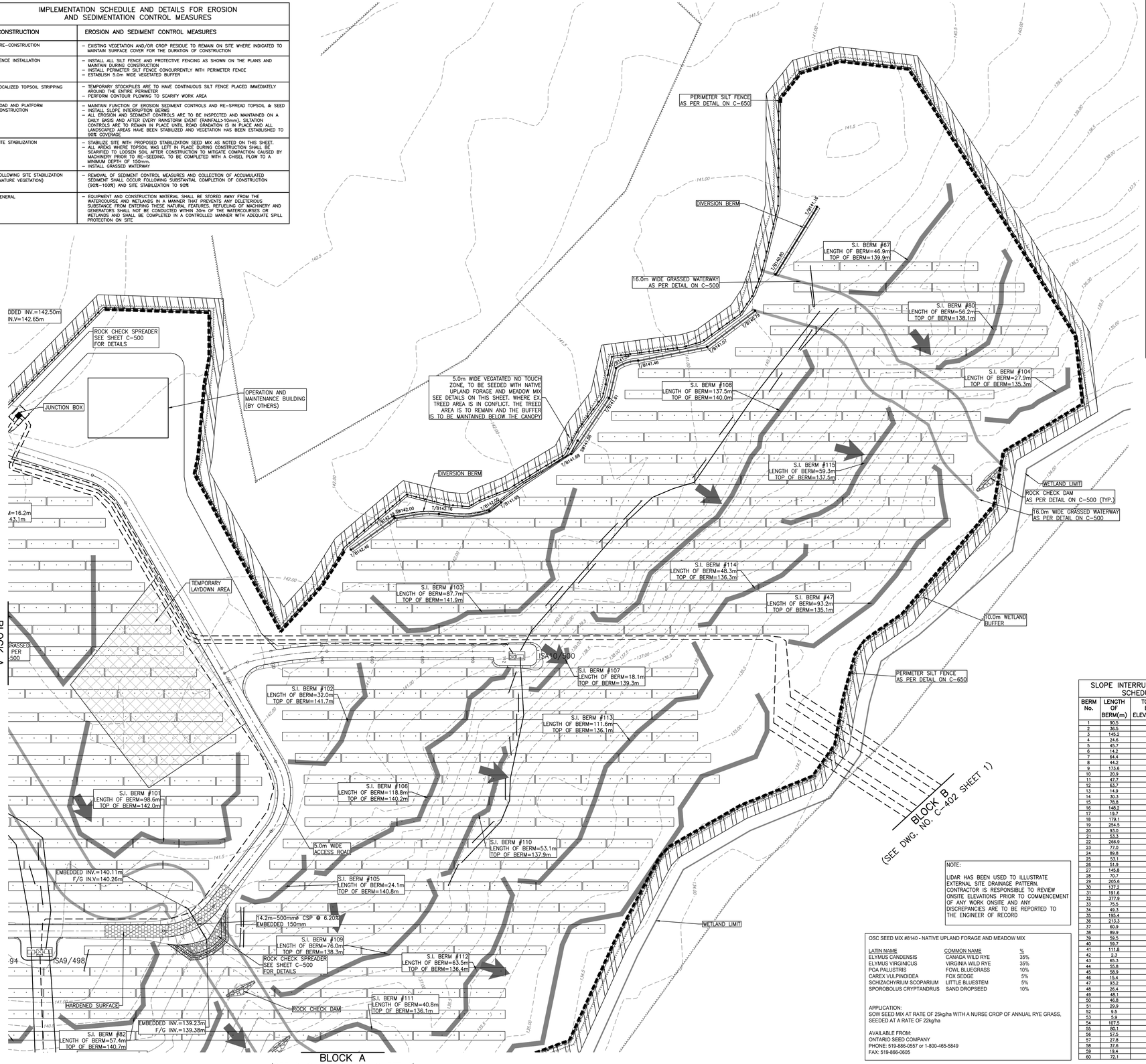
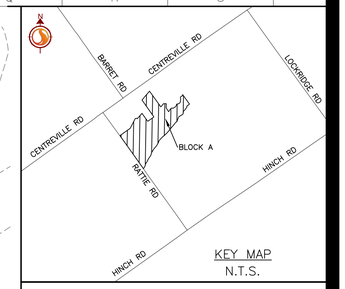
2018/01/16 7:43 PM By: Stantec, Dan

ORIGINAL SHEET - ARCH D

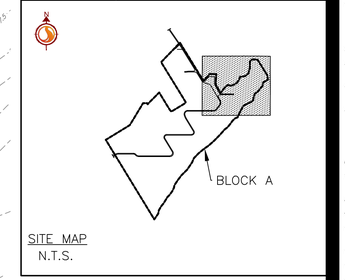
IMPLEMENTATION SCHEDULE AND DETAILS FOR EROSION AND SEDIMENTATION CONTROL MEASURES

CONSTRUCTION	EROSION AND SEDIMENT CONTROL MEASURES
PRE-CONSTRUCTION	– EXISTING VEGETATION AND/OR CROP RESIDUE 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 5.0m WIDE VEGETATED BUFFER
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 DAILY 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. TO BE COMPLETED WITH A CHISEL PLOW TO A MINIMUM DEPTH OF 150mm. – INSTALL GRASSED WATERWAY
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 AND WETLANDS IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THESE NATURAL FEATURES. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN 30m OF THE WATERCOURSES OR WETLANDS AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE





KEY MAP
N.T.S.



SITE MAP
N.T.S.

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 PERFORMED AGAIN AT END OF CONSTRUCTION PRIOR TO RESTORATION SEEDING.

REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS AND DETAILS OF TRENCHING

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS IS 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.

NOTE:
LIDAR HAS BEEN USED TO ILLUSTRATE EXTERNAL SITE DRAINAGE PATTERN. CONTRACTOR IS RESPONSIBLE TO REVIEW ONSITE ELEVATIONS PRIOR TO COMMENCEMENT OF ANY WORK ONSITE AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER OF RECORD

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:
ONTARIO SEED COMPANY
PHONE: 519-886-0557 or 1-800-465-5849
FAX: 519-866-0605

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	179.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	123.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	36.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

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 AND RECEIVED OCTOBER 20, 2017. TOPOGRAPHIC SURVEY IS UTM 18. LIDAR INFORMATION CONDUCTED BY TULOCH 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 LOCATION 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.
12. TEMPORARY EROSION CONTROL TO BE COMPLETED IN ACCORDANCE WITH OPSS 577.
13. GRADING TO BE COMPLETED IN ACCORDANCE WITH OPSS 206. GRANULAR MATERIAL TO BE USED IN ACCORDANCE WITH OPSS 1010.
14. CULVERT TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 421. HEIGHT OF FILL TABLE FOR CSP CULVERTS TO COMPLY WITH OPSD 805.010.
15. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B–B.
16. ALL SEEDING TO BE COMPLETED IN ACCORDANCE WITH OPSS 804.
17. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Legend

PROPOSED	EXISTING
	FENCE
	TOPOGRAPHIC SURVEY CONTOUR
	LIDAR CONTOUR
HEAVY DUTY SILT FENCE (SEE DETAILS ON SHEET C–650)	
SWALE	
CULVERT	
ROCK CHECK DAMS (SEE DETAILS ON SHEET C–650)	
OVERLAND FLOW DIRECTION	
SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET 1 C–604)	
TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK	
5.0M WIDE VEGETATIVE BUFFER	
HARDENED SURFACE	
AC CABLE TRENCH	
DC CABLE TRENCH	
POTENTIAL ROCK OUTCROP LOCATIONS	
GRASSED WATERWAY (SEE C–500 FOR DETAILS)	
DIVERSION BERM	
ROCK SPREADER SWALE	

B	ISSUED FOR TENDER	MALM	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-EC-BLOCK_A.dwg	KC	DS	KC	17.11.30
	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 A
SEDIMENTATION AND EROSION CONTROL PLAN

Project No.	Scale
133560220	1:750 (0, 7.5, 22.5, 37.5m)
Drawing No.	Sheet / Revision
C-601	3 of 6 / B

V:\0164\active\133560220\design\drawing_04\civil\Layout_Files\133560220_C-EC-BLOCK_A.dwg
2018/01/16 7:43 PM By: Samtes, Dan

ORIGINAL SHEET - ARCH D

SLOPE INTERRUPTION BERM SCHEDULE			
BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
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7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	179.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.6	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE			
BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
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65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	123.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	84.5	134.4	134.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

IMPLEMENTATION SCHEDULE AND DETAILS FOR EROSION AND SEDIMENTATION CONTROL MEASURES	
CONSTRUCTION	EROSION AND SEDIMENT CONTROL MEASURES
PRE-CONSTRUCTION	– EXISTING VEGETATION AND/OR CROP RESIDUE 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 5.0m WIDE VEGETATED BUFFER
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 DAILY BASIS AND AFTER EVERY RAINSTORM EVENT (RAIN/ALL>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 MX 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. TO BE COMPLETED WITH A CHISEL PLOW TO A MINIMUM DEPTH OF 150mm. – INSTALL GRASSED WATERWAY
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 AND WETLANDS IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THESE NATURAL FEATURES. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN 30m OF THE WATERCOURSES OR WETLANDS AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE

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 PERFORMED AGAIN AT END OF CONSTRUCTION PRIOR TO RESTORATION SEEDING.

NOTE:
LIDAR HAS BEEN USED TO ILLUSTRATE EXTERNAL SITE DRAINAGE PATTERN. CONTRACTOR IS RESPONSIBLE TO REVIEW ONSITE ELEVATIONS PRIOR TO COMMENCEMENT OF ANY WORK ONSITE AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER OF RECORD

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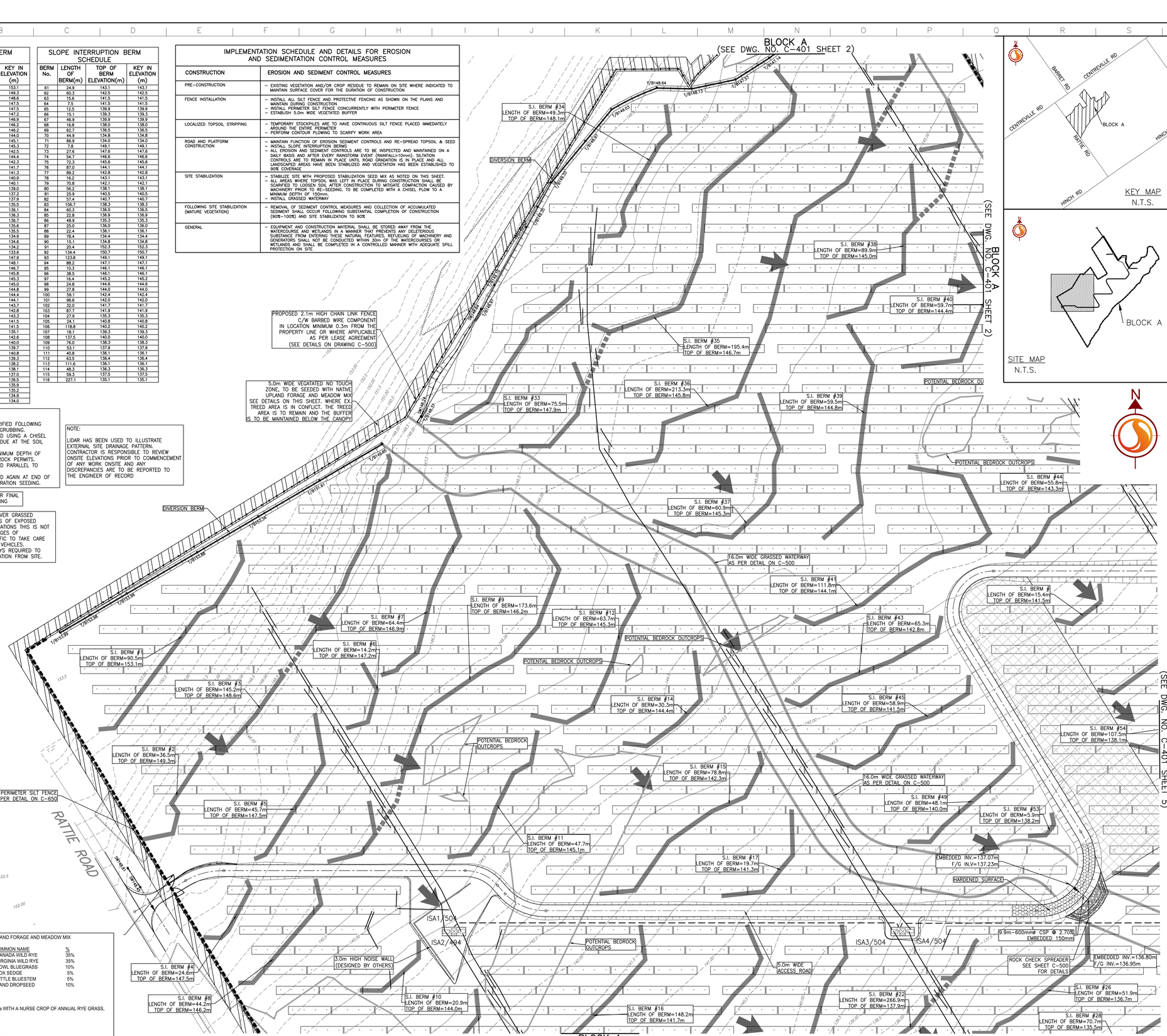
CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS IS NOT POSSIBLE, DURING THE VARIOUS STAGES OF CONSTRUCTION, CONSTRUCTION TRAFFIC TO TAKE CARE OF VEGETATION BY SLOWER MOVING VEHICLES. MAINTENANCE OF GRASSED WATERWAYS REQUIRED TO MITIGATE ADDITIONAL SEDIMENT MIGRATION FROM SITE.

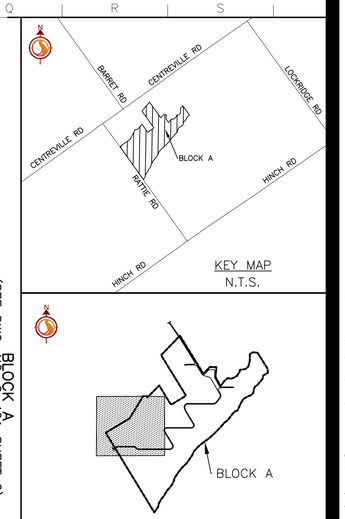
OSC SEED MIX #8140 - NATIVE UPLAND FORAGE AND MEADOW MIX

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:
ONTARIO SEED COMPANY
PHONE: 519-866-0557 or 1-800-465-5849
FAX: 519-866-0605





Legend

PROPOSED	EXISTING
FENCE	
TOPOGRAPHIC SURVEY CONTOUR	295.5
LIDAR CONTOUR	295.5
HEAVY DUTY SILT FENCE (SEE DETAILS ON SHEET C-650)	
SWALE	
CULVERT	
ROCK CHECK DAMS (SEE DETAILS ON SHEET C-650)	
OVERLAND FLOW DIRECTION	
SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET 1 C-604)	
TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK	
5.0M WIDE VEGETATIVE BUFFER	
HARDENED SURFACE	
AC CABLE TRENCH	
DC CABLE TRENCH	
POTENTIAL ROCK OUTCROP LOCATIONS	
GRASSED WATERWAY (SEE C-500 FOR DETAILS)	
DIVERSION BERM	
ROCK SPREADER SWALE	

B	ISSUED FOR TENDER	MALM	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21
Revision		By	Appd.	YY.MM.DD

File Name: 133560220_C-EC-BLOCK_A.dwg	KC	DS	KC	17.11.30
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

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300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

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15. RIPRAP AT CULVERT OUTLETS SHALL BE IN ACCORDANCE WITH OPSD 810.010 SECTION B-B.
16. ALL SEEDING TO BE COMPLETED IN ACCORDANCE WITH OPSS 804.
17. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

Client/Project
LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK A
SEDIMENTATION AND EROSION CONTROL PLAN

Project No.	Scale	Drawing No.	Sheet	Revision
133560220	1:750 (0 7.5 22.5 37.5m)	C-601	4 of 6	B

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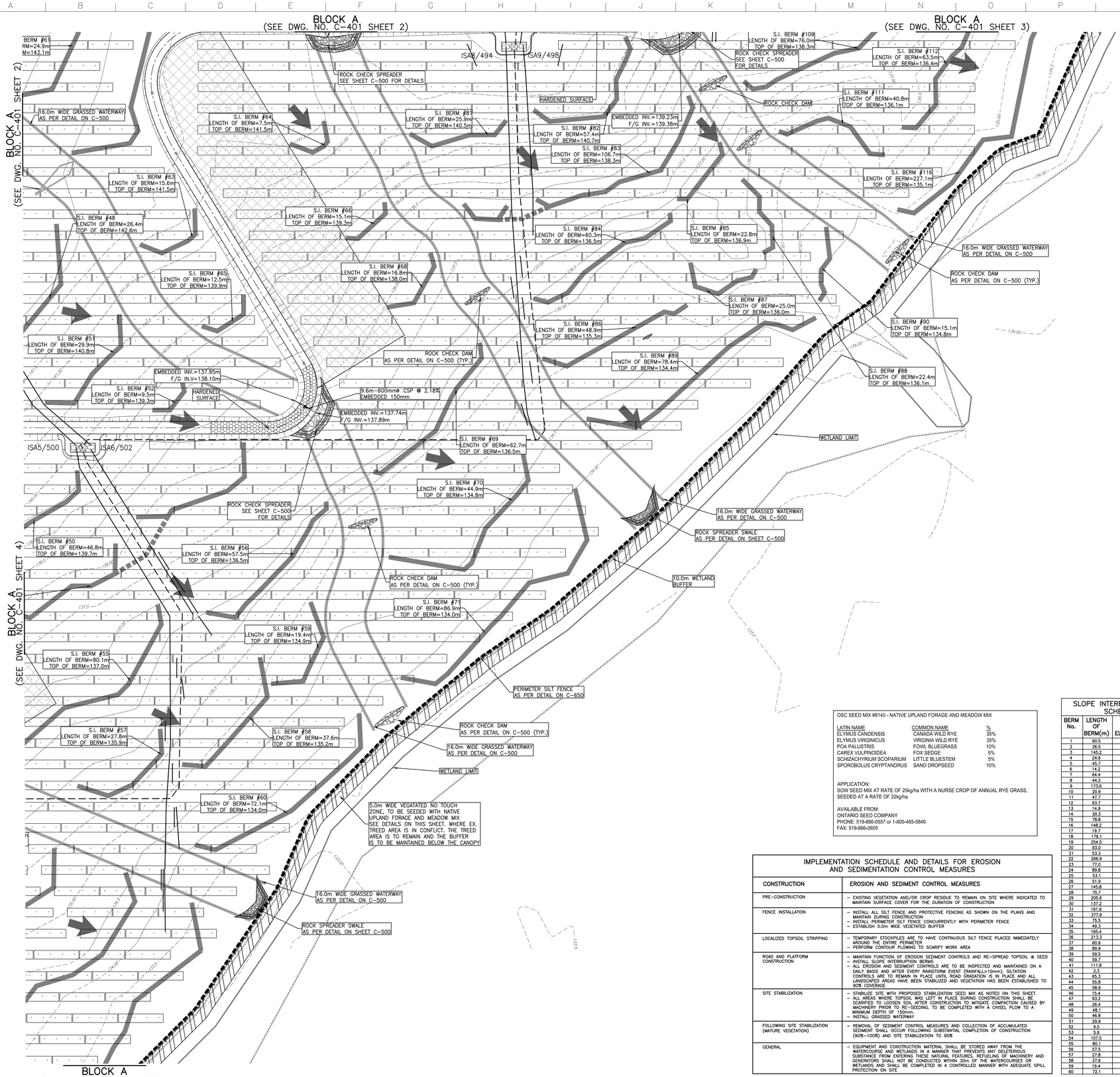
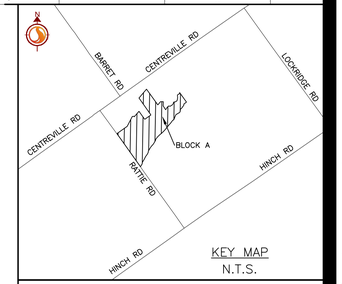
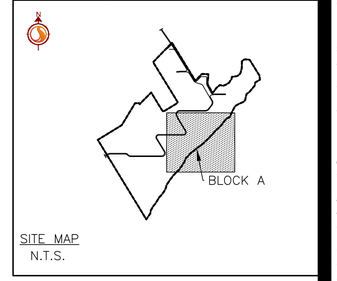




KEY MAP
N.T.S.



SITE MAP
N.T.S.

N

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 PERFORMED AGAIN AT END OF CONSTRUCTION PRIOR TO RESTORATION SEEDING.

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IMPLEMENTATION SCHEDULE AND DETAILS FOR EROSION AND SEDIMENTATION CONTROL MEASURES

CONSTRUCTION	EROSION AND SEDIMENT CONTROL MEASURES
PRE-CONSTRUCTION	– EXISTING VEGETATION AND/OR CROP RESIDUE 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 5.0m WIDE VEGETATED BUFFER
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 DAILY 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. TO BE COMPLETED WITH A CHISEL PLOW TO A MINIMUM DEPTH OF 150mm. – INSTALL GRASSED WATERWAY
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 AND WETLANDS IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THESE NATURAL FEATURES. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN 30m OF THE WATERCOURSES OR WETLANDS AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	179.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	123.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

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Permit-Seal

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LOYALIST SOLAR LP
LOYALIST SOLAR PROJECT

54MW GROUND-MOUNT SOLAR FARM

County of Lennox and Addington, Ontario

Title
BLOCK A
SEDIMENTATION AND EROSION CONTROL PLAN

Project No.
133560220

Scale
1:750
0 7.5 22.5 37.5m

Drawing No.
C-601

Sheet
5 of 6

Revision
B

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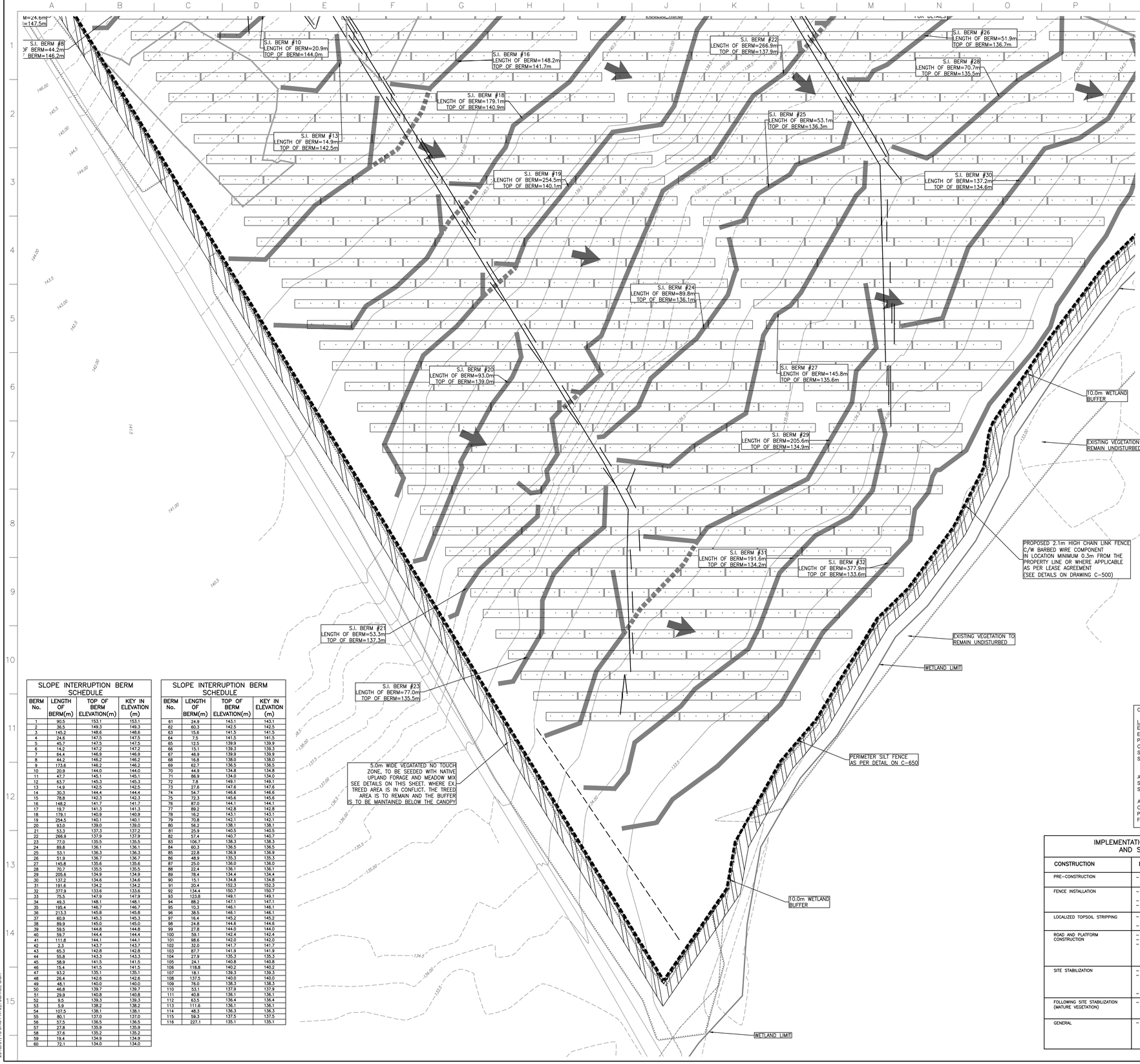
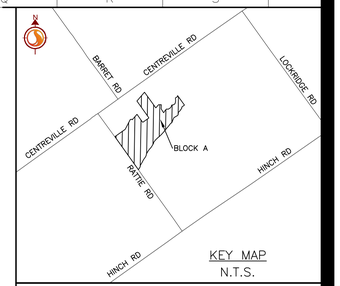
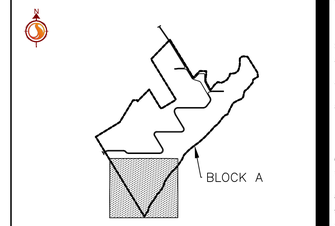
ORIGINAL SHEET - ARCH D





KEY MAP
N.T.S.



SITE MAP
N.T.S.

NOTE:
LIDAR HAS BEEN USED TO ILLUSTRATE EXTERNAL SITE DRAINAGE PATTERN. CONTRACTOR IS RESPONSIBLE TO REVIEW ONSITE ELEVATIONS PRIOR TO COMMENCEMENT OF ANY WORK ONSITE AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER OF RECORD

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 PERFORMED AGAIN AT END OF CONSTRUCTION PRIOR TO RESTORATION SEEDING.

REFER TO ELECTRICAL DRAWINGS FOR FINAL LOCATIONS AND DETAILS OF TRENCHING

CONSTRUCTION TRAFFIC CROSSING OVER GRASSED WATERWAYS TO BE LIMITED TO AREAS OF EXPOSED BEDROCK, WHERE POSSIBLE. IN SITUATIONS THIS IS 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 #6140 - 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:
ONTARIO SEED COMPANY
PHONE: 519-886-0557 or 1-800-465-5849
FAX: 519-866-0605

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
1	90.5	153.1	153.1
2	36.5	149.3	149.3
3	145.2	148.6	148.6
4	24.6	147.5	147.5
5	45.7	147.5	147.5
6	14.2	147.2	147.2
7	64.4	146.9	146.9
8	44.2	146.2	146.2
9	173.6	146.2	146.2
10	20.9	144.0	144.0
11	47.7	145.1	145.1
12	63.7	145.3	145.3
13	14.9	142.5	142.5
14	30.3	144.4	144.4
15	78.8	142.3	142.3
16	148.2	141.7	141.7
17	19.7	141.3	141.3
18	179.1	140.9	140.9
19	254.5	140.1	140.1
20	93.0	139.0	139.0
21	53.3	137.3	137.2
22	266.9	137.9	137.9
23	77.0	135.5	135.5
24	89.8	136.1	136.1
25	53.1	136.3	136.3
26	51.9	136.7	136.7
27	145.8	135.6	135.6
28	70.7	135.5	135.5
29	205.6	134.9	134.9
30	137.2	134.6	134.6
31	191.6	134.2	134.2
32	377.9	133.6	133.6
33	75.5	147.9	147.9
34	49.3	148.1	148.1
35	195.4	146.7	146.7
36	213.3	145.8	145.8
37	60.9	145.3	145.3
38	89.9	145.0	145.0
39	59.5	144.8	144.8
40	59.7	144.4	144.4
41	111.8	144.1	144.1
42	2.3	143.7	143.7
43	65.3	142.8	142.8
44	55.8	143.3	143.3
45	58.9	141.5	141.5
46	15.4	141.5	141.5
47	93.2	135.1	135.1
48	26.4	142.6	142.6
49	48.1	140.0	140.0
50	46.8	139.7	139.7
51	29.9	140.8	140.8
52	9.5	139.3	139.3
53	5.9	138.2	138.2
54	107.5	138.1	138.1
55	80.1	137.0	137.0
56	57.5	136.5	136.5
57	27.8	135.9	135.9
58	37.6	135.2	135.2
59	19.4	134.9	134.9
60	72.1	134.0	134.0

SLOPE INTERRUPTION BERM SCHEDULE

BERM No.	LENGTH OF BERM(m)	TOP OF BERM ELEVATION(m)	KEY IN ELEVATION (m)
61	24.9	143.1	143.1
62	60.3	142.5	142.5
63	15.6	141.5	141.5
64	7.5	141.5	141.5
65	12.5	139.9	139.9
66	15.1	139.3	139.3
67	46.9	139.9	139.9
68	16.8	138.0	138.0
69	62.7	136.5	136.5
70	44.9	134.8	134.8
71	86.9	134.0	134.0
72	7.8	149.1	149.1
73	27.6	147.6	147.6
74	54.7	146.6	146.6
75	72.3	145.6	145.6
76	87.0	144.1	144.1
77	89.2	142.8	142.8
78	16.2	143.1	143.1
79	70.8	142.1	142.1
80	56.2	138.1	138.1
81	25.9	140.5	140.5
82	57.4	140.7	140.7
83	106.7	138.3	138.3
84	60.3	136.5	136.5
85	22.8	136.9	136.9
86	48.9	135.3	135.3
87	25.0	136.0	136.0
88	22.4	136.1	136.1
89	78.4	134.4	134.4
90	15.1	134.8	134.8
91	20.4	152.3	152.3
92	134.4	150.7	150.7
93	123.8	149.1	149.1
94	88.2	147.1	147.1
95	10.3	146.1	146.1
96	38.5	146.1	146.1
97	16.4	145.2	145.2
98	24.8	144.6	144.6
99	27.8	144.0	144.0
100	59.1	142.4	142.4
101	98.6	142.0	142.0
102	32.0	141.7	141.7
103	87.7	141.9	141.9
104	27.9	135.3	135.3
105	24.1	140.8	140.8
106	118.8	140.2	140.2
107	18.1	139.3	139.3
108	137.5	140.0	140.0
109	76.0	138.3	138.3
110	53.1	137.9	137.9
111	40.8	136.1	136.1
112	63.5	136.4	136.4
113	111.6	136.1	136.1
114	48.3	136.3	136.3
115	59.3	137.5	137.5
116	227.1	135.1	135.1

IMPLEMENTATION SCHEDULE AND DETAILS FOR EROSION AND SEDIMENTATION CONTROL MEASURES

CONSTRUCTION	EROSION AND SEDIMENT CONTROL MEASURES
PRE-CONSTRUCTION	– EXISTING VEGETATION AND/OR CROP RESIDUE 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 5.0m WIDE VEGETATED BUFFER
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 DAILY 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. TO BE COMPLETED WITH A CHISEL PLOW TO A MINIMUM DEPTH OF 150mm. – INSTALL GRASSED WATERWAY
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 AND WETLANDS IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE FROM ENTERING THESE NATURAL FEATURES. REFUELING OF MACHINERY AND GENERATORS SHALL NOT BE CONDUCTED WITHIN 30m OF THE WATERCOURSES OR WETLANDS AND SHALL BE COMPLETED IN A CONTROLLED MANNER WITH ADEQUATE SPILL PROTECTION ON SITE

Legend

PROPOSED	EXISTING	
		FENCE
	295.5	TOPOGRAPHIC SURVEY CONTOUR
	295.5	LIDAR CONTOUR
		HEAVY DUTY SILT FENCE (SEE DETAILS ON SHEET C-650)
		SWALE
		CULVERT
		ROCK CHECK DAMS (SEE DETAILS ON SHEET C-650)
		OVERLAND FLOW DIRECTION
		SLOPE INTERRUPTION BERM (SEE DETAIL ON SHEET 1 C-604)
		TEMPORARY REMOVAL OF S.I. BERM FOR TRENCH INSTALLATION. TRENCHES TO BE LINED WITH CLAY OR FILLED WITH CONCRETE IF INSTALLED IN BEDROCK
		5.0M WIDE VEGETATIVE BUFFER
		HARDENED SURFACE
		AC CABLE TRENCH
		DC CABLE TRENCH
		POTENTIAL ROCK OUTCROP LOCATIONS
		GRASSED WATERWAY (SEE C-500 FOR DETAILS)
		DIVERSION BERM
		ROCK SPREADER SWALE

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 AND RECEIVED OCTOBER 20, 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 LOCATION 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 COMPLETED IN ACCORDANCE WITH OPSS 804.
16. ROCK SPOIL FROM INSTALLATION TO BE REMOVED FROM GROUND SURFACE PRIOR TO GROUND PREPARATION FOR RESTORATION SEEDING.

B	ISSUED FOR TENDER	MALM	DS	18.01.16
A	ISSUED FOR CLIENT REVIEW	KC	DS	17.12.21
Revision		By	Appd.	YY.MM.DD
File Name:	133560220_C-EC-BLOCK_A.dwg	KC	DS	KC 17.11.30
		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 A
SEDIMENTATION AND EROSION CONTROL PLAN

Project No. 133560220
Scale 1:750 (0, 7.5, 22.5, 37.5m)
Drawing No. C-601
Sheet 6 of 6
Revision B

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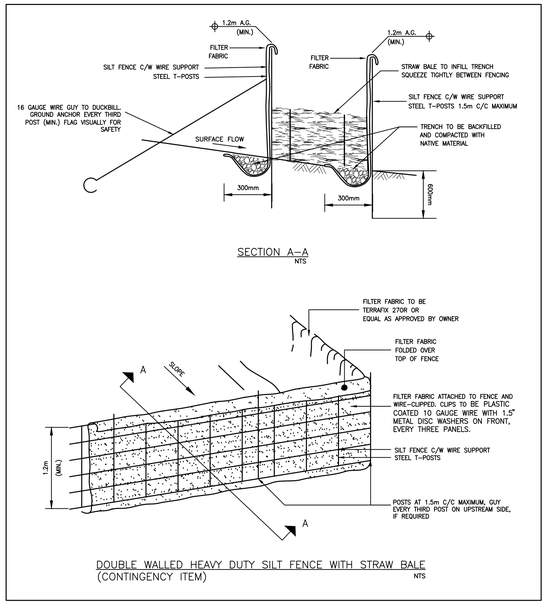
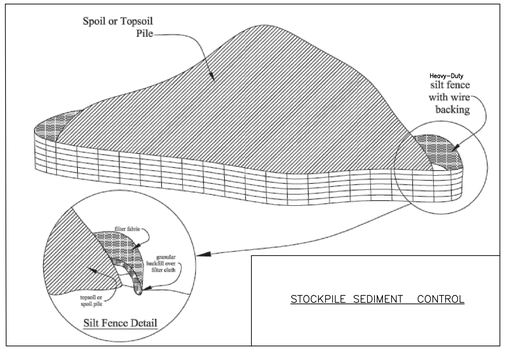
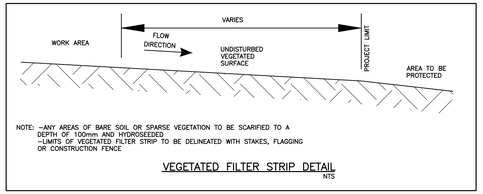
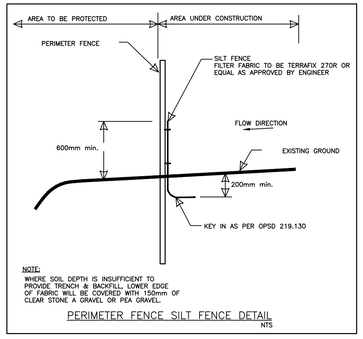
2018/01/16 3:46 PM By: Santos, Dan

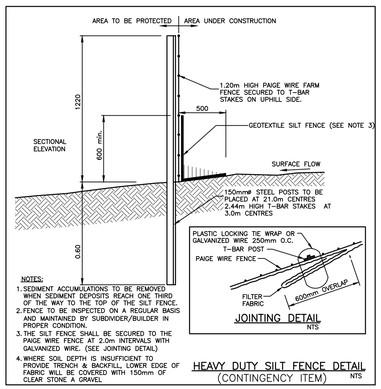
ORIGINAL SHEET - ARCH D

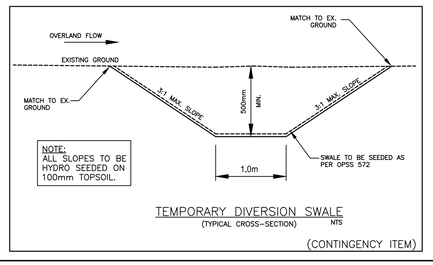


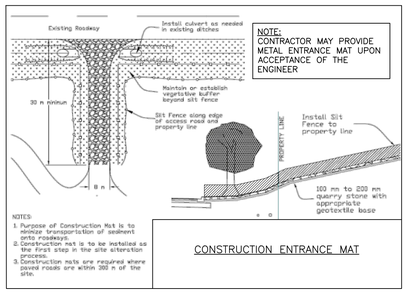












EROSION AND SEDIMENT CONTROL NOTES:
(SEE DETAILS THIS SHEET)

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

File Name: 133560220_C-DT-EC.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

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