Appendix G STORMWATER MANAGEMENT REPORT

Stormwater Management Report, Bass Pro Mills Drive Extension

Weston Road to Highway 400

August 10, 2022

Prepared for:

City of Vaughan

Prepared by:

Stantec Consulting

STORMWATER MANAGEMENT REPORT, BASS PRO MILLS DRIVE EXTENSION

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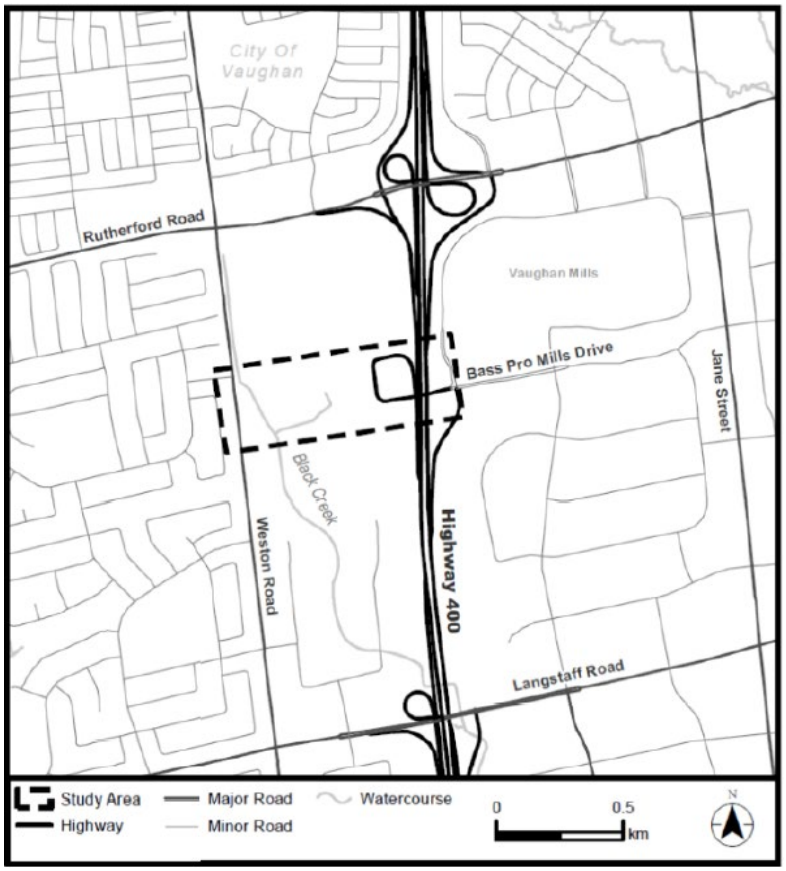
1.0 INTRODUCTION

Stantec Consulting Ltd. ('Stantec') was retained by the City of Vaughan (the 'City') to provide the consulting services required to complete a Municipal Class Environmental Assessment ('MCEA') for the proposed extension of Bass Pro Mills Drive, from Weston Road easterly to Highway 400. The proposed extension is located within the Vaughan Mills Centre Secondary Plan ('VMCSP'), which is generally bound by Weston Road to the west, Rutherford Road to the north, Jane Street to the east and, Langstaff Road to the south, and includes Highway 400, as well as all ramps at the Rutherford Road and Langstaff Road interchanges.

The extension of Bass Pro Mills Drive will provide a new major collector roadway that unites neighbourhoods from Weston Road to Jane Street, redistributes east-west traffic and alleviates congestion on Rutherford Road. The extension of Bass Pro Mills Drive is located approximately 800 m south of Rutherford Road between Weston Road and Highway 400. **Figure 1** illustrates the limits of the Study Area.

Figure 1: Study Area Map



This stormwater management ('SWM') report documents the existing drainage through the Study Area, evaluates the potential impacts of the recommended road design on the receiving surface water system, and outlines measures to mitigate the impacts of the preferred alternative road design.

1.1 BACKGROUND INFORMATION

As part of our background investigation, the following documents were reviewed:

Site Specific Documents

Reports

- *Bass Pro Mills Drive Extension in Vaughan, Ontario, Environmental Impact Study,* prepared by Stantec, February 14, 2022 ('Bass Pro Mills Drive EIS');
- *Meander Belt Assessment for Black Creek at Bass Pro Mills Drive from Highway 400 to Weston Road-Vaughan, Ontario,* prepared by Stantec, July 22, 2021 ('Bass Pro Mills Drive Meander Belt Assessment');
- *Geotechnical and Hydrogeological Desktop Review, Bass Pro Mills Drive Extension, Between Highway 400 and Weston Road, City of Vaughan, Ontario,* prepared by Geo Pro Consulting Limited, July 22, 2021 ('Bass Pro Mills Drive Geotechnical and Hydrogeological Review);
- *Humber River Hydrology Update-Final Report*, prepared by Civica, April 2018 ('Humber River HU');
- *Vaughan Mills Centre Secondary Plan*, prepared by Dialog and MMM Group, 2014; ('VMCSP'); and
- *Stormwater Management Facility Design Brief, Block 14 Draft Plan 19T-97014, Part of Lot 14, Concession 5, Hwy. 400 and Bass Pro Mills Drive, City of Vaughan, Ontario,* prepared by Stantec, March 10, 2004 ('Highway 400 and Bass Pro Mills Drive SWM Pond Report').

Topographic Information

- 1m Airborne Imaging Bare Earth Lidar obtained from First Base Solutions and dated Summer 2019 ('Lidar Topography'); and
- 1m Contour Topographic Information provided by the City ('City Topography').

Data

- Storm Sewer Information provided by the City;
- Hydrologic data (Visual OTTHYMO models) provided by TRCA; and
- Hydraulic data (HEC-RAS model) provided by TRCA.

Reference Documents

- *Wetland Water Balance Risk Evaluation* prepared by Toronto and Region Conservation Authority, November 2017 ('TRCA WWBRE');
- *Fish and Wildlife Crossing Guidelines*, prepared by prepared by Credit Valley Conservation, April 28, 2017 ('CVC Crossing Guidelines');
- *Crossing Guidelines for Valley and Stream Corridors*, prepared by prepared by Toronto and Region Conservation Authority, September 2015 ('TRCA Crossing Guidelines');
- *Stormwater Management Criteria*, prepared by Toronto and Region Conservation Authority, August 2012 ('TRCA SWM Criteria');
- *Low Impact Development Stormwater Management Planning and Design Guide*, prepared by Credit Valley Conservation and Toronto and Region Conservation Authority, 2010 and ('LID SWM Design Guide');
- *Highway Drainage Design Standards,* prepared by Ministry of Transportation, January 2008 ('MTO Drainage Design Standards');
- *Design Criteria*, prepared by City of Vaughan, March 2004 ('City Criteria');
- *Stormwater Management Planning and Design Manual*, prepared by Ontario Ministry of Environment, Conservation and Parks (formerly the Ministry of the Environment, Ontario), March 2003 ('MECP SWM Manual'); and
- *SG-6: Percolation Time and Soil Descriptions*, Supplementary Guidelines to the Ontario Building Code 1997 ('SG-6 of SGOBC').

2.0 EXISTING CONDITIONS

2.1 SURFACE DRAINAGE

The Study Area is located within the Humber River Watershed, which falls under the jurisdiction of Toronto and Region Conservation Area ('TRCA'). A review of the Lidar Topography confirms that the Study Area is fully located within the Black Creek Subwatershed. The Study Area, located within the lands bound by Weston Road to the west, Rutherford Road to the north, Highway 400 to the east and industrial land uses to the south, generally slope toward Black Creek. **Drawing 1**, provide in **Appendix A**, illustrates the Study Area and existing conditions such as land use, drainage patterns and surface water features.

Black Creek is a TRCA regulated watercourse; it originates at a culvert located 90 m south of Rutherford Road on the east side of Weston Road. It flows south as a roadside ditch to Astona Boulevard, after which it flows southeast and then south. Approximately 400 m south of the proposed Bass Pro Mills Drive extension, within an industrial subdivision, Black Creek has been realigned, lowered, and restored. As outlined in the Bass Pro Mills Drive Meander Belt Assessment (Stantec, 2021), the above-referenced channel alignment has been modified over the years due to urbanization. In the vicinity of the proposed Bass Pro Mills Drive extension, Black Creek currently exhibits a straightened planform within an unconfined valley. The channel cross-section is generally trapezoidal with a small low-flow channel present. The bed material is mostly silt/clay with some sand and gravel. Black Creek is described as being generally stable with no significant aggradation, degradation or areas of bank erosion. The watercourse has a bankfull width of approximately 4.0 m.

As outlined in the Bass Pro Mills Drive EIS (Stantec, 2022), the existing land cover within and adjacent to the Study Area consists predominantly of natural areas such as culturally influenced mixed meadow communities, which appear to be comprised of former agricultural lands. A shallow marsh community, ('Wetland-1') is located within the center of the Study Area and is estimated to be approximately 3.6 ha in size, based on desktop delineation. A berm equipped with a broad crested trapezoidal weir divides the community into two portions. The northern portion of Wetland-1 appears to contribute water to Black Creek via a TRCA regulated tributary to Black Creek, referred to as Headwater Drainage Feature ('HDF')-A. HDF-A originates in the northwest corner of the northern wetland at a small area of standing water. The southern portion of Wetland-1 is smaller in size but contains a larger area of standing water. A potential HDF connects this area to Black Creek; however, the feature does not appear to be an HDF. HDF-A is located within the proposed Bass Pro Mills Drive right of way ('ROW') while the potential HDF is located sufficiently south of the future ROW and will not be altered or impacted.

Wetland-1 has an existing total contributing drainage area of 23.4 ha, 20.7 ha drains directly to the northern portion of the wetland and the remaining 2.7 ha drains directly to the southern portion of the wetland. The connecting trapezoidal weir within the berm has a bottom width of approximately 5 m, average side slopes of 4.5:1 and a spill elevation of 209.90 m. HDF-A is a trapezoidal swale having a

bottom width between 1 to 2 m, side slopes of 3:1, a spill elevation of 209.70 m and a longitudinal slope of 0.5%. The potential HDF is also a trapezoidal swale having a bottom width between 1 to 2 m, side slopes of less than 4:1, a spill elevation of 209.20 m and a longitudinal slope of 0.4%.

A secondary shallow marsh community, is located along Black Creek alignment within adjacent low-lying areas.

A SWM pond is located inside the southbound on-ramp to Highway 400 at Bass Pro Mills Drive. As outlined in the Highway 400 and Bass Pro Mills Drive SWM Pond Report (Stantec, 2004), the SWM pond was constructed in advance of its contributing drainage area as MTO required it to be completed prior to the opening of the ramp. The SWM pond was designed as a quality, erosion, and quantity control pond. Based on a review of *Figure 3: Proposed Drainage* of Highway 400 and Bass Pro Mills Drive SWM Pond Report, provided in **Appendix B.1**, it was designed to accept drainage from 29.5 ha from the adjacent lands. The adjacent lands were assumed to be a commercial/industrial subdivision having an imperviousness of 82%. The pond was designed assuming the development blocks will control post-development flows to 180 L/s/ha and runoff from roadways during a 5 year-storm event will be controlled to Humber River Unit Flow Rates. Runoff from roadways during events greater than the 5-year storm are to be conveyed to the proposed future channel. As illustrated on Figure 3 of Highway 400 and Bass Pro Mills Drive SWM Pond Report, a portion of the existing and future Bass Pro Mills Drive ROW has been account for in the design of the SWM Pond.

Under current existing conditions, it is unclear where the Highway 400 and Bass Pro Mills Drive SWM Pond currently discharges flows to as the outlet structure was to be connected to storm sewers that have not yet been constructed. Site access was also not permitted; therefore, a field investigation could not be completed.

Within the Study Area, two (2) industrial blocks (a garden center and a storage facility) front onto Weston Road.

Existing Bass Pro Mills Drive, east of Highway 400 southbound on-ramp, consists of an urban cross section with four-lanes, two travel lanes in each direction. A high point exists at the midpoint of the Highway 400 overpass and directs stormwater runoff east and west. West of the high point, a small local storm sewer network collects stormwater runoff from existing Bass Pro Mills Drive and the adjacent south slope and discharges it westly towards the Wetland-1.

Other than the existing Highway 400 and Bass Pro Mills Drive SWM Pond, discussed above, there does not appear to be any other SWM measures within or adjacent to the proposed ROW corridor that would be able to provide either quality or quantity control for the stormwater runoff from the extension of Bass Pro Mills Drive.

2.2 FLOODPLAIN

As discussed above, Black Creek is a regulated watercourse; however, the TRCA regulatory (existing condition) hydraulic model did not extend upstream through the Study Area. The hydraulic model terminated approximately 400 m downstream of Bass Pro Mills Drive extension where the creek realignment/restoration works terminated. In order to evaluate the impacts that the extension of Bass Pro Mills Drive would have on the Black Creek floodplain, the hydraulic modeling would need to be extended north of the proposed future ROW.

Stantec obtained the existing conditions HEC-RAS hydraulic model as well as the Visual OTTHYMO ('VO') hydrologic model for Humber River from TRCA. The hydrologic model was obtained to enable Stantec to insert the appropriate peak-flows from the hydrologic model into the hydraulic model.

2.2.1 Hydrologic Model

TRCA provided two (2) VO models. The models and associated scenarios are outlined below:

1) **Design Storm Scenarios (2015)**

   - 2015 Existing Conditions – 25yrs with Ponds
   - 2015 Existing Conditions – 10-500yrs with Ponds

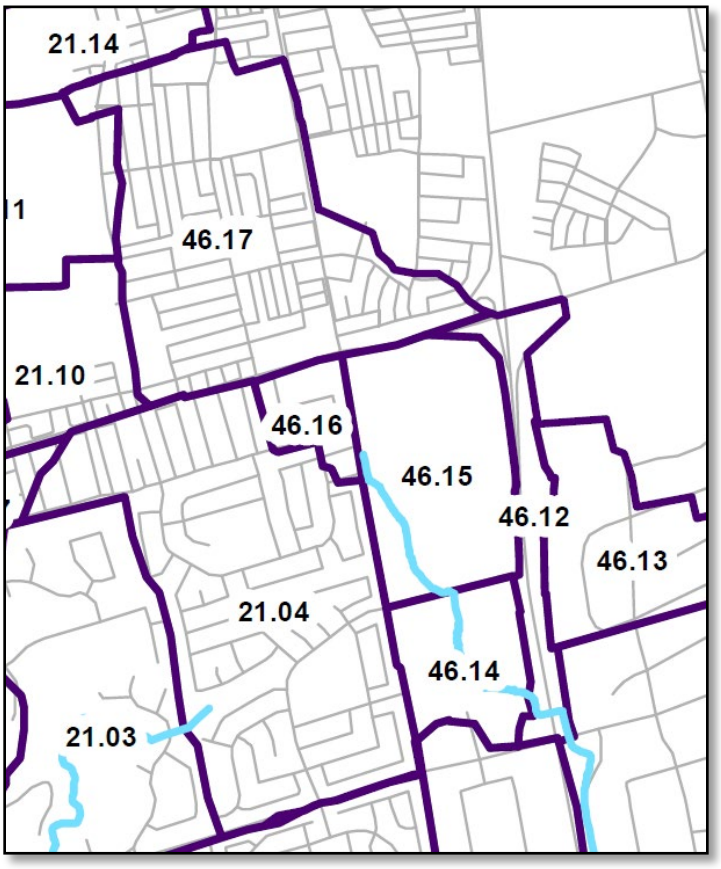
2) **Humber Large Storms – No Ponds – Civica 2017**

   - Existing Model for 350, 500 yr design Storms – CNII without Ponds
   - Existing Model for Regional Model – CNIII without Ponds
   - Future Model for 350, 500 yr design Storms – CNII without Ponds
   - Future Model for Regional Model – CNIII without Ponds

On review of the TRCA provided HEC-RAS model, it was determined that the existing flows for the 2-year to 100-year storm events from the Design Storm Scenarios (2015) model, as well as the future flows for the 350-year and Regional Storm events from the Humber Large Storms-No Ponds Civica 2017 were simulated in the hydraulic model.

As shown on *Figure 2.1: Catchments for Existing Scenario* and *Figure 5.4 Catchments for Future Scenario* of the Humber River HU, provided in **Appendix B.2** with a relevant excerpt provided in **Figure 2**, the extension of Bass Pro Mills Drive is located within Catchment 46.15. Per the TRCA provided VO models, in all scenarios, Catchments 46.16 and 46.17 are added together and then routed through Catchments 46.15. Catchments 46.15 and 46.14 are then individually added to the flow before being routed to the next downstream flow node.

Figure 2: TRCA Humber River Catchments (Excerpt from Figure 2.1)



Peak-flows were extracted from TRCA's VO hydrologic model and inputted in the steady-state hydraulic simulation. **Table 1** summarizes the Regional Storm peak flows.at all flow change locations within the HEC-RAS model.

Table 1: Regional Storm Peak Flows

HEC-RAS Cross Section	VO Node	TRCA Regional Storm Peak Flow (m^3/s)
9061	688[2]/4089[3]	25.81
8848	805	28.65
8694	Transposition Equation[4]	33.23
7933[1]/8224	7669	35.79
7006	1543	41.76
6668	1540	55.90
4755	N/A	70.53
4008	N/A	75.83
3250	1532	88.78
2377	1514	91.24
1004	7667	105.60
1597	1503	153.79
880	1567	167.38

Notes:

1. Upstream limit of TRCA Regulatory Hydraulic Mode.
2. StandHyd of Catchment 46.17.
3. Route Reservoir controlling flows from Catchment 46.17
4. No VO Node available, Transposition Equation used to approximate flows.

A detailed summary of the 2-year through Regional Storm flows used in the hydraulic model are provided in **Appendix C**.

2.2.2 Hydraulic Model

Stantec reviewed the TRCA provided HEC-RAS model. As discussed above, the provided existing conditions hydraulic model did not extend through the Study Area but instead terminated approximately 400 m downstream of Bass Pro Mills Drive extension., just north of the realigned/restored section of the watercourse at cross section 7933. To evaluate the impacts to Black Creek floodplain as a result of the extension of Bass Pro Mills Drive, Stantec extended the HEC-RAS model north to the commercial plaza at the SE corner of Weston Road and Rutherford Road. To create an updated existing conditions model, the following modifications were made to the TRCA provided hydraulic model:

- Cross section 7933 and 7844 were deleted;
- Forty-three (43) new cross sections were added to the model upstream of existing cross-section 7771. The geometric data was generated using the Lidar Topography ;
- Detailed design drawings or surveys for seven (7) existing watercourse crossings were not able to be obtained. As such, to be conservative, the top of road profile was coded into the model as the cross-section;
- A horizontal variation in manning's 'n' values approach was utilized to reflect the various surface roughness coefficients and are as follows:

Table 2: Applied Mannings 'n' Values

Land Use	Manning's 'n' Value
Channel	0.035
Paved	0.025
Lawns/Boulevards	0.045
Garden Centre	0.045
Dense Grass/Former Agricultural Lands	0.060
Natural Dense Overbank	0.080

- Levees and ineffective flow stations were inserted at various cross section to ensure flow conveyance areas were accurately modeled; and
- Updated peak-flows extracted from the VO hydrologic models, as discussed in **Section 2.2.1**, were utilized in the steady-state hydraulic simulation.

A summary of the Regional Storm water levels for Black Creek is provided in **Table 3** with the detailed modeling output for all storm events provided in **Appendix C**. The corresponding cross section locations and mapped floodlines are illustrated on **Drawing 2 and 3, provided in Appendix A**.

Table 3: Existing Conditions Regional Storm Flood Summary

Cross Section	Regional Storm	
	Flow (m^3/s)	Water Surface Elevation (m)
9061	25.81	212.10
9037	25.81	211.93
9010	25.81	211.88
8985	25.81	211.81
8958	25.81	211.79
8952[1]	25.81	211.66
8930	25.81	211.17
8906	25.81	211.20
8901[1]	25.81	211.20

Table 3: Existing Conditions Regional Storm Flood Summary

Cross Section	Regional Storm	
	Flow (m^3/s)	Water Surface Elevation (m)
8890	25.81	211.20
8848	28.65	211.03
8773	28.65	210.23
8694	33.23	210.12
8617	33.23	210.01
8574	33.23	209.98
8569	33.23	209.98
8563	33.23	209.97
8514	33.23	209.96
8456[1]	33.23	209.93
8395	33.23	209.89
8337[2]	33.23	209.84
8290[2]	33.23	209.53
8271	33.23	209.65
8264[1]	33.23	209.65
8257	33.23	209.63
8224	33.23	209.59
8191	35.79	209.52
8158	35.79	209.46
8149[1]	35.79	209.46
8143	35.79	209.46
8115	35.79	209.25
8082	35.79	209.19
8062	35.79	209.18
8056[1]	35.79	209.19
8049	35.79	209.18
8009	35.79	209.18
7982	35.79	209.10
7956	35.79	208.88
7949[1]	35.79	208.80
7937	35.79	208.83
7883	35.79	208.65
7854	35.79	208.29

Table 3: Existing Conditions Regional Storm Flood Summary

Cross Section	Regional Storm	
	Flow (m^3/s)	Water Surface Elevation (m)
7807	35.79	208.13
7771[3]	35.79	208.15

Notes:

1. Cross Sections coincide with Top of Road profile at an existing watercourse crossing.
2. Cross Sections immediately upstream and downstream of the proposed Bass Pro Mills Drive ROW.
3. Upstream limit of TRCA Regulatory Hydraulic Model.

The updated existing conditions HEC-RAS model should be updated if/when crossing structures can be surveyed following receipt of permission-to-enter the subject private lands.

3.0 DESIGN CRITERIA

3.1 ROAD DRAINAGE

The drainage system for the extension of Bass Pro Mills Drive is to be designed in accordance with relevant design criteria established in the City Guidelines. The design criteria requires that flood protection from the 100-year or Regional Storm event, whichever is greater, be provided and includes, but is not limited to, the following:

- Storm sewers designed to capture and convey the 5-year storm runoff from the road, at minimum; and
- Runoff flows in excess of the design capacity of the storm sewer system to be conveyed overland via curbs/gutters/designated overland flow routes to a safe outlet.

3.2 STORMWATER MANAGEMENT

Through review of the background documents and discussions between Stantec, TRCA and the City, the following SWM design criteria and objectives have been identified for this project (**Table 4**):

Table 4: Applied SWM Criteria

Criterion	Control Measures
Water Quality	All watercourses and water bodies within TRCA's jurisdiction are classified as requiring an 'Enhanced' level of protection as defined in MECP Guidelines. This corresponds to a long-term removal efficiency of 80% of Total Suspended Solids (TSS).
Water Balance	Based on Figure C9 of the TRCA SWM Criteria, the Study Area is located in a Low Volume Groundwater Recharge Area ('LGRA') and the requirement is to make best efforts to maintain recharge, provided the site does not impact an ecological feature. Due to the presence of natural features within the Study Area, specifically Wetland-1, TRCA's WWBRE screening tool will need to be used to evaluate the potential impacts of the roadway construction on the subject feature. Based on the results of the evaluation, the scope of a feature-based water balance assessment can be determined.
Erosion Control	Minimum retention of the first 5 mm of every rainfall event.
Water Quantity	Unit-release rates for Sub-Basin 46 (Equation G) of the Humber River Watershed are to be used to determine the Study Area's allowable release rates and post development flows are to be controlled to the those calculated values

An independent/standalone SWM strategy to service the future Bass Pro Mills ROW is presented in the following sections. Opportunities for potential combined SWM facilities that service both the future Bass Pro Mills Drive VMCSP should remain open for further discussion/ confirmation during detailed design and as capital planning for the roadway extension and future plan of subdivisions are being advanced in parallel.

3.3 ROAD CROSSINGS

The proposed extension of Bass Pro Mills Drive will, regardless of the recommended horizontal alignment, cross Black Creek and Wetland-1. The crossings will need to be sized in accordance with TRCA Watercourse Crossing Guidelines, if applicable, as well as CVC Crossing Guidelines. The sizing of the watercourse crossing should also follow MTO Design Standards, which identifies design storms to be used for culvert/bridge sizing and the necessary associated freeboards based on roadway classification within the Province of Ontario. A summary of the various guidelines is provided below. Section 8.8.1 of Bass Pro Mills Drive EIS (Stantec, 2022), further outlines the best management practices for the design of the proposed crossing.

3.3.1 TRCA Crossing Guidelines

The TRCA Crossing Guidelines state that for new road crossings, many aspects of the natural hazard and natural heritage objectives can be accomplished through proper siting of infrastructure. For example, crossings that are perpendicular to valley and stream corridor and crossing at the narrowest point along the valley corridor can reduce the impacts and construction costs.

The natural hazards objectives pertain to avoidance and mitigation of flood risk, geomorphic risk from channel migration over time and geotechnical risk from slope stability. The proposed crossing:

- must not increase flood risk for design storm events up to and including the Regulatory storm event;
- should be located away from geomorphically active and unstable areas and be designed to span the zone of potential future channel migration, as defined by the meander belt or the 100-year erosion limit, to reduce risks from channel migration over time. Should this not be practical, alternative designs supported by geomorphic studies may be acceptable; and
- should be located away from areas of active erosion and ensure crossing structure does not aggravate valley slope instability.

The natural heritage function objectives relate to terrestrial and aquatic habitat and connectivity functions. The proposed crossing:

- should be sited to avoid impacts to woodlots, wetland, seepage areas, and other sensitive habitats; and
- should permit wildlife movement and fish passage.

3.3.2 CVC Crossing Guidelines

The CVC Crossing Guidelines provides guidance on reducing impacts to wildlife and incorporating best management practices (BMP) within transportation planning. The impacts of roads can be direct or indirect. Direct impacts include habitat loss, road mortality and injury. Indirect impacts include habitat fragmentation, wildlife population decline, habitat degradation, barriers to fish passage and road avoidance behaviour by wildlife. The proposed crossing:

- should be designed to safely and effectively allow fish and wildlife to cross beneath a road;
- should ensure that structure openness ratio ('OR'), defined as the cross-sectional area of the structure entrance divided by its length, is adequate for the target species or habitat;
- should be open bottom or use native substrate if closed bottom; and
- should maintain or improve connectivity of existing features.

3.3.3 MTO Design Standards

The following criteria were extracted from the MTO Design Standards for crossings over a watercourse:

- WC-1 Design Flows (Bridges and Culverts): The 100-year design flow shall be used in the sizing of the crossing as the total span is anticipated to be greater than 6 m.
- WC-7 Culvert Crossings on a Watercourse: A minimum freeboard of 1.0 m from the computed High Water Level for the Design Flow to the edge of the travelled lane. A minimum soffit clearance for culverts with open footings (erodible bottom) should be 0.30 m.
- WC-13 Relief Flow (Bridges and Culverts): If Relief Flow is required during the Regional Storm, the maximum depth over the roadway shall not exceed 0.30 m and the product of velocity x depth on the road shall not exceed 0.8 m/s^2.

4.0 PROPOSED CONDITIONS

4.1 PREFERRED DESIGN

To identify a preferred design that is cost effective, provides safe and functional traffic operation, improves local access and minimizes impact to the environment, four (4) alternative road cross-sections and two (2) alternative horizontal alignments were evaluated.

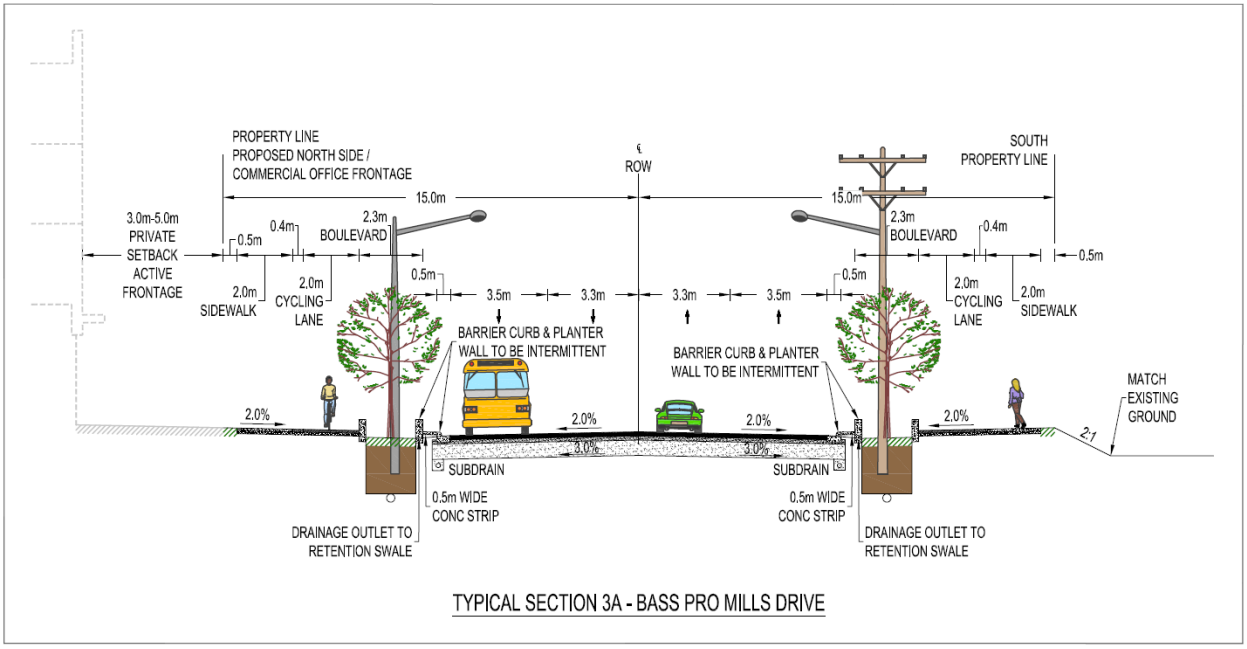
4.1.1 Preferred Cross Section

Alternative Cross Section 3 was selected as the technically recommended cross-section for the extension of Bass Pro Mills Drive, from Weston Road to just west of the Highway 400 overpass. Alternative Cross Section 3 has a total ROW width of 30 m, and is comprised of the following features:

- 3.3 m travel lane, 1 lane in each direction;
- 3.5 m curb lane, 1 lane in each direction;
- 0.5 m curb (both sides);
- 0.5 m wide concrete strip (both sides);
- 2.3 m wide boulevard/ planter (both sides);
- 2.0 m cycling lane (both sides);
- 0.4 m buffer (both sides);
- 2.0 m sidewalk (both sides); and
- 0.5 m wide boulevard.

Alternative Cross Section 3 is illustrated in Figure 3. It has a 5-year storm runoff coefficient of 0.79 which equates to an imperviousness of 85%.. Per City Criteria, for storms larger than the 5-year storm, the runoff coefficients are to be increased to account for the increase in runoff due to soil saturation. Alternative Cross Section 3 will therefore have a 100-year storm runoff coefficient of 0.90, detailed calculations are provided in **Appendix D.1.**

Figure 3: Alternative Cross Section 3



4.1.2 Preferred Horizontal Alignment

Alignment Alternative A was selected as the preferred horizontal alignment. Alignment Alternative A is illustrated in **Drawing 4**, provide in **Appendix A**.

Alignment Alternative A will result in approximately 580 m of new road between Weston Road and the Highway 400 overpass. The total approximately footprint area of the new extended ROW is 1.74 ha.

4.1.3 Proposed Vertical Alignment

The proposed vertical alignment of Bass Pro Mills Drive extension was established by creating a low point immediately east of the future Weston Road and Bass Pro Mills Drive intersection. From there, the proposed road profile slopes upward at a grade of 0.50% for approximately 490m at which point the slope increases to 3.61%, to connect to existing Bass Pro Mills Drive at Highway 400 southbound on-ramp. Two vertical curves were also incorporated into the design to ease the transition between the different grades. The proposed vertical alignment is illustrated on the **Plan and Profile** drawing, provided in **Appendix A**. As illustrated on the **Plan and Profile** drawing, the proposed vertical alignment ranges between approximately 1 to 4 m above the existing ground.

4.2 POTENTIAL IMPACTS OF PREFERRED DESIGN

4.2.1 Wetland

The extension of Bass Pro Mills Drive has the potential to hydrologically impact Wetland-1 by:

- dividing Wetland-1 into two completely separate wetlands; and
- removing contributing drainage area from Wetland-1.

4.2.2 Surface Drainage

The extension of Bass Pro Mills Drive will also alter the existing drainage pattern. The east/west alignment of the proposed extension of Bass Pro Mills Drive has the potential to:

- impede any northeast to southwest sheet drainage that occurs under existing conditions; and
- require the removal of a portion of HDF-A.

4.2.3 Stormwater Runoff Quality and Quantity

The extension of Bass Pro Mills Drive will increase the amount of impervious surface area which has the potential to impact receiving watercourses by:

- increasing the amount of pollutants which are commonly found in roadway runoff. Pollutants often include, but are not necessarily limited to: TSS, phosphorus, hydrocarbons, metals, chlorides and various nutrients, all of which can impair the aquatic ecosystem of the receiving watercourse; and
- generating a greater volume and rate of surface water runoff being directed to the receiving watercourse.

5.0 MITIGATION MEASURES

5.1 PROPOSED SURFACE DRAINAGE

Per the proposed vertical alignment, discussed in Section 4.1.3, the majority of stormwater runoff from Bass Pro Mills Drive extension will flow in a westerly direction to the low point immediately east of the future Weston Road and Bass Pro Mills Drive intersection, refer to **Drawing 4**, provide in **Appendix A**. There are currently no SWM controls in place for existing Bass Pro Mills Drive, between the high point on Highway 400 overpass and the termination of existing Bass Pro Mills Drive; therefore, the total drainage area that will require SWM measures is 2.22 ha.

As illustrated on **Drawing 4, provided** in **Appendix A**, the proposed Bass Pro Mills Drive extension will be constructed within the contributing drainage area to Wetland-1. **Table 5** summaries the existing and proposed drainage areas to Wetland-1.

Table 5: Wetland-1 Drainage Areas

Wetland-1 Area	Existing Drainage Area (ha)	Proposed Drainage Area (ha)
North Portion	20.7	19.3
South Portion	2.7	3.1
Total Area	23.4	22.4

Due to the change in contributing drainage area, Wetland-1 needs to be evaluated utilizing TRCA's WWBRE screening tool to determine the extent of the required feature-based water balance assessment. Please refer to Section 5.4 for more details.

To further minimize the potential impacts the proposed extension of Bass Pro Mills Drive will have on the existing drainage patterns and to ensure the external drainage areas to the north can be safely conveyed south of the road, the following surface drainage measures are required:

- A realignment of HDF-A to the north side of the proposed ROW to maintain the surface water connection between the Wetland-1 and Black Creek (refer to Section 5.7.2)
- A culvert crossing of Black Creek (refer to Section 5.8.1); and
- An equalizer culvert between the north and south portions of Wetland-1 to maintain the surface water connection between the north and south portion of Wetland-1 (refer to Section 5.8.2).

5.2 EVALUATION OF STORMWATER MANAGEMENT MEASURES

SWM practices for the management of roadway runoff generally fall into the categories of water quality, water balance, erosion control and water quantity. Various SWM measures to address the above mentioned SWM practices were explored as part of the Class EA and included source and conveyance controls as well as end of pipe controls. Source and conveyance controls are commonly referred to as Low Impact Development (LID). LID is a more integrated approach to SWM that seeks to maintain the existing hydrology of the site after development by promoting filtration, infiltration, evaporation as well as detaining runoff. It is most effective during the small, frequent rain events that typically comprise 90% of the total rainfall events experienced throughout the calendar year. During these events LID measures absorb a significant portion of the runoff and treats the 'first flush'. While LID measures do not remove the need for end of pipe controls like detention ponds or oversized pipes, there are clear benefits in water quality treatment and volume reduction (through infiltration).

Table 6 provides information on various relevant LID measures, which should be further reviewed and implemented during the detailed design of the technically recommended design:

Table 6: LID Measures

LID Measure	Description	Considerations
Bioretention Facility	Bioretention uses the natural properties of soils, plants and associated microbial activity to infiltrate water and remove pollutants from stormwater runoff. They do this through filtration by soil media and uptake by plant roots and reduce runoff volume through evapo-transpiration. The practice provides aesthetic benefits and can easily be modified to fit a wide variety of space and drainage contexts. Bioretention can be designed with full (no underdrain), partial (underdrain)or no infiltration (high groundwater).	• Can be integrated with site landscaping. • Footprint is typically 10-20% of the contributing drainage area. • Typical ratio ranges of impervious area to swale area of 5:1 to 10:1. • Location must be relatively flat. • Pre-treatment should be provided to remove sediment and debris • High groundwater level can limit the use of this measure.
Grass Swales	Grass swales are vegetated open channels designed to convey, treat and attenuate stormwater runoff.	• Grass swales are effective at removing pollutants assuming the velocities, from the peak flow during a 25 mm 4-hour Chicago storm, are less than 0.5 m/s at a maximum depth of 0.10 m.
Enhanced Grass Swales	Enhanced grass swales are vegetated open channels designed to convey, treat and attenuate stormwater runoff. Check dams are incorporated into the design to help slow and filter water to enhance sediment removal, soil infiltration and evapotranspiration by plants and grass.	• Footprint is typically 5-15% of the contributing drainage area. • Typical ratio ranges of impervious area to swale area of 5:1 to 10:1.
Bioswales	Bioswales are similar to enhanced grass swales (vegetated open channels designed to convey, treat and attenuate stormwater runoff); however, they incorporate an engineered bioretention soil media.	• Typical ratio ranges of impervious area to swale area of 5:1 to 10:1. • Pre-treatment should be provided to remove sediment and debris.

Table 6: LID Measures

	Depending upon the native soil, an underdrain can be incorporated into the design.	
Infiltration Rock Trenches	Infiltration trenches are excavations lined with geotextile fabric and filled with clean granular stone.	• Risk of shallow groundwater contamination, particularly from deicing agents. • High groundwater level can limit the use of this measure. • Pre-treatment must be provided to remove sediment and debris. • Often used when surface areas not available.
Underground Chambers	Underground chambers are typically open bottom storage units that convey stormwater runoff and can provide both retention storage (infiltration) and detention storage. These systems consist of open bottom chambers surrounded by clean aggregate and wrapped with geotextile fabric.	• Risk of shallow groundwater contamination, particularly from deicing agents. • High groundwater level can limit the use of this measure. • Pre-treatment must be provided to remove sediment and debris. • Often used when surface areas not available. • Able to detain more stormwater runoff than a trench. • Provide both infiltration and detention storage capability.
Perforated Pipe Systems	Perforated pipe systems are long infiltration trenches, that are designed for both conveyance and infiltration of stormwater runoff. They are underground stormwater conveyance systems designed to attenuate runoff volume and thereby, reduce contaminant loads to receiving waters.	• Risk of shallow groundwater contamination, particularly from deicing agents. • High groundwater level can limit the use of this measure • Pre-treatment must be provided to remove sediment and debris. • Design and construction costs may be significant.
Soil Support Systems	Soil Support Systems are modular support systems that provide a sturdy and permeable ground level decking that transfers surface loads to a compacted subbase 0.4 – 1.1 m below grade without compacting the near-surface soil layers.	• The near-surface layers remain uncompacted and void ratios remain high making the near surface layers useful for stormwater detention and infiltration. • Provide suitable soil conditions for large tree growth
Catch Basin Controls	Catch basin controls are devices to prevent floatables and sediments from entering the storm sewer and consist of covers, geotextile fabrics or inserts.	• Can be used in any catch basin. • Are maintained in the same manner and frequency as normal catch basins.
Amended Topsoils	A mixture of higher permeability materials like sand and gravel, with lower percentage of clays.	• Can be used within the boulevard

End-of-Pipe controls are implemented at the end of the major/minor collection system. These types of facilities typically include:

- Wet Ponds: designed to provide quality treatment through settling of suspended solids into the forebay (typically 1.0 to 1.5 m deep) and aftbay (typically 1.5 m to 3.0 m deep), extended detention and quantity control within the active storage component.

- Engineered Wetlands: designed to provide quality treatment through settling of suspended solids into the forebay (typically 1 m deep) and shallow permanent pool (typically 0.15 m to 0.3 m deep), and extended detention and quantity control within the active storage component.
- Dry Ponds: provide some quality treatment through detention time, and primarily provide extended detention and quantity control within the active storage component. Dry ponds, with proper pre-treatment, can also be designed as surface infiltration facilities or soakaways to help to achieve water balance/erosion control targets.
- Manufactured Treatment Devices (Oil-Grit Separators or Filters): Pre-fabricated infrastructure designed to settle suspended solids but are typically less effective at nutrient removal. Generally acceptable for use as a pre-treatment system or as a component in a treatment train approach to address water quality.
- Oversized Pipes: Pre-manufactured pipes are oversized and equipped with orifices in the system to create pipe storage. Oversized pipes are generally utilized for small developments which lack sufficient surface space to construct detention facilities. Pipe slopes are kept to a minimum to increase the amount of storage available within the pipe. Oversized pipes provide only marginal water quality benefits as some of the coarse sediment may settle.

On review of the various LID measures and end-of-pipe controls in conjunction with **Figure 3, Drawing 4, provided in Appendix A,** and the **Plan and Profile** Drawing, the following LID/SWM measures have been 'pre-screened' as suitable to be incorporate in the independent/standalone SWM strategy to service the future Bass Pro Mills ROW:

- Bioretention
- Bioswales
- Infiltration Rock Trenches
- Infiltration Chambers
- Catchbasin Controls
- Oversized Pipes

Due to the small drainage area associated with the extension of Bass Pro Mills Drive, wet ponds, engineered wetlands and dry ponds were not deemed as suitable options to solely service the future proposed Bass Pro Mills Drive ROW extension. A combined SWM facility that services both the proposed Bass Pro Mills Drive extension and VMCSP would be a considerable option if the timing of the construction of the two developments coincide as it would reduce the amount of infrastructure that the City will ultimately need to maintain.

As discussed in Section 2.0, a portion of the existing and future Bass Pro Mills Drive ROW has already been accounted for in the design of the Highway 400 and Bass Pro Mills Drive SWM Pond. This SWM pond may be an viable option to provide quality and quantity control for Bass Pro Mills Drive if storm servicing can be coordinated with the adjacent developers. A new combined SWM facility option with VMCSP developers should also remain open for further discussion/confirmation during detailed design.

The following Sections describe how the above suitable LID/SWM measures could be implemented as part of the independent /stand alone solution to service the extension of Bass Pro Mills to meet the design criteria outlined in **Section 3.0**.

5.3 QUALITY CONTROL

Stormwater runoff from roadways, if left untreated, is detrimental to the water quality of the receiving watercourse as it increases the amount of pollutants to the watercourse. For this reason, the SWM design criteria requires the implementation of MECP 'Enhanced' Level of Protection (80% TSS removal efficiency).

As illustrated in **Figure 3**, the recommended cross section includes two (2) - 2.3 m wide boulevard/ planters, one (1) on each side of the road. A bioretention facility or bioswale could be integrated into the design of the planters. The planters can be either continuous or split up to incorporate intersections, turning lanes, hydrants or utilities such as street lighting, pedestals, hydro poles, etc. **Drawing 4,** provided in **Appendix A**, and **Plan and Profile** drawing highlight the available areas where LIDs can potentially be located.

Bioretention facilities (equipped with an underlying stone gallery for infiltration) can be utilized in areas where the longitudinal road slopes are shallow (0.5%) and the separation between the final grade and existing ground is in the range of 1 m -1.5 m to enable direct contact between the bottom of the infiltration gallery and native soil rather than engineered fill. Bioswales equipped with an underdrain can be utilized along the remaining length of the road, where the longitudinal road slope is moderate (3.61%) or the separation between the final grade and existing ground is greater than 1.5 m. In areas where the proposed longitudinal road slopes are moderate (3.61%), check dams can be incorporated into the design to help slow the flow of water, which will promote sediment removal, infiltration and evapotranspiration.

During detailed design, the bioretention facilities and bioswales should be designed in accordance with MECP Guidelines and LID SWM Design Guide or the most current design publications. The following considerations should be included in the design:

- Stormwater runoff from the roadway can enter the facility via curb cut inlet (located upstream of any on-street catchbasins), catchbasin lead inlet or another proprietary inlet structure;
- Inlets should be adequately sized to capture runoff from the 'first flush' 25 mm storm event. Flows above this capture event may bypass directly to the on-street catchbasins;
- For ease of maintenance and to lengthen the life span of the facility, stormwater runoff should be pretreated, to remove sediment, and dissipated prior to entering the facility. Pretreatment options include, but not limited to, concrete 'forebays', catchbasin controls/inserts, filters, etc.;
- Per MECP Guidelines, the velocities within the bioretention facility and bioswales from the peak flow during a 25 mm 4-hour Chicago storm should be less than 0.5 m/s at a maximum depth of 0.10 m; and
- An overflow structure with a connection to the storm sewer network to provide emergency relief in the case that stormwater runoff is unable to infiltrate.

5.4 WATER BALANCE

A shallow marsh community situated within the Study Area, Wetland-1, was evaluated utilizing TRCA's WWBRE screening tool. A preliminary evaluation of the magnitude of potential hydrological change was completed utilizing desktop evaluation of the wetland limits and the proposed ROW alignment and is included in **Appendix D.2.** An evaluation of the sensitivity of the wetland could not be completed at this time as site access was not permitted and a field investigation could not be completed.

The results of the preliminary assessment indicate that the anticipated hydrologic change that may result due to the roadway extension will be considered as 'low' magnitude. Based on Figure 3: Wetland Risk Evaluation Decision Tree in TRCA WWBRE, a Risk Assignment of Low Risk can be assigned to Wetland-1 even if the sensitivity of the wetland is deemed to be high in the future.

Based on the recommendations in TRCA WWBRE, pre-development water balance monitoring will not be required, and instead, a desktop derived feature based Thornthwaite Mather water balance assessment will need to be completed. The assessment should evaluate pre-development, post-development and post-development with mitigation and will be completed during the detailed design phase when more information on the wetland and contributing drainage area are known.

Should the Thornthwaite-Mather water balance assessment require that supplemental water be directed to Wetland-1, stormwater runoff from the extension of Bass Pro Mills Drive upstream of Wetland-1 that has been filtered through the bioswales (that include an underdrain) could be directed to the feature. Another option to provide supplemental water to Wetland-1 would be to direct stormwater runoff captured in on-street catchbasins. The catchbasins would need to be equipped with catchbasin controls/inserts, for pretreatment and discharge flows to a grassed swale for further treatment and polishing prior to outleting to Wetland-1.

5.5 EROSION CONTROL

The erosion control criteria requires on-site retention of the first 5 mm of every rainfall event from the impervious area.

Based on the total roadway drainage area of 2.22 ha and an imperviousness of 85%, the total required retention volume for the first 5 mm of rainfall is 93.8 m^3 refer to **Appendix D.3** The required retention storage can be provided for in bioretention facilities, discussed above, infiltration rock trenches, underground chambers or a combination of the three.

Based on a review of the Bass Pro Mills Drive Geotechnical and Hydrogeological Review (GeoPro, 2021), the Study Area is located within an area comprised of Bevelled Til Plain Soils and *'the subsurface soil and bedrock conditions at the site are anticipated to consist of fine textured glaciolacustrine deposits of clayey/silty/sandy/gravelly soils and clay to silt textured till'.* Per Table 2 of SG-6 of SGOBC, this soil type could be classified as G.M.- clayey gravels, gravel-sand-clay mixtures or S.C.- clayey sands, sand-clay mixtures. For both soil types the Coefficient of Permeability, K, is in the range of 10^{-4} - 10^{-6} cm/sec. Per

Table C.1 of the LID SWM Design Guide, the infiltration rate could range between 12-50 mm/hr. If an infiltration rate of 12 mm/hr and a factor of safety of 2.5 is assumed, the minimum required infiltration bottom area, based on MECP Guidelines, would be 407 m^2. During the detailed design phase, in-situ testing of soil permeability, at the anticipated location and depth of the infiltration measure, will need to be completed.

At detailed design, the bioretention facilities, infiltration rock trench or underground chamber should be designed in accordance with MECP Guidelines and LID SWM Design Guide or the most current design publications. It should be noted that only clean, treated stormwater runoff should be infiltrated.

5.6 QUANTITY CONTROL

Per TRCA SWM Criteria, unit-release rates for Sub-Basin 46 (Equation G) of the Humber River Watershed are to be used to determine the Study Area's allowable release rates and post development flows are to be controlled to the those calculated values. **Table 7** summarizes the storm event, unit rate equations, unit rates and allowable release rates. The unit rates and allowable release rates were calculated using an area of 2.22 ha.

Table 7: Allowable Release Rate

Storm Event	Equation G Sub-Basin 46[1] (L/s/ha)	Unit Rate (L/s/ha)	Allowable Release Rates (L/s)
2-year	Q = 7.745 - 0.762 * ln(A)	7.1	16
5-Year	Q = 11.468 - 1.123 * ln(A)	10.6	23
10-Year	Q = 13.877 - 1.342 * ln(A)	12.8	28
25-Year	Q = 17.381 - 1.342 * ln(A)	16.3	36
50-Year	Q = 20.164 - 1.973 * ln(A)	18.6	41
100-Year	Q = 22.973 - 2.256 * ln(A)	21.2	47

Storage requirements for the 2-year to 100-year storm events were generated using the Modified Rational Method as well as VO hydrologic modeling. The modified rational method calculations applied the City's intensity-duration-frequency parameters for the 2-year through 100-year storm events and the runoff coefficient for the extension of Bass Pro Mills Drive. Per City Criteria, runoff coefficients for storm events larger than the 5-year storm event are to be increased based on the equations in Table 4.4 of the City Criteria. The storage volumes calculated using VO applied TRCA's 6-hr, 12-hr and 24-hr AES storm distributions for the 2-year through 100-year storm events. **Table 8** compares the various storage requirements. The detailed modified rational calculations and VO simulation output files are provided in **Appendix D.4**.

Table 8: Storage Requirements

Storm Event	Allowable Release Rate (L/s)	Storage Requirements (m^3)			
		Modified Rational	VO Modeling		
			6-hr AES	12-hr AES	24-hr AES
2-Year	15.8	407	**525**	551	521
5-Year	23.5	530	**707**	716	658
10-Year	28.4	652	**828**	827	754
25-Year	36.2	744	**978**	961	872
50-Year	41.3	919	**1,090**	1,061	958
100-Year	47.0	1,021	**1,202**	1,162	1,045

Based on the above summary, the largest storage requirements, **bolded**, were determined using VO modelling and TRCA's 6-hr AES storm distributions. Oversized pipes, a combined retention/detention underground chambers or a combination of the two practices can be used to achieve the required storage. **Table 9** summarizes some preliminary oversized pipe options which satisfy the total 100-year storage requirements.

Table 9: Preliminary Oversized Pipe Options

Circular Pipe Diameter (m)	Equivalent Elliptical Pipe Size		Total Required Length (m)	Volume (m3)
	Rise (m)	Span (m)		
1.500	1.220	1.920	680	1,202
1.650	1.340	2.110	565	1,208
1.800	1.465	2.305	475	1,209
1.950	1.585	2.495	405	1,210
2.100	1.705	2.690	350	1,212

During detailed design a quantity control strategy will need to be finalized and an outlet control structure(s) designed such that the allowable release rates are met.

5.7 STORMWATER CONVEYANCE

5.7.1 Storm Sewer Design

Stormwater runoff from the proposed ROW will be captured via on-street catchbasins or overflow structure within the planters and conveyed to the selected quantity control measure via storm sewers. The proposed storm sewers are to be designed to capture and convey, at minimum, the 5-year storm runoff from the road. Flows in excess of the 5-year storm event will be routed overland within the proposed ROW. Within the Study Area, 100-year capture is required in order to meet the allowable release rates specified above. The 100-year capture can be accomplished by increasing the number of

catchbasins or establishing a 100-year capture location at the proposed low point The storm sewers are to be sized using a minimum 5-year runoff coefficients of 0.75 and a minimum 100-year runoff coefficient of 0.90.

5.7.2 HDF-A

The east/west alignment of the proposed extension of Bass Pro Mills Drive will impede any northeast to southwest sheet drainage that occurs under existing conditions. For this reason, HDF-A will need to be relocated to the north to maintain it's current function as a surface water connection to Black Creek. During detailed design HDF-A should be designed using natural channel design principals to maintain, at minimum, current conveyance capacity while ensuring adequate separation between high water level and elevations at ROW limits.

5.8 ROAD CROSSINGS

Two crossings are required as part of the proposed Bass Pro Mills extension. The crossings will need to be sized in accordance with TRCA Watercourse Crossing Guidelines, if applicable, as well as CVC Crossing Guidelines. The sizing of the watercourse crossing should also follow MTO Design Standards. The following sections discuss the details of each of the proposed crossings.

5.8.1 Black Creek Crossing

The proposed Bass Pro Mills Drive extension will cross Black Creek at one (1) discrete location. The final land use plan and ultimate watercourse location for the adjacent lands, VMCSP, is currently unknown; therefore, in discussion with TRCA staff, it was agreed to that the proposed crossing would be situated and sized at the existing location. TRCA staff also requested that alternative conceptual option(s) be identified to support land use development planning within the VMCSP area and to illustrate where the future Black Creek relocation alignment can be accommodated by the extension of Bass Pro Mills Drive.

A preliminary road crossing of Black Creek has been prepared and consists of a 32.5 m long x 13.4 m wide x 1.5 m high pre-cast open bottom culvert flanked by two (2) – 32.5 m long x 3.6 m wide x 1.2 m high box culverts. **Drawing 4, provided in Appendix A,** and **Plan and Profile** drawing, provided in **Appendix A**, illustrate the proposed crossing design in plan and cross section. The proposed culvert size is supported in the following discussion.

To reduce impacts to the adjacent lands and avoid increasing the crossing length, the proposed culverts will be situated perpendicular to the proposed ROW. A small channel realignment will be required on the upstream side due to the slight skew in Black Creek at the existing location.

As outlined in the Bass Pro Mills Drive Meander Belt Assessment (Stantec, 2021), in the vicinity of the extension of Bass Pro Mills Drive a meander belt width was empirically calculated to be 39 m. Due to the wide meander belt width, it is not practical to span its entirety with a single span structure; therefore, a large pre-cast open bottom culvert is proposed. The proposed preliminary size will need to be discussed

with TRCA and, if required, additional geomorphic studies in support of the proposed size will need to be complete during the detailed design stage.

A 100-year erosion rate was estimated using Table 4 of Appendix 2.A in TRCA Crossing Guidelines. For watercourses less than 5 m in width, having a native soil of clays, clay-silt, gravels and conservatively assuming that the watercourse is showing signs of active erosion, the approximate 100-year toe erosion can be estimated to be in the range of 5 – 8 m. A more detailed 100-year erosion rate should be determined during the detailed design stage.

To permit wildlife movement and fish passage, the proposed road crossing is an open bottom culvert and will have an openness ratio of 0.6, which is an acceptable value for the target species of small mammals and amphibians and reptiles.

Based on the hydraulic analysis for the proposed crossing, described below, there will be no anticipated increase in the Regional Storm water-surface elevation upstream of the proposed crossing.

5.8.1.1 Hydraulic Modelling

To assess conveyance capacity and ensure no impacts to the Regional Storm water surface elevations, the preliminary crossing configuration was inserted into the updated existing conditions HEC-RAS model as Cross Section 8313. **Table 10** compares the existing and proposed Regional Storm water surface elevations for cross sections in the vicinity of the extension of Bass Pro Mills Drive. Detailed modeling output for all storm events are provided in **Appendix D.5**. **Drawing 5, provided in Appendix A,** illustrates the proposed Regional Storm floodline and associated water-surface elevations.

Table 10: Existing and Proposed Regional Storm Flood Summary

Cross Section	Regional Storm Flow (L/s)	Regional Water Surface Elevation (m)		
		Existing	Proposed	Difference
8569	33.23	209.98	209.98	0.00
8563	33.23	209.97	209.98	0.01
8514	33.23	209.96	209.96	0.00
8456	33.23	209.93	209.93	0.00
8395	33.23	209.89	209.89	0.00
8337	33.23	209.84	209.77	-0.07
8313	Culvert-			
8290	33.23	209.53	209.63	0.10
8271	33.23	209.65	209.65	0.00
8264	33.23	209.65	209.65	0.00

As noted in **Table 10**, the Regional Storm water-surface elevations are, for the most part, the same as existing conditions and any variation is due to rounding issues. Due to culvert hydraulics, there is a

slightly larger increase in water-surface elevation at the cross-section located at the immediate downstream face of the culvert; however, as shown on **Drawing 5, provided in Appendix A,** the difference in the floodlines is minimal and the proposed condition ties back to existing condition water-surface levels at cross-section 8271.

5.8.1.2 MTO Criteria

The watercourse crossing should also follow MTO Drainage Design Standards, outlined in Section 3.3.3, which identifies design storms to be used for culvert/bridge sizing and the necessary associated freeboards based on roadway classification. **Table 11** summarizes MTO Drainage Design Standards, road and culvert information, as well as water levels and freeboards.

Table 11: Watercourse Crossing

Criteria	Black Creek Crossing
Proposed Bass Pro Mills Drive Extension Information	
Road Classification	Urban Arterial
Elevation of Edge of Traveled Lane (at Road Low Point)[1]	210.67 m
MTO Drainage Design Standard WC-1	
Design Flow (based on Road Classification and Span Over 6.0 m)	100-Year Storm Event
MTO Drainage Design Standard WC-7	
High Water Level for Design Flow (100-Year)	209.39 m
Freeboard to Edge of Traveled Lane (Required 1.0m)	1.28 m
Soffit Elevation	209.92 m
Soffit Clearance (Required 0.3m)	0.53 m
MTO Drainage Design Standard WC-13	
Regional Storm Water Level	209.77 m
Overtopping Depth	No Overtopping

Notes:

1. Edge of traveled lane is assumed to be 0.15m above proposed CL elevation.

As shown in **Table 11** the preliminary Bass Pro Mills Drive crossing of Black Creek is hydraulically sufficient based on current MTO Drainage Design Standards.

5.8.1.3 Alternative Conceptual Options

To support the future land use development planning within the VMCSP Area, three (3) potential alternative locations for the proposed Black Creek Crossing have been identified and illustrate how the future Black Creek relocation alignment could be accommodated by the extension of Bass Pro Mills Drive, refer to **Figure 6**.

The proposed preliminary crossing, discussed above, can be replicated at the alternate locations, provided vertical separation between proposed road grade culvert can be maintained. The watercourse crossing location and size will need to be confirmed during detailed design when the adjacent land use plan has been finalized.

5.8.2 Wetland-1 Culvert

As outlined in the Section 6.4 of Bass Pro Mills Drive EIS (Stantec, 2022), little is known about the hydrologic and ecological functions of Wetland-1, excerpt provided below:

> *The functions of the wetland related to ground water recharge and discharge and water storage and release are unknown. The presence of fish and fish habitat is also not known, and only limited information on terrestrial wildlife habitat is available due to land access restrictions. No amphibians were recorded during roadside call count surveys but calling individuals may have been missed due to traffic noise. The wetland is providing habitat for bird species, including those ranked as species of regional concern (Alder Flycatcher, Swamp Sparrow, Marsh Wren, Virginia Rail). The wetland is dominated by common and invasive plant species.*

The report recommends that during detailed design, Wetland-1 should be evaluated following Ontario Wetland Evaluation System procedures. The results of the evaluation will provide additional information on wetland function and can be used to inform compensation and connectivity.

The report further recommends that an equalizer culvert be used to maintain the hydraulic connectivity of the two wetland sections and the culvert be sized to facilitate wildlife passage.

As discussed in Section 2.1, the northern and southern portions of Wetland-1 are currently connected by a trapezoidal weir within the berm that has a bottom width of approximately 5 m, average side slopes of 4.5:1 and a spill elevation of 209.90 m. Due to the large size of the weir, it is not possible to hydraulically replicate the conveyance characteristics with a culvert.

During detailed design, an appropriately sized an equalizer culvert should be sized to maintain the hydraulically connectivity of the two wetland sections and satisfy wildlife crossing requirements. To ensure wetland connectivity, the equalizer culvert should be countersunk and the bottom filled with river run stone. Overtime, fines from the wetland will fill the voids in the river run stone which will provide a natural substrate for wildlife passage.

6.0 CONCLUSION

An independent/standalone SWM strategy to service the extension of Bass Pro Mills Drive ROW has been presented herein. The proposed SWM strategy sufficiently addresses stormwater quality control, erosion control, water balance and quantity control and is generally summarized as follows:

- Quality control can be provided in bioretention facilities or bioswales located within the 2.3 m wide boulevard/ planter on both sides of the road;
- A Thornthwaite Mather water balance assessment will be required for the Wetland-1 located in the center of the Study Area and will be completed during detailed design;
- Erosion control (on-site retention of 5 mm of rainfall) can be achieved through the use the bioretention facilities, infiltration rock trench or underground chamber or any combination thereof;
- Quantity controls can be provided for in oversized pipes or a combined retention/detention underground chamber;
- HDF-A will need to be relocated to the north to maintain it's current function as a surface water connection to Black Creek;
- A preliminary road crossing of Black Creek has been prepared and consists of a 13.4 m wide x 1.5 m high open span culvert flanked by two (2) - 3.6 m wide x 1.2 m high box culverts. The proposed crossing can be replicated at alternate locations in order to accommodate the land use plan for the adjacent property; and
- An equalizer culvert between the north and south portions of Wetland-1 should be sized during detailed design to maintain the hydraulic connectivity of the two wetland sections and satisfy wildlife crossing requirements.

Appendix A DRAWINGS

RUTHERFORD RD

HIGHWAY 400

TRIBUTARY OF BLACK CREEK

Wetland1
23.4ha

WESTON ROAD

FISHERMENS WAY

HIGHWAY 400 SB RAMP

SWM POND

BASS PRO MILLS DRIVE

ASTONA BLVD

BLACK CREEK

HDF-A

WETLAND-1
AREA = 3.6ha

POTENTIAL HEADWATER DRAINAGE FEATURE

WESTON ROAD

VALERIA BLVD

HIGHWAY 400

Stantec

Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham ON
Tel. 905.944.7777
www.stantec.com

Legend

- STUDY AREA
- EXISTING CONTOURS
- OVERLAND FLOW
- WATERCOURSE
- HEADWATER DRAINAGE FEATURE-A
- POTENTIAL HEADWATER DRAINAGE FEATURE
- DIRECTION OF FLOW
- MARSH COMMUNITIES
- WETLAND 1 CONTRIBUTING DRAINAGE AREAS
- PROPOSED BASS PRO MILLS DRIVE ROW
- EXISTING STORM SEWER NETWORK
- HIGH POINT

Client/Project

CITY OF VAUGHAN

BASS PRO MILLS DRIVE EXTENSION
WESTON ROAD TO HIGHWAY 400
Vaughan, Ontario

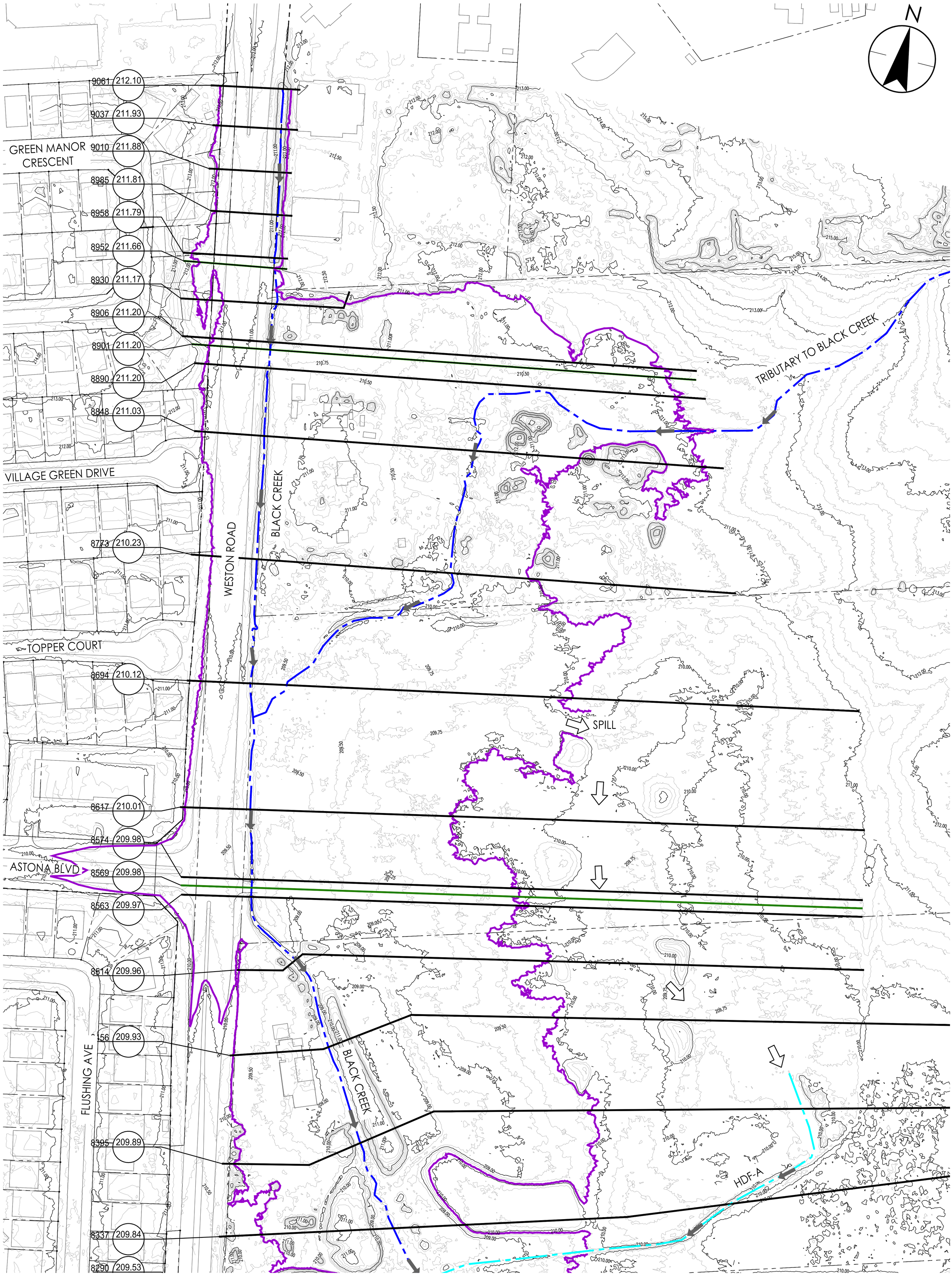
Title

EXISTING CONDITIONS

Project No.	Scale	Dwg No.
1605 40006	1:2000	1

\\CD1215-F01\WORK_GROUP\01605\ACTIVE\160540006\10_DRAWINGS\10.4_SHEET_FILES\10_SWM DRAWING 1 - EXISTING CONDITIONS.DWG

ORIGINAL SHEET - ARCH D



Stantec

Stantec Consulting Ltd.
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Markham ON
Tel. 905.944.7777
www.stantec.com

Legend

- REGULATED WATERCOURSE
- DIRECTION OF FLOW
- EXISTING CONTOURS (183.00)
- HEADWATER DRAINAGE FEATURE ('HDF')
- POTENTIAL HDF
- EXISTING REGIONAL FLOODLINE
- SPILL LOCATION/OVERLAND FLOW
- HEC-RAS CROSS SECTION
- HEC-RAS TOP-OF-ROAD CROSS SECTION
- UPSTREAM CROSS SECTION OF TRCA REGULATORY MODEL
- 179.15 / 2021.85 — EX. REGIONAL STORM FLOOD ELEVATION (m) / HEC-RAS CROSS SECTION NUMBER

Client/Project

CITY OF VAUGHAN

BASS PRO MILLS DRIVE EXTENSION
WESTON ROAD TO HIGHWAY 400
Vaughan, Ontario

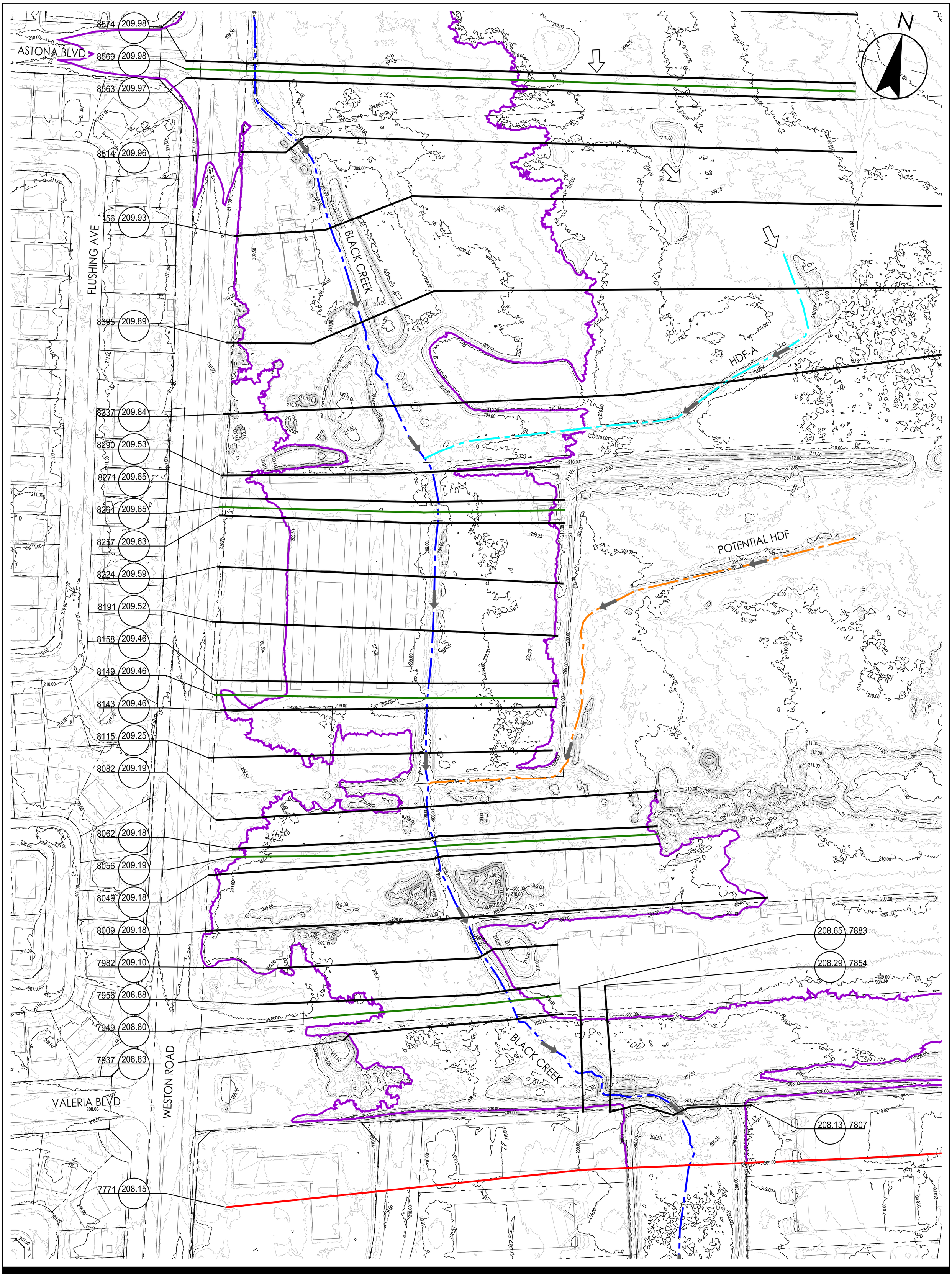
Title

EXISTING CONDITIONS REGIONAL STORM FLOODPLAIN MAPPING (1 OF 2)

Project No.	Scale	Dwg No.
1605 40006	1:1000	2

V:\01606\ACTIVE\160540006\160540006_FPM.DWG

ORIGINAL SHEET - ARCH D



Stantec

Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham ON
Tel. 905.944.7777
www.stantec.com

Legend

- REGULATED WATERCOURSE
- DIRECTION OF FLOW
- 183.00 EXISTING CONTOURS
- HEADWATER DRAINAGE FEATURE ("HDF")
- POTENTIAL HDF
- EXISTING REGIONAL FLOODLINE
- SPILL LOCATION/OVERLAND FLOW
- HEC-RAS CROSS SECTION
- HEC-RAS TOP-OF-ROAD CROSS SECTION
- UPSTREAM CROSS SECTION OF TRCA REGULATORY MODEL
- 179.15 / 2021.85 — EX. REGIONAL STORM FLOOD ELEVATION (m) / HEC-RAS CROSS SECTION NUMBER

Client/Project
CITY OF VAUGHAN

BASS PRO MILLS DRIVE EXTENSION
WESTON ROAD TO HIGHWAY 400
Vaughan, Ontario

Title
EXISTING CONDITIONS REGIONAL STORM FLOODPLAIN MAPPING (2 OF 2)

Project No.	Scale	Dwg No.
1605 40006	1:1000	3

V:\01606\ACTIVE\160540006\160540006_FPM.DWG

ORIGINAL SHEET - ARCH D

RUTHERFORD RD

HIGHWAY 400

TRIBUTARY OF BLACK CREEK

WESTON ROAD

Wetland1-N
19.3ha

HIGHWAY 400 SB RAMP

FISHERMENS WAY

SWM POND

BLACK CREEK

ASTONA BLVD

BASS PRO MILLS DRIVE

R.O.W.
2.22ha

REALIGNED HDF-A

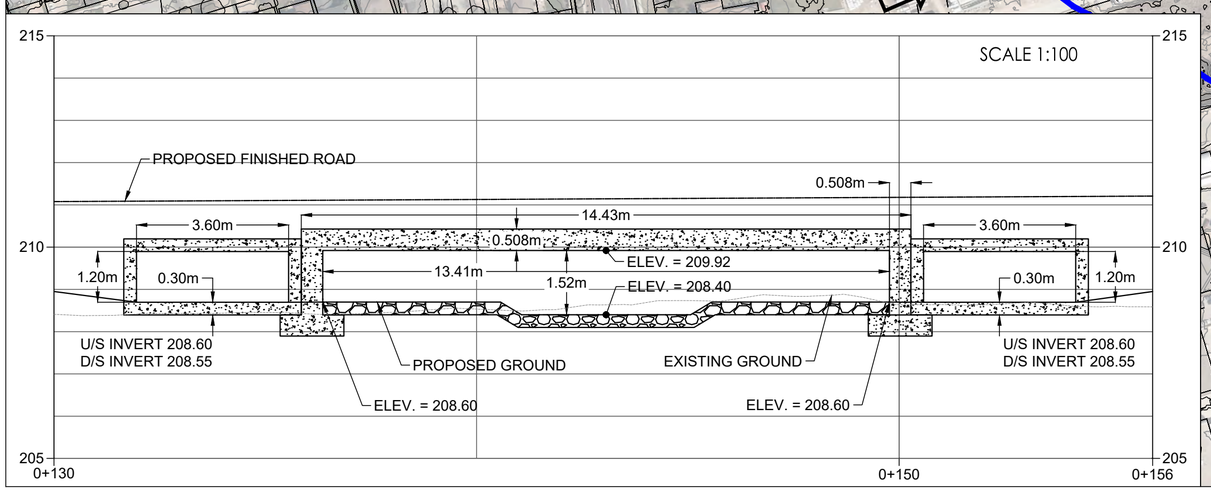
PROPOSED EQUALIZATION CULVERT

Wetland1-S
3.1ha

REALIGNMENT OF BLACK CREEK CROSSING

POTENTIAL HEADWATER DRAINAGE FEATURE

PROPOSED BLACK CREEK CROSSING
32.5m LONG X 13.4m WIDE X 1.5m HIGH
OPEN BOTTOM CULVERT
INVERT 208.40 m
SOFFIT 209.90 m
2-32.5 m LONG X 3.6m WIDE X 1.2m HIGH
BOX CULVERTS
INVERT 208.60 m



HIGHWAY 400

Legend

- STUDY AREA
- EXISTING CONTOURS
- OVERLAND FLOW
- WATERCOURSE
- REALIGNED HEADWATER DRAINAGE FEATURE-A
- POTENTIAL HEADWATER DRAINAGE FEATURE
- DIRECTION OF FLOW
- MARSH COMMUNITIES
- WETLAND 1 CONTRIBUTING DRAINAGE AREAS
- BASS PRO MILLS DRIVE DRAINAGE AREA
- POTENTIAL LID LOCATION
- EXISTING STORM SEWER NETWORK
- HIGH / LOW POINTS

Stantec

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300W-675 Cochrane Drive
Markham ON
Tel. 905.944.7777
www.stantec.com

Client/Project
CITY OF VAUGHAN

BASS PRO MILLS DRIVE EXTENSION
WESTON ROAD TO HIGHWAY 400
Vaughan, Ontario

Title
PROPOSED CONDITIONS

Project No.	Scale	Dwg No.
1605 40006	1:2000	4

ORIGINAL SHEET - ARCH D

\\CD1215-F01\WORK_GROUP\01605\ACTIVE\160540006\10_DRAWINGS\10.4_SHEET_FILES\10_SWM\DRAWING 4 - PROPOSED CONDITIONS.DWG

8563 209.97 209.98
8544 209.96 209.96
8456 209.93 209.93
8395 209.89 209.89
8337 209.84 209.77
8290 209.53 209.63
8271 209.65 209.65
8264 209.65 209.65
8257 209.63 209.63
8224 209.59 209.59

FLUSHING AVE

BLACK CREEK

HDF-A

PROPOSED BASS PRO MILLS DRIVE

POTENTIAL HDF

PROPOSED BLACK CREEK CROSSING
32.5m LONG x 13.4m WIDE x 1.5m HIGH
OPEN BOTTOM CULVERT
INVERT 208.40 m
SOFFIT 209.90 m
2 - 32.5m LONG x 3.6m WIDE x 1.2m HIGH
BOX CULVERTS
U/S INVERT 208.60 m
D/S INVERT 208.55 m

N

Stantec

0 15 30 45 60 75
1:1500

Legend

- REGULATED WATERCOURSE
- DIRECTION OF FLOW
- EXISTING CONTOURS
- HEADWATER DRAINAGE FEATURE ("HDF")
- POTENTIAL HDF
- EXISTING REGIONAL FLOODLINE
- PROPOSED REGIONAL FLOODLINE
- SPILL LOCATION/OVERLAND FLOW
- HEC-RAS CROSS SECTION
- HEC-RAS TOP-OF-ROAD CROSS SECTION
- UPSTREAM CROSS SECTION OF TRCA REGULATORY MODEL

179.15 EX. REGIONAL STORM FLOOD ELEVATION (m)
2021.85 HEC-RAS CROSS SECTION NUMBER
179.15 PROP. REGIONAL STORM FLOOD ELEVATION (m)

CITY OF VAUGHAN

BASS PRO MILLS DRIVE EXTENSION
WESTON ROAD TO HIGHWAY 400
VAUGHAN, ONTARIO

FIGURE 5

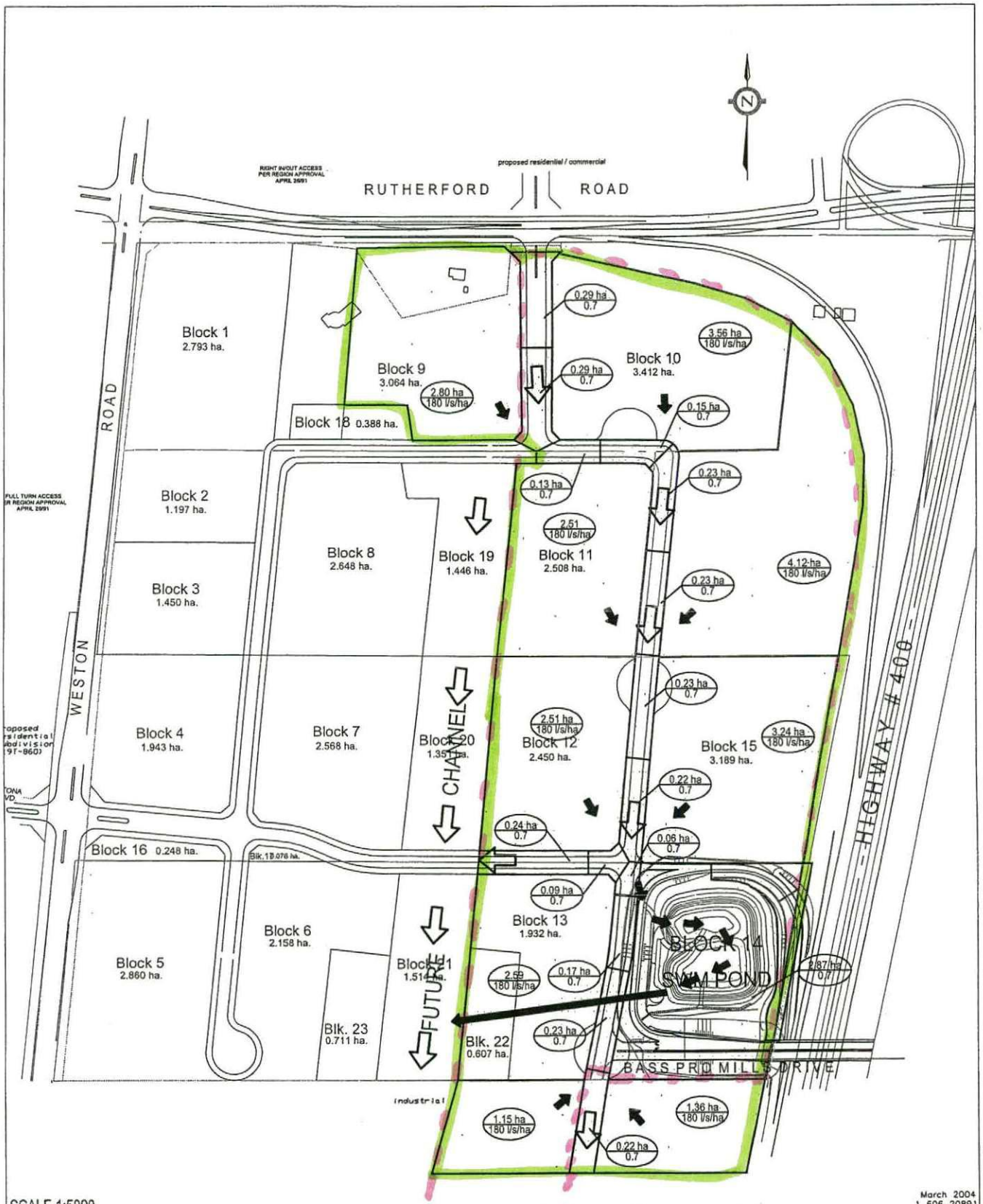
PROPOSED CONDITIONS REGIONAL STORM FLOODPLAIN MAPPING

August 2022

File: \\cd1215-f01\01606\Active\160540006\Drawing\sheet_files\160540006_C-TB.dwg - Revised by <Luk, James>, Tue, Apr 05, 2016, 1:40 PM

Appendix B BACKGROUND INFORMATION

B.1 HIGHWAY 400 AND BASS PRO MILLS DRIVE SWM POND EXCERPTS



Stantec Consulting Ltd.
300, 7270 Woodbine Ave.
Markham ON Canada
L3R 4B9
Tel. 905.474.0455
Fax. 905.474.9889
www.stantec.com

MAJOR SYSTEM DRAINAGE

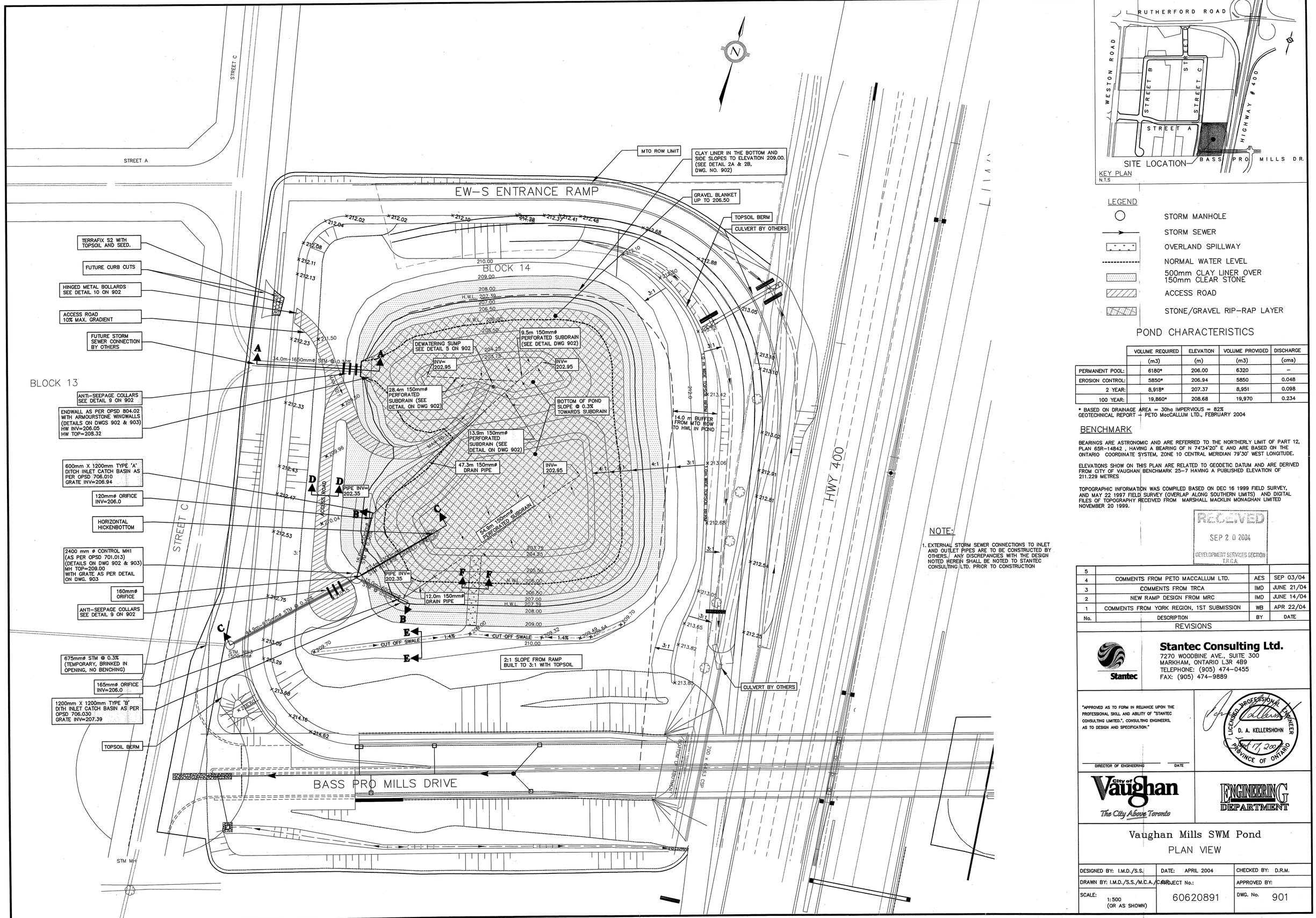
MINOR SYSTEM DRAINAGE

NE Quality Pond drainage boundary from CPM report

Client/Project
MILLS CORPORATION
RUTHERFORD BUSINESS PARK
SWM POND IN HWY.400 ON-RAMP

Figure No.
3

Title
Proposed Drainage



KEY PLAN
N.T.S

LEGEND

- STORM MANHOLE
- STORM SEWER
- OVERLAND SPILLWAY
- NORMAL WATER LEVEL
- 500mm CLAY LINER OVER 150mm CLEAR STONE
- ACCESS ROAD
- STONE/GRAVEL RIP-RAP LAYER

POND CHARACTERISTICS

	VOLUME REQUIRED (m3)	ELEVATION (m)	VOLUME PROVIDED (m3)	DISCHARGE (cms)
PERMANENT POOL:	6180*	206.00	6320	–
EROSION CONTROL:	5850*	206.94	5850	0.048
2 YEAR:	8,918*	207.37	8,951	0.098
100 YEAR:	19,860*	208.68	19,970	0.234

* BASED ON DRAINAGE AREA = 30ha IMPERVIOUS = 82%
GEOTECHNICAL REPORT - PETO MacCALLUM LTD., FEBRUARY 2004

BENCHMARK

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE NORTHERLY LIMIT OF PART 12, PLAN 65R-14842 , HAVING A BEARING OF N 74°34'20" E AND ARE BASED ON THE ONTARIO COORDINATE SYSTEM, ZONE 10 CENTRAL MERIDIAN 79°30' WEST LONGITUDE.

ELEVATIONS SHOW ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM CITY OF VAUGHAN BENCHMARK 25-7 HAVING A PUBLISHED ELEVATION OF 211.229 METRES

TOPOGRAPHIC INFORMATION WAS COMPILED BASED ON DEC 16 1999 FIELD SURVEY, AND MAY 22 1997 FIELD SURVEY (OVERLAP ALONG SOUTHERN LIMITS) AND DIGITAL FILES OF TOPOGRAPHY RECEIVED FROM MARSHALL MACKLIN MONAGHAN LIMITED NOVEMBER 20 1999.

NOTE:

1. EXTERNAL STORM SEWER CONNECTIONS TO INLET AND OUTLET PIPES ARE TO BE CONSTRUCTED BY OTHERS./ ANY DISCREPANCIES WITH THE DESIGN NOTED HEREIN SHALL BE NOTED TO STANTEC CONSULTING LTD. PRIOR TO CONSTRUCTION

RECEIVED
SEP 2 0 2004
DEVELOPMENT SERVICES SECTION
T.R.C.A.

No.	DESCRIPTION	BY	DATE
5			
4	COMMENTS FROM PETO MACCALLUM LTD.	AES	SEP 03/04
3	COMMENTS FROM TRCA	IMD	JUNE 21/04
2	NEW RAMP DESIGN FROM MRC	IMD	JUNE 14/04
1	COMMENTS FROM YORK REGION, 1ST SUBMISSION	WB	APR 22/04

REVISIONS

Stantec Consulting Ltd.
7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R 4B9
TELEPHONE: (905) 474-0455
FAX: (905) 474-9889

"APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF "STANTEC CONSULTING LIMITED.", CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION."

DIRECTOR OF ENGINEERING — DATE

LICENSED PROFESSIONAL ENGINEER
D. A. KELLERSHOHN
SEP 17, 2004
PROVINCE OF ONTARIO

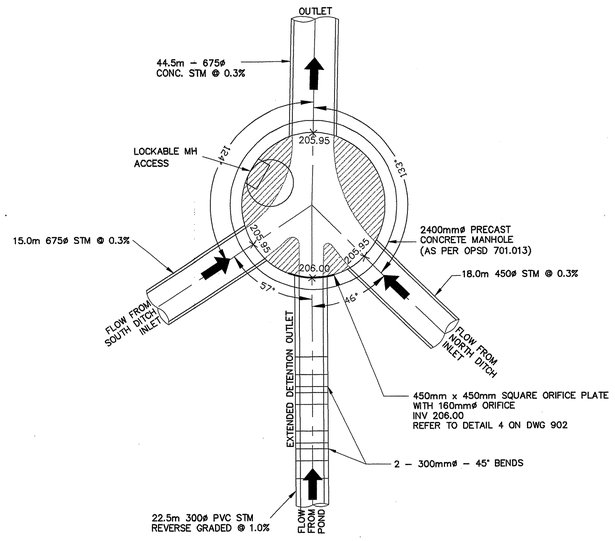
City of Vaughan
The City Above Toronto

ENGINEERING DEPARTMENT

Vaughan Mills SWM Pond
PLAN VIEW

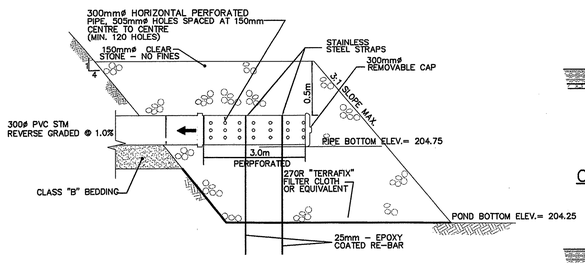
DESIGNED BY: I.M.D./S.S.	DATE: APRIL 2004	CHECKED BY: D.R.M.
DRAWN BY: I.M.D./S.S./M.C.A./C.G.	PROJECT No.: 60620891	APPROVED BY:
SCALE: 1:500 (OR AS SHOWN)		DWG. No. 901

File: V:\01606\Active\160620891\Drawing\Phase1\Base\60620891U-DBase- 09-Sep-2004.dwg (901) <coreed> Sep 17, 2004-11:43am



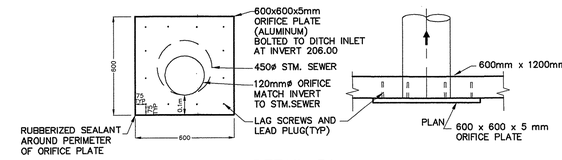
DETAIL 1
2400mmø SWM CONTROL MANHOLE MH1 DETAIL

N.T.S.



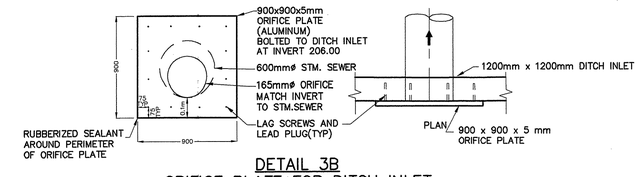
DETAIL 2
PERFORATED PIPE WITH CLEAR STONE INSTALLATION DETAIL

N.T.S.



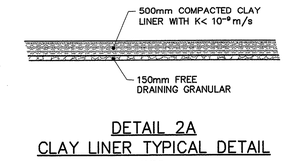
DETAIL 3A
ORIFICE PLATE FOR DITCH INLET

N.T.S.



DETAIL 3B
ORIFICE PLATE FOR DITCH INLET

N.T.S.



DETAIL 2A
CLAY LINER TYPICAL DETAIL

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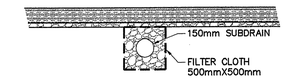

DETAIL 2B
SUBDRAIN DETAIL

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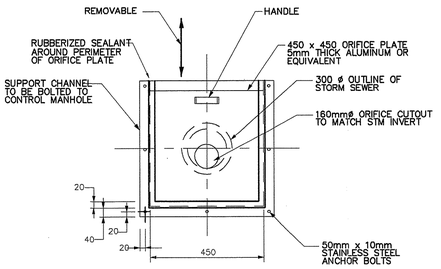
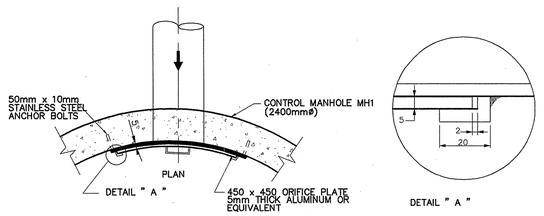
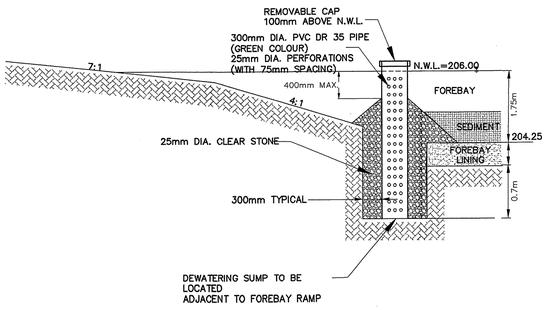




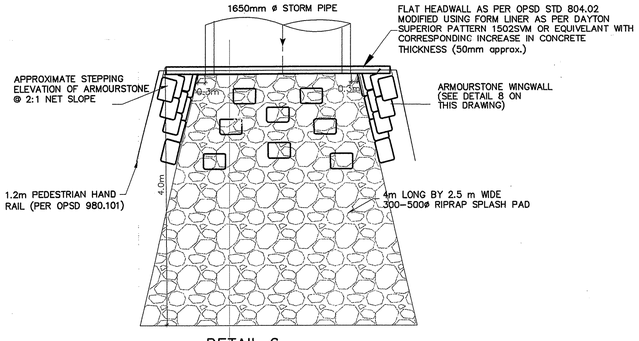
DETAIL 4
REMOVABLE ORIFICE PLATE FOR CONTROL MANHOLE MH1

N.T.S.



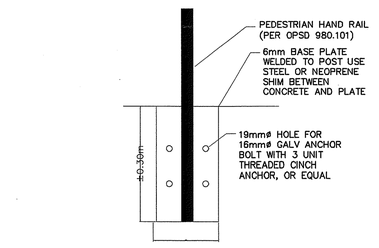
DETAIL 5
FOREBAY DEWATERING SUMP

N.T.S.



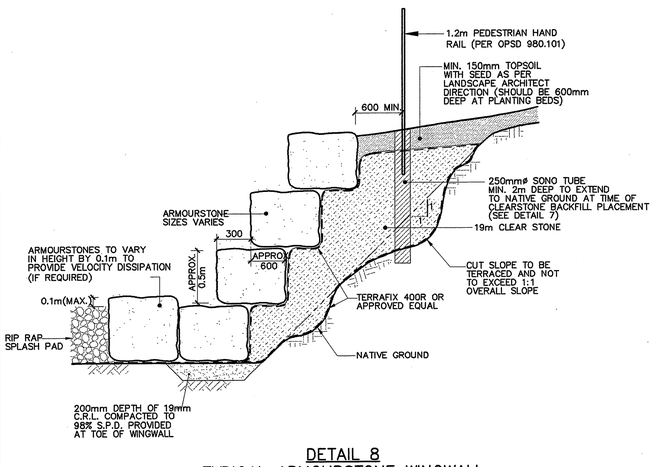
DETAIL 6
POND INLET HEADWALL

N.T.S.



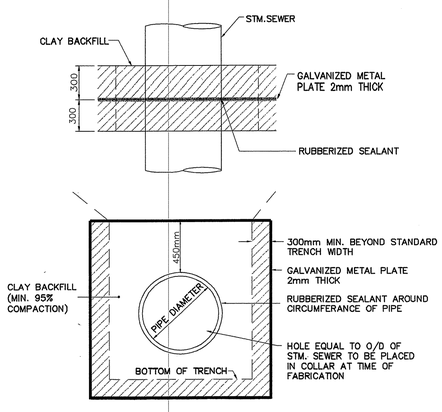
DETAIL 7
ANCHOR DETAIL FOR PEDESTRIAN HANDRAIL

N.T.S.



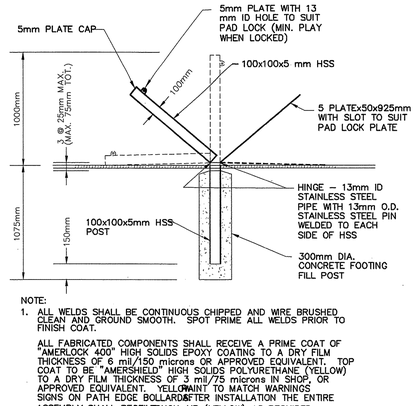
DETAIL 8
TYPICAL ARMOURSTONE WINGWALL CONSTRUCTION CROSS–SECTION DETAIL

N.T.S.



DETAIL 9
ANTI–SEEPAGE COLLAR

N.T.S.

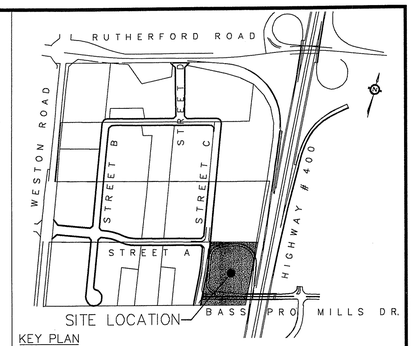


NOTE:
1. ALL WELDS SHALL BE CONTINUOUS CHIPPED AND WIRE BRUSHED CLEAN AND GROUND SMOOTH. SPOT PRIME ALL WELDS PRIOR TO FINISH COAT.

ALL FABRICATED COMPONENTS SHALL RECEIVE A PRIME COAT OF "AMERLOCK 400" HIGH SOLIDS EPOXY COATING TO A DRY FILM THICKNESS OF 6 mil/150 microns OR APPROVED EQUIVALENT. TOP COAT TO BE "AMERSHIELD" HIGH SOLIDS POLYURETHANE (YELLOW) TO A DRY FILM THICKNESS OF 3 mil/75 microns IN SHOP, OR APPROVED EQUIVALENT. YELLOW PAINT TO MATCH WARNINGS SIGNS ON PATH EDGE BOLLARDS. AFTER INSTALLATION THE ENTIRE ASSEMBLY SHALL RECEIVE TOUCH–UP (YELLOW) AS REQUIRED.

DETAIL 10
HINGED METAL BOLLARD

N.T.S.



KEY PLAN
N.T.S

LEGEND

NOTES

1. RESTORATION AND PLANTING TO BE CARRIED OUT AS PER LANDSCAPE PLANNING DRAWINGS.
2. ALL SEDIMENTATION CONTROL MEASURES ARE TO BE INSTALLED PRIOR TO TOP SOIL REMOVAL AND ARE TO BE MAINTAINED IN WORKING ORDER UNTIL RESTORATION AND STABILIZATION OF WORK AREA.
3. THIS STORMWATER MANAGEMENT POND DESIGN CONFORMS TO THE APPROVED STORMWATER MANAGEMENT REPORT, WESTON / 400 NORTH DEVELOPMENT AREA, CITY OF VAUGHAN, COSBURN PATTERSON WARDMAN LIMITED, JANUARY 1993
4. POND LEGAL BOUNDARIES TAKEN FROM GUIDO PAPA SURVEYING LTD. LOT 15, CONCESSION 5, CITY OF VAUGHAN, PARTS 1 AND 2, PLAN 65R–21747
5. ALL DIMENSION SHOWN IN METRES (m) UNLESS OTHERWISE NOTED.
6. REFER TO DRAWING 901 AND 903 FOR ADDITIONAL POND DETAILS.
7. POND BERMS TO BE CONSTRUCTED WITH LOCAL MATERIALS CONSISTING OF SILTY CLAY TILL. THIS MATERIAL IS TO BE APPROVED BY GEOTECHNICAL CONSULTANT ON SITE.
8. ALL CONCRETE PIPE TO CONFORM TO C.S.A. A257.2 C76 (CL 65–D) WITH BEDDING AS PER OPSD 802.030 – CLASS 'B' UNLESS OTHERWISE NOTED.
9. ALL RIBBED PVC PIPE TO CONFORM TO C.S.A. B182.4. ALL OTHER PVC PIPE TO CONFORM TO C.S.A. B182.2 DR–35, AND B137.3 DR–18. BEDDING AS PER OPSD 802.010 UNLESS OTHERWISE NOTED.
10. ALL SUBDRAIN CONNECTIONS ARE TO BE MORTARED AT THE INSIDE AND OUTSIDE OF THE CATCHBASIN WALLS. THE SUBDRAIN SHALL BE CONTINUOUS PLUGGED WITH MANUFACTURED PLUG AT THE HIGH POINT WHERE THERE IS NO CATCHBASIN.

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SEP 2 0 2004
DEVELOPMENT SERVICES SECTION
T.R.C.A.

No.	DESCRIPTION	BY	DATE
5			
4	COMMENTS FROM PETO MACCALLUM LTD.	AES	SEP 03/04
3	COMMENTS FROM TRCA	IMD	JUNE 21/04
2	NEW RAMP DESIGN FROM MRC	IMD	JUNE 14/04
1	COMMENTS FROM YORK REGION, 1ST SUBMISSION	WB	APR 22/04

REVISIONS

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7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R 4B9
TELEPHONE: (905) 474–0455
FAX: (905) 474–9889

"APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF "STANTEC CONSULTING LIMITED.", CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION."

DIRECTOR OF ENGINEERING — DATE

LICENCED PROFESSIONAL ENGINEER
D. A. KELLERSHOHN
17 11 2004
PROVINCE OF ONTARIO

City of Vaughan
The City Above Toronto

ENGINEERING DEPARTMENT

Vaughan Mills SWM Pond
DETAILS

DESIGNED BY: I.M.D./S.S.	DATE: APRIL 2004	CHECKED BY: D.R.M.
DRAWN BY: I.M.D./S.S./M.C.A.	PROJECT No.: 60620891	APPROVED BY:
SCALE: 1:500 (OR AS SHOWN)		DWG. No. 902

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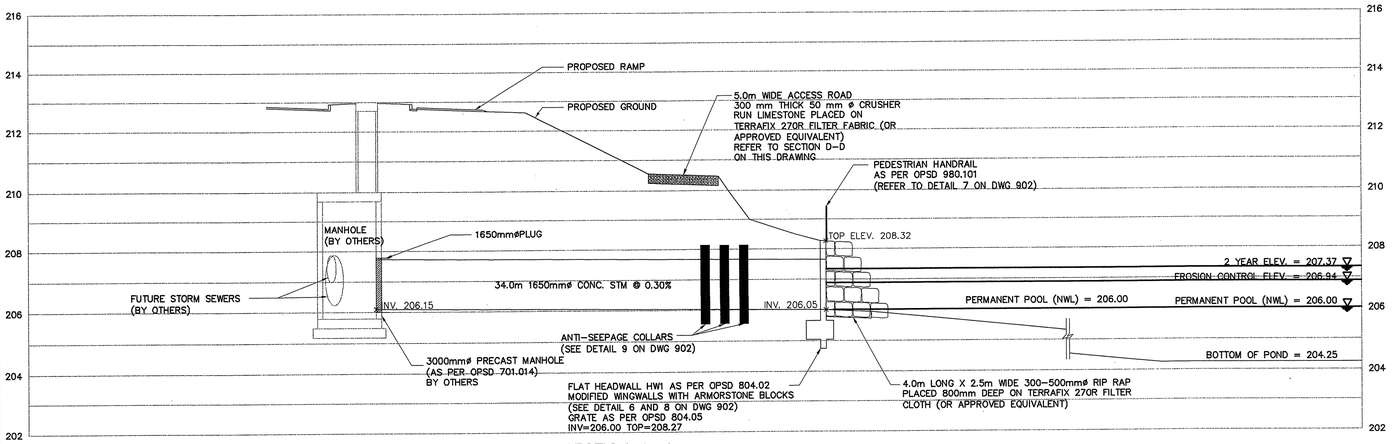
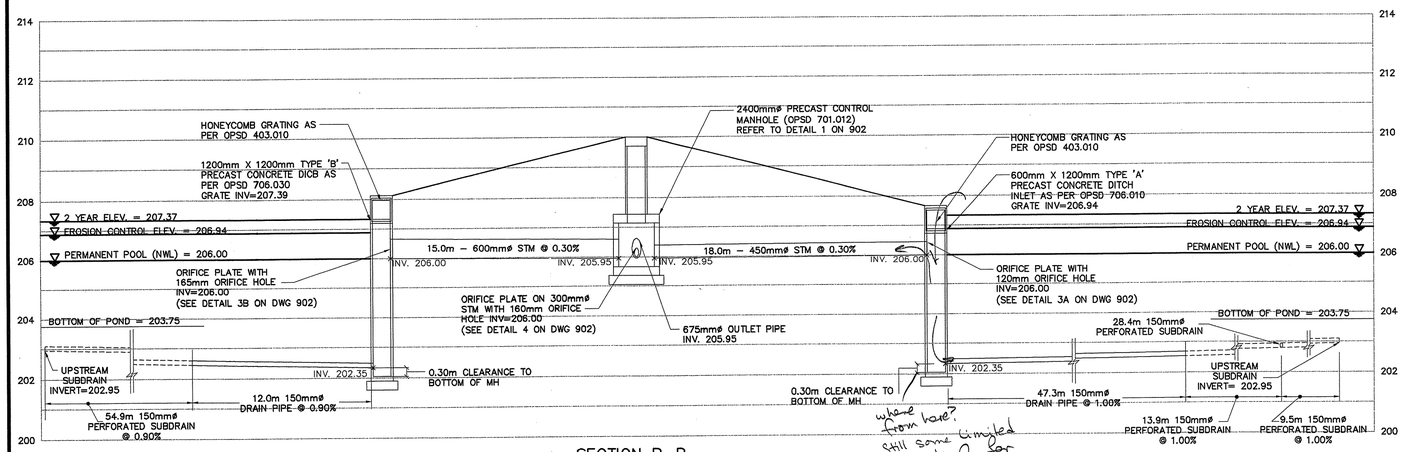


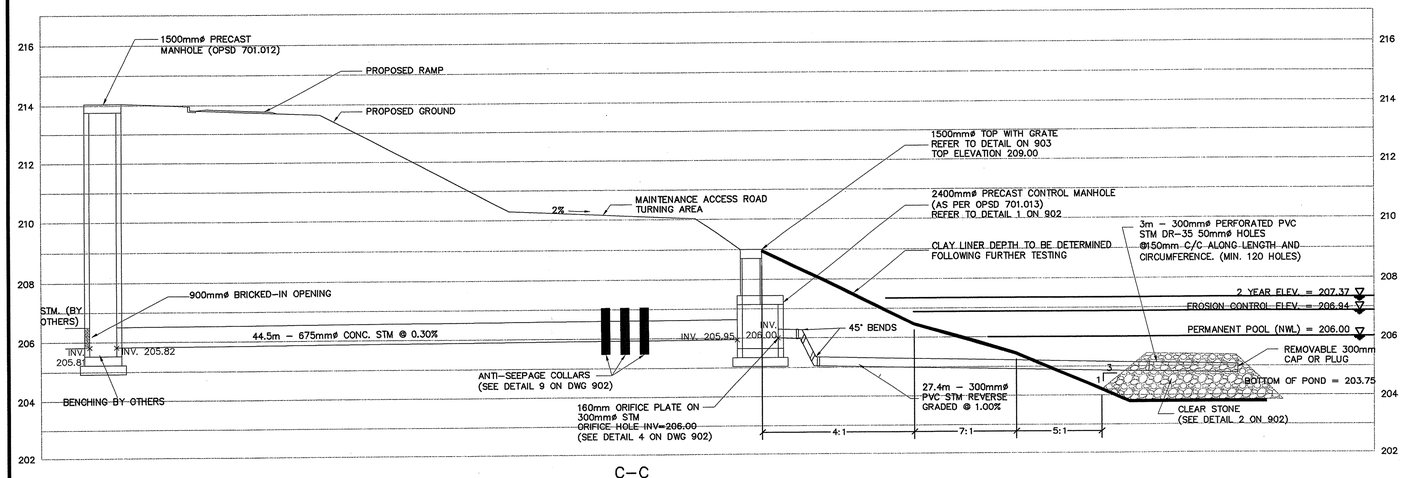
SECTION A-A
POND INLET STRUCTURE

V. SCALE = 1:100
H. SCALE = 1:200



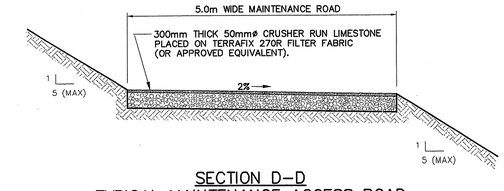
SECTION B-B
POND OUTLET STRUCTURE

V. SCALE = 1:100
H. SCALE = 1:200



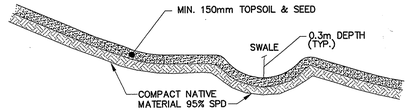
C-C
POND OUTLET STRUCTURE

V. SCALE = 1:100
H. SCALE = 1:200



SECTION D-D
TYPICAL MAINTENANCE ACCESS ROAD

N.T.S.



SECTION E-E
CUT OFF SWALE

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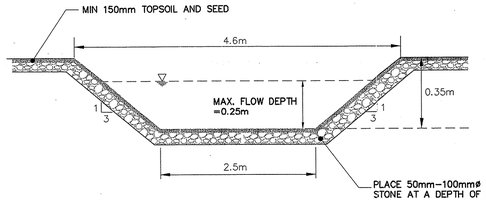
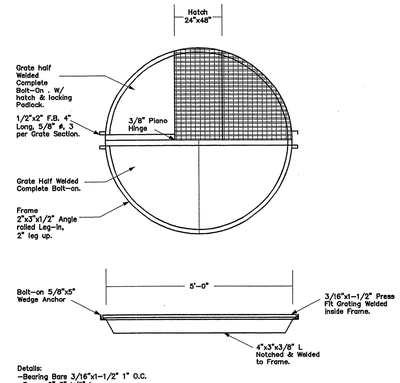


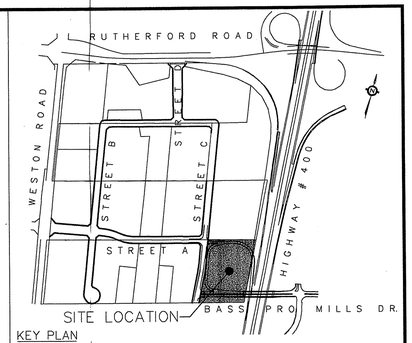
SECTION F-F
OVERLAND FLOW ROUTE BELOW CUT OFF SWALE

N.T.S.



1500mm STEEL COVER W/ HATCH
AS PER STEPCON INDUSTRIES INC. MODEL 4965

N.T.S.



KEY PLAN
N.T.S

LEGEND

NOTES

1. RESTORATION AND PLANTING TO BE CARRIED OUT AS PER LANDSCAPE PLANNING DRAWINGS.
2. ALL SEDIMENTATION CONTROL MEASURES ARE TO BE INSTALLED PRIOR TO TOP SOIL REMOVAL AND ARE TO BE MAINTAINED IN WORKING ORDER UNTIL RESTORATION AND STABILIZATION OF WORK AREA.
3. THIS STORMWATER MANAGEMENT POND DESIGN CONFORMS TO THE APPROVED STORMWATER MANAGEMENT REPORT, WESTON / 400 NORTH DEVELOPMENT AREA, CITY OF VAUGHAN, COSBURN PATTERSON WARDMAN LIMITED, JANUARY 1993
4. POND LEGAL BOUNDARIES TAKEN FROM GUIDO PAPA SURVEYING LTD. LOT 15, CONCESSION 5, CITY OF VAUGHAN, PARTS 1 AND 2, PLAN 65R-21747
5. ALL DIMENSION SHOWN IN METRES (m) UNLESS OTHERWISE NOTED.
6. REFER TO DRAWING 901 AND 902 FOR ADDITIONAL POND DETAILS.
7. POND BERMS TO BE CONSTRUCTED WITH LOCAL MATERIALS CONSISTING OF SILTY CLAY TILL. THIS MATERIAL IS TO BE APPROVED BY GEOTECHNICAL CONSULTANT ON SITE.
8. ALL CONCRETE PIPE TO CONFORM TO C.S.A. A257.2 C76 (CL 65-D) WITH BEDDING AS PER OPSD 802.030 - CLASS 'B' UNLESS OTHERWISE NOTED.
9. ALL RIBBED PVC PIPE TO CONFORM TO C.S.A. B182.4. ALL OTHER PVC PIPE TO CONFORM TO C.S.A. B182.2 DR-35, AND B137.3 DR-18. BEDDING AS PER OPSD 802.010 UNLESS OTHERWISE NOTED.

RECEIVED
SEP 2 0 2004
DEVELOPMENT SERVICES SECTION
T.R.C.A.

No.	DESCRIPTION	BY	DATE
5			
4	COMMENTS FROM PETO MACCALLUM LTD.	AES	SEP 03/04
3	COMMENTS FROM TRCA	IMD	JUNE 21/04
2	NEW RAMP DESIGN FROM MRC	IMD	JUNE 14/04
1	COMMENTS FROM YORK REGION, 1ST SUBMISSION	WB	APR 22/04

REVISIONS

Stantec Consulting Ltd.
7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R 4B9
TELEPHONE: (905) 474-0455
FAX: (905) 474-9889

"APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF "STANTEC CONSULTING LIMITED.", CONSULTING ENGINEERS, AS TO DESIGN AND SPECIFICATION."

LICENSED PROFESSIONAL ENGINEER
D. A. KELLERSHOHN
100117307
PROVINCE OF ONTARIO

DIRECTOR OF ENGINEERING — DATE

City of Vaughan
The City Above Toronto

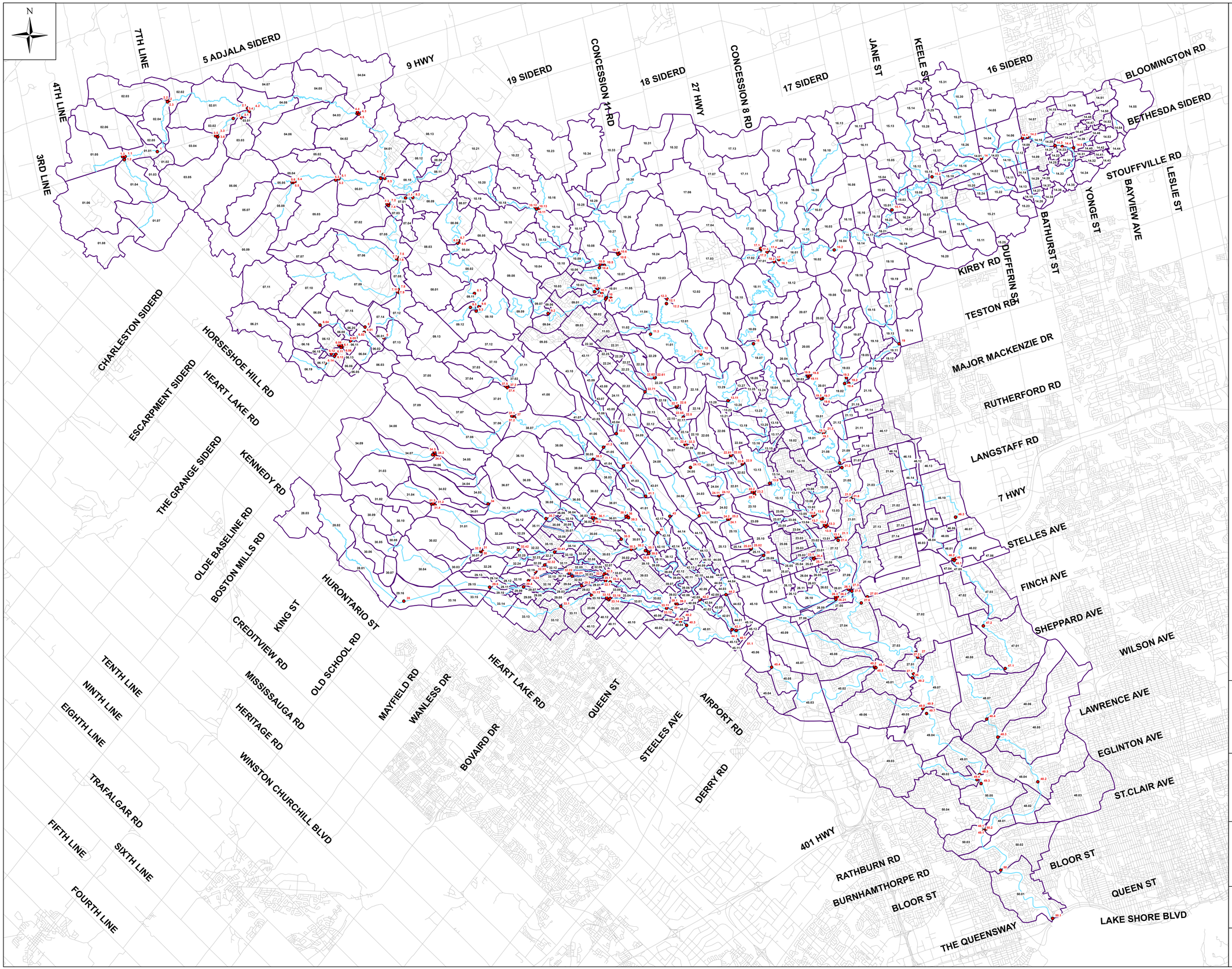
ENGINEERING DEPARTMENT

Vaughan Mills SWM Pond
SECTIONS

DESIGNED BY: I.M.D./S.S.	DATE: APRIL 2004	CHECKED BY: D.R.M.
DRAWN BY: I.M.D./S.S./M.C.A./C.C.	PROJECT No.: 60620891	APPROVED BY:
SCALE: 1:500 (OR AS SHOWN)		DWG. No. 903

File: V:\01606\Active\160620891\Drawing\Phase1\swm\Pond Details-09-SEPT-04.dwg (DETAILS 903) <ccreed> Sep 17, 2004-11:43am

B.2 TRCA HUMBER RIVER HYDROLOGY UPDATE EXCERPTS



Legend

- Flow Node
- General River
- Subcatchment

TORONTO AND REGION Conservation for The Living City

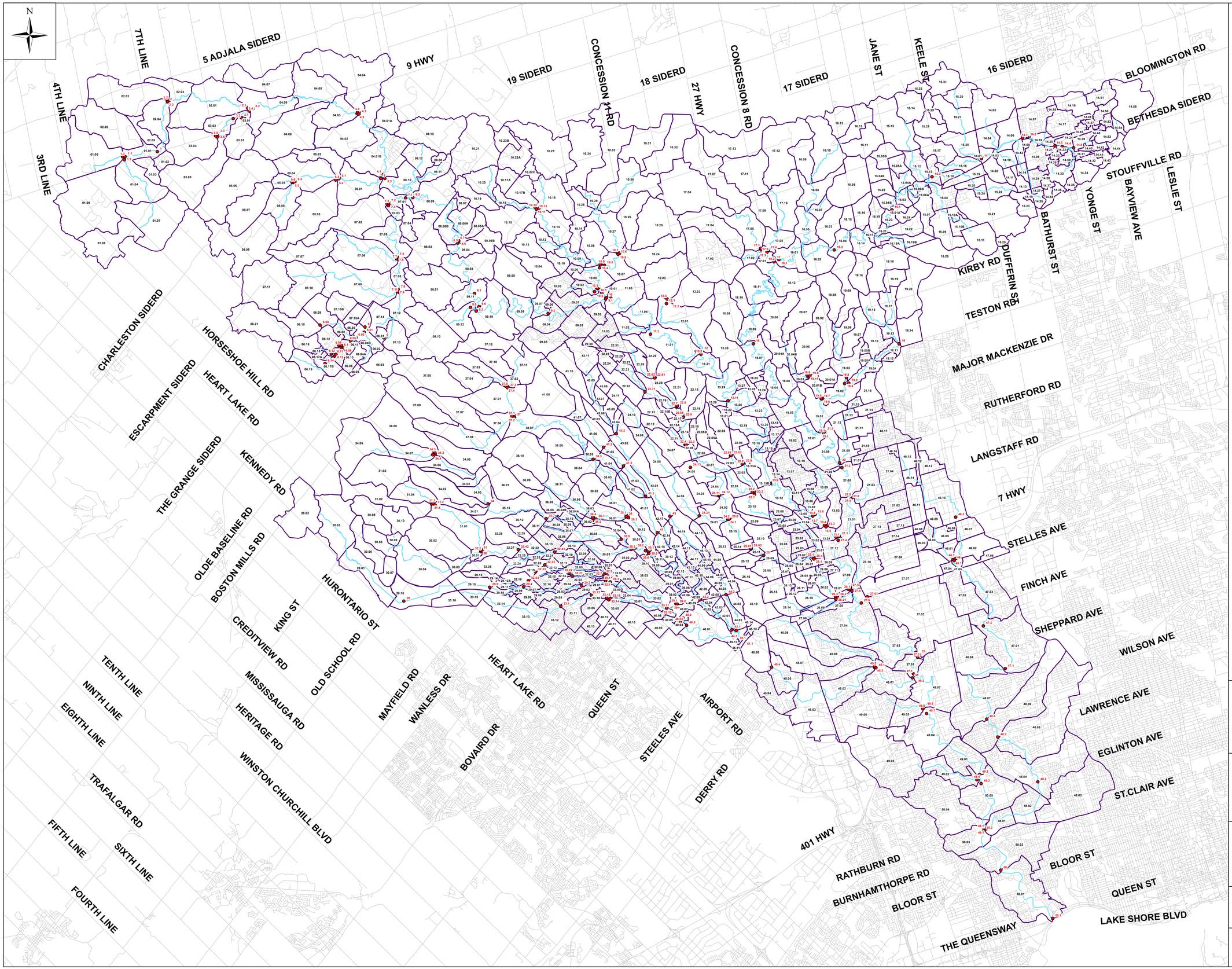
CIVICA

Humber River Hydrology

Figure 2.1 Catchments for Existing Scenario

Drawn By: M.Y. Date: Dec. 20, 2017

0 1.25 2.5 5 Kilometers



Legend

- Flow Node
- General River
- Subcatchment

TORONTO AND REGION Conservation for The Living City

CIVICA

Humber River Hydrology

Figure 5.4 Catchments for Future Scenario

Drawn By: M.Y. Date: Dec. 20, 2017

0 1.25 2.5 5 Kilometers

Appendix C EXISTING CONDITIONS HEC-RAS

Stantec

Project: Bass Pro Mills Drive Extention
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

HEC-RAS Flow Inputs

River	Reach	RS	VO Node	Fut_ Regional	Fut_350 yr	Ex_100 yr	Ex_50 yr	Ex_25 yr	Ex_10 yr	Ex_5 yr	Ex_2 yr
Black Creek	2	9061	4089/688	25.81	22.98	1.98	1.74	1.51	1.22	0.80	0.56
Black Creek	2	8848	805	28.65	25.65	4.26	3.79	3.33	2.66	1.81	1.25
Black Creek	2	8694	TR Eqn[1]	33.23	29.83	8.70	7.64	6.58	5.04	3.00	2.01
Black Creek	2	8224	7669	35.79	32.17	12.44	10.84	9.26	6.94	3.87	2.55
Black Creek	2	7006	1543	41.76	37.82	19.68	17.33	14.98	11.63	7.30	5.03
Black Creek	2	6668	1540	55.90	51.02	29.21	23.34	19.96	15.11	9.22	6.37
Black Creek	2	4755	N/A	70.53	62.39	50.65	44.02	38.31	31.24	21.75	15.17
Black Creek	2	4008	N/A	75.83	67.67	54.93	47.74	41.55	33.88	23.59	16.45
Black Creek	2	3250	1532	88.78	79.23	64.32	55.90	48.65	39.67	27.62	19.26
Black Creek	2	2377	1514	91.24	79.84	35.73	30.13	24.65	17.09	9.51	6.23
Black Creek	2	1004	7667	105.60	89.67	38.64	32.11	26.20	18.69	10.00	6.51
Black Creek	1	1597	1503	153.79	139.40	65.46	55.91	46.85	34.87	19.18	12.76
Black Creek	1	880	1567	167.38	150.65	72.99	62.52	51.91	38.60	21.16	13.67

Notes:

1. Refer to Peak Flow Calculations (Transpostition Equation) and Figure C-1.

Stantec

Project: Bass Pro Mills Drive Extention
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Peak Flow Calculations (Transposition Equation)

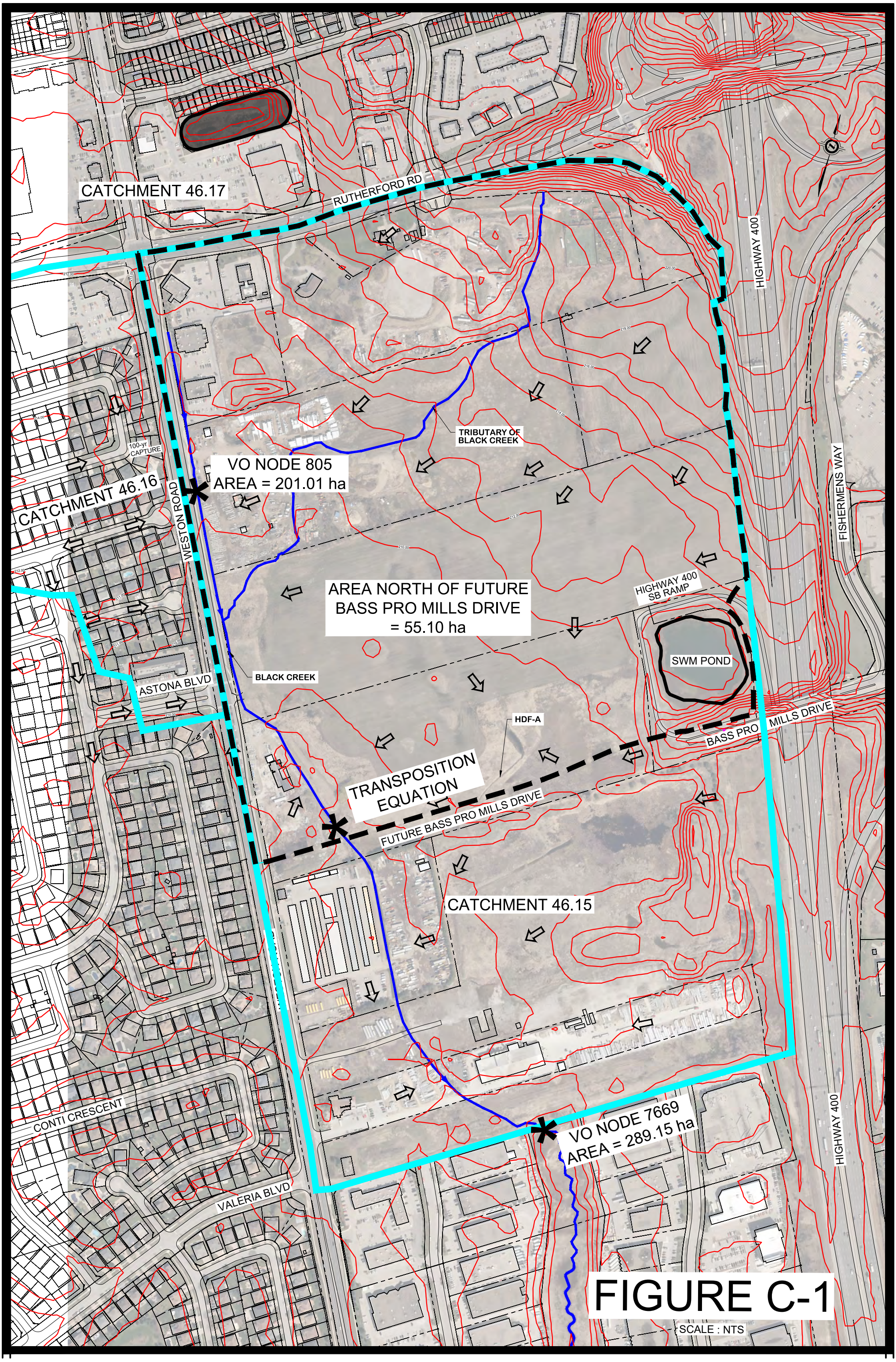
Based on the USGS Transposition Equation $Q_1/Q_2 = (A_1/A_2)^n$

HEC-RAS Cross Section 8848

Flow Node[1]		Area (ha)	Fut_ Regional	Fut_350 yr	Ex_100 yr	Ex_50 yr	Ex_25 yr	Ex_10 yr	Ex_5 yr	Ex_2 yr
U/S	805	201.01	28.65	25.65	4.26	3.79	3.33	2.66	1.81	1.25
D/S	7669	289.15	35.79	32.17	12.44	10.84	9.26	6.94	3.87	2.55
Solve for exponent 'n'			0.612	0.623	2.947	2.890	2.817	2.634	2.088	1.963
U/S Crossing		256.11	33.23	29.83	8.70	7.64	6.58	5.04	3.00	2.01

Notes:

1. Refer to Figure C-1.


CATCHMENT 46.17
RUTHERFORD RD
HIGHWAY 400
TRIBUTARY OF BLACK CREEK
VO NODE 805
AREA = 201.01 ha
CATCHMENT 46.16
WESTON ROAD
100-yr CAPTURE
FISHERMENS WAY
AREA NORTH OF FUTURE BASS PRO MILLS DRIVE = 55.10 ha
HIGHWAY 400 SB RAMP
SWM POND
BLACK CREEK
ASTONA BLVD
HDF-A
BASS PRO MILLS DRIVE
TRANSPOSITION EQUATION
FUTURE BASS PRO MILLS DRIVE
CATCHMENT 46.15
CONTI CRESCENT
VALERIA BLVD
VO NODE 7669
AREA = 289.15 ha
HIGHWAY 400
FIGURE C-1
SCALE : NTS

HEC-RAS Plan: Rev_Ex River: Black Creek Reach: 2

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	9061	Fut_Regional	25.810	210.28	212.10		212.18	0.001237	1.39	22.57	42.99	0.34
2	9061	Fut_350 yr	22.980	210.28	212.06		212.13	0.001168	1.33	20.89	42.56	0.33
2	9061	Ex_100 yr	1.980	210.28	211.35		211.37	0.000205	0.38	5.03	7.44	0.13
2	9061	Ex_50 yr	1.740	210.28	211.34		211.35	0.000171	0.34	4.91	7.38	0.12
2	9061	Ex_25 yr	1.510	210.28	211.32		211.33	0.000139	0.31	4.80	7.32	0.10
2	9061	Ex_10 yr	1.220	210.28	211.30		211.31	0.000101	0.26	4.64	7.23	0.09
2	9061	Ex_5 yr	0.800	210.28	211.26		211.27	0.000052	0.18	4.38	7.09	0.06
2	9061	Ex_2 yr	0.560	210.28	211.24		211.24	0.000029	0.13	4.21	6.99	0.05
2	9037	Fut_Regional	25.810	210.20	211.93	211.93	212.12	0.003816	2.43	18.81	42.82	0.60
2	9037	Fut_350 yr	22.980	210.20	211.89	211.89	212.08	0.003619	2.34	17.37	42.41	0.59
2	9037	Ex_100 yr	1.980	210.20	211.35		211.36	0.000231	0.45	5.60	7.20	0.14
2	9037	Ex_50 yr	1.740	210.20	211.34		211.34	0.000188	0.40	5.49	7.10	0.12
2	9037	Ex_25 yr	1.510	210.20	211.32		211.33	0.000149	0.35	5.38	6.99	0.11
2	9037	Ex_10 yr	1.220	210.20	211.30		211.30	0.000104	0.29	5.24	6.92	0.09
2	9037	Ex_5 yr	0.800	210.20	211.26		211.26	0.000051	0.20	4.99	6.81	0.06
2	9037	Ex_2 yr	0.560	210.20	211.24		211.24	0.000027	0.14	4.83	6.73	0.05
2	9010	Fut_Regional	25.810	210.13	211.88		212.01	0.002817	2.13	21.72	42.11	0.52
2	9010	Fut_350 yr	22.980	210.13	211.84		211.97	0.002747	2.07	20.06	41.32	0.52
2	9010	Ex_100 yr	1.980	210.13	211.34		211.35	0.000212	0.45	6.16	8.03	0.13
2	9010	Ex_50 yr	1.740	210.13	211.33		211.34	0.000171	0.40	6.04	7.94	0.12
2	9010	Ex_25 yr	1.510	210.13	211.32		211.32	0.000135	0.35	5.93	7.84	0.11
2	9010	Ex_10 yr	1.220	210.13	211.30		211.30	0.000094	0.29	5.78	7.71	0.09
2	9010	Ex_5 yr	0.800	210.13	211.26		211.26	0.000045	0.20	5.51	7.50	0.06
2	9010	Ex_2 yr	0.560	210.13	211.24		211.24	0.000024	0.14	5.33	7.36	0.04
2	8985	Fut_Regional	25.810	210.09	211.81	211.74	211.93	0.003145	2.23	21.53	40.12	0.55
2	8985	Fut_350 yr	22.980	210.09	211.77	211.71	211.89	0.003017	2.15	20.13	39.66	0.54
2	8985	Ex_100 yr	1.980	210.09	211.34	210.53	211.35	0.000264	0.52	6.05	7.88	0.15
2	8985	Ex_50 yr	1.740	210.09	211.32	210.50	211.33	0.000212	0.46	5.96	7.80	0.14
2	8985	Ex_25 yr	1.510	210.09	211.31	210.47	211.32	0.000166	0.40	5.86	7.74	0.12
2	8985	Ex_10 yr	1.220	210.09	211.29	210.43	211.30	0.000115	0.33	5.71	7.64	0.10
2	8985	Ex_5 yr	0.800	210.09	211.26	210.36	211.26	0.000055	0.23	5.47	7.48	0.07
2	8985	Ex_2 yr	0.560	210.09	211.24	210.32	211.24	0.000029	0.16	5.29	7.36	0.05
2	8958	Fut_Regional	25.810	210.01	211.79	211.61	211.85	0.001573	1.56	29.15	55.26	0.39
2	8958	Fut_350 yr	22.980	210.01	211.76	211.56	211.82	0.001481	1.50	27.31	54.18	0.37
2	8958	Ex_100 yr	1.980	210.01	211.33	210.46	211.34	0.000182	0.43	6.42	9.64	0.12
2	8958	Ex_50 yr	1.740	210.01	211.32	210.43	211.33	0.000146	0.38	6.31	9.36	0.11
2	8958	Ex_25 yr	1.510	210.01	211.31	210.40	211.31	0.000115	0.34	6.20	8.72	0.10
2	8958	Ex_10 yr	1.220	210.01	211.29	210.37	211.29	0.000079	0.28	6.05	8.55	0.08
2	8958	Ex_5 yr	0.800	210.01	211.26	210.30	211.26	0.000038	0.19	5.78	8.23	0.06
2	8958	Ex_2 yr	0.560	210.01	211.24	210.26	211.24	0.000020	0.13	5.60	8.00	0.04
2	8952	Fut_Regional	25.810	211.07	211.66	211.66	211.83	0.008190	1.79	14.45	45.95	1.02

HEC-RAS Plan: Rev_Ex River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8952	Fut_350 yr	22.980	211.07	211.64	211.64	211.79	0.007695	1.71	13.44	44.81	1.00
2	8952	Ex_100 yr	1.980	211.07	211.28	211.28	211.33	0.013841	1.00	1.98	20.29	1.02
2	8952	Ex_50 yr	1.740	211.07	211.27	211.27	211.32	0.013515	0.96	1.82	19.48	1.00
2	8952	Ex_25 yr	1.510	211.07	211.26	211.26	211.31	0.013587	0.94	1.61	17.69	1.00
2	8952	Ex_10 yr	1.220	211.07	211.25	211.25	211.29	0.014513	0.92	1.33	16.01	1.02
2	8952	Ex_5 yr	0.800	211.07	211.22	211.22	211.26	0.014798	0.82	0.97	14.00	1.00
2	8952	Ex_2 yr	0.560	211.07	211.20	211.20	211.23	0.015596	0.76	0.74	12.34	1.00
2	8930	Fut_Regional	25.810	209.91	211.17	211.06	211.24	0.003552	1.84	29.05	68.86	0.55
2	8930	Fut_350 yr	22.980	209.91	211.14	211.03	211.21	0.003369	1.77	27.18	66.74	0.54
2	8930	Ex_100 yr	1.980	209.91	210.67	210.33	210.69	0.001177	0.72	3.66	9.49	0.29
2	8930	Ex_50 yr	1.740	209.91	210.63	210.30	210.65	0.001150	0.68	3.30	8.94	0.28
2	8930	Ex_25 yr	1.510	209.91	210.63	210.28	210.64	0.000861	0.59	3.31	8.96	0.24
2	8930	Ex_10 yr	1.220	209.91	210.55	210.24	210.57	0.000912	0.56	2.69	8.00	0.25
2	8930	Ex_5 yr	0.800	209.91	210.50	210.19	210.50	0.000593	0.42	2.26	7.15	0.19
2	8930	Ex_2 yr	0.560	209.91	210.47	210.15	210.47	0.000356	0.31	2.08	6.44	0.15
2	8906	Fut_Regional	25.810	209.78	211.20	210.89	211.20	0.000330	0.59	108.35	275.56	0.17
2	8906	Fut_350 yr	22.980	209.78	211.17	210.87	211.17	0.000329	0.58	100.05	269.87	0.17
2	8906	Ex_100 yr	1.980	209.78	210.64	210.22	210.66	0.000835	0.64	3.59	8.30	0.24
2	8906	Ex_50 yr	1.740	209.78	210.61	210.19	210.62	0.000786	0.59	3.31	7.17	0.23
2	8906	Ex_25 yr	1.510	209.78	210.61	210.17	210.63	0.000572	0.51	3.36	7.25	0.20
2	8906	Ex_10 yr	1.220	209.78	210.54	210.13	210.55	0.000562	0.47	2.86	6.32	0.19
2	8906	Ex_5 yr	0.800	209.78	210.49	210.06	210.49	0.000331	0.34	2.54	5.98	0.15
2	8906	Ex_2 yr	0.560	209.78	210.46	210.01	210.47	0.000189	0.25	2.41	5.83	0.11
2	8901	Fut_Regional	25.810	210.32	211.20		211.20	0.000181	0.21	121.27	277.68	0.10
2	8901	Fut_350 yr	22.980	210.32	211.17		211.17	0.000181	0.20	112.87	274.68	0.10
2	8901	Ex_100 yr	1.980	210.32	210.65		210.65	0.002380	0.27	7.46	65.53	0.25
2	8901	Ex_50 yr	1.740	210.32	210.61		210.61	0.002847	0.33	5.34	39.46	0.28
2	8901	Ex_25 yr	1.510	210.32	210.61		210.62	0.001895	0.27	5.59	40.63	0.23
2	8901	Ex_10 yr	1.220	210.32	210.53		210.54	0.007307	0.42	2.87	27.12	0.42
2	8901	Ex_5 yr	0.800	210.32	210.45	210.45	210.49	0.049898	0.85	0.94	13.32	1.02
2	8901	Ex_2 yr	0.560	210.32	210.43	210.43	210.46	0.051973	0.77	0.72	12.09	1.01
2	8890	Fut_Regional	25.810	209.73	211.20	210.76	211.20	0.000086	0.32	168.78	283.82	0.09
2	8890	Fut_350 yr	22.980	209.73	211.17	210.76	211.17	0.000080	0.30	160.19	281.69	0.08
2	8890	Ex_100 yr	1.980	209.73	210.61	210.20	210.63	0.000980	0.73	4.54	31.82	0.27
2	8890	Ex_50 yr	1.740	209.73	210.57	210.17	210.59	0.001024	0.72	3.42	23.80	0.27
2	8890	Ex_25 yr	1.510	209.73	210.59	210.14	210.61	0.000672	0.59	3.91	26.30	0.22
2	8890	Ex_10 yr	1.220	209.73	210.51	210.10	210.52	0.000713	0.56	2.57	5.92	0.22
2	8890	Ex_5 yr	0.800	209.73	210.38	210.03	210.39	0.000636	0.46	1.93	4.73	0.20
2	8890	Ex_2 yr	0.560	209.73	210.28	209.98	210.29	0.000638	0.40	1.48	4.22	0.20
2	8848	Fut_Regional	28.650	209.63	211.03	211.03	211.17	0.004761	2.28	23.41	65.94	0.65
2	8848	Fut_350 yr	25.650	209.63	211.00	211.00	211.14	0.004915	2.27	21.14	64.01	0.65

HEC-RAS Plan: Rev_Ex River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8848	Ex_100 yr	4.260	209.63	210.24	210.24	210.45	0.014699	2.06	2.19	5.71	0.96
2	8848	Ex_50 yr	3.790	209.63	210.20	210.20	210.40	0.015379	2.00	1.99	5.46	0.97
2	8848	Ex_25 yr	3.330	209.63	210.51	210.16	210.55	0.001763	0.97	4.16	9.85	0.36
2	8848	Ex_10 yr	2.660	209.63	210.43	210.11	210.47	0.001684	0.88	3.48	8.52	0.35
2	8848	Ex_5 yr	1.810	209.63	210.32	210.03	210.35	0.001484	0.73	2.70	6.31	0.31
2	8848	Ex_2 yr	1.250	209.63	210.23	209.97	210.25	0.001329	0.61	2.15	5.67	0.29
2	8773	Fut_Regional	28.650	209.63	210.23	210.19	210.30	0.011738	1.99	27.86	120.01	0.88
2	8773	Fut_350 yr	25.650	209.63	210.19	210.17	210.27	0.013718	2.06	24.10	110.68	0.94
2	8773	Ex_100 yr	4.260	209.63	210.11	210.11	210.12	0.001114	0.52	15.98	88.05	0.26
2	8773	Ex_50 yr	3.790	209.63	210.11	210.11	210.11	0.000882	0.46	15.99	88.05	0.23
2	8773	Ex_25 yr	3.330	209.63	210.06	210.06	210.24	0.016513	1.84	1.90	6.31	0.98
2	8773	Ex_10 yr	2.660	209.63	210.01	210.01	210.16	0.017515	1.72	1.59	5.90	0.99
2	8773	Ex_5 yr	1.810	209.63	209.94	209.94	210.06	0.019678	1.53	1.19	5.31	1.00
2	8773	Ex_2 yr	1.250	209.63	209.89	209.89	209.98	0.020978	1.35	0.92	4.88	0.99
2	8694	Fut_Regional	33.230	209.39	210.12	209.68	210.13	0.000833	0.64	112.05	318.02	0.25
2	8694	Fut_350 yr	29.830	209.39	210.08	209.68	210.09	0.000869	0.63	103.60	304.73	0.25
2	8694	Ex_100 yr	8.700	209.39	209.85	209.68	209.85	0.000427	0.33	57.16	187.35	0.16
2	8694	Ex_50 yr	7.640	209.39	209.84	209.68	209.84	0.000381	0.30	54.58	180.74	0.15
2	8694	Ex_25 yr	6.580	209.39	209.82	209.68	209.82	0.000326	0.27	52.04	176.48	0.14
2	8694	Ex_10 yr	5.040	209.39	209.92	209.68	209.92	0.000082	0.16	69.55	231.26	0.07
2	8694	Ex_5 yr	3.000	209.39	209.82	209.68	209.82	0.000070	0.13	51.33	175.33	0.07
2	8694	Ex_2 yr	2.010	209.39	209.70	209.68	209.70	0.000124	0.13	32.70	144.97	0.08
2	8617	Fut_Regional	33.230	209.03	210.01	209.83	210.03	0.001902	1.12	66.01	257.50	0.39
2	8617	Fut_350 yr	29.830	209.03	209.96	209.77	209.98	0.002265	1.18	58.01	242.14	0.42
2	8617	Ex_100 yr	8.700	209.03	209.76	209.76	209.78	0.002784	1.09	22.83	105.22	0.44
2	8617	Ex_50 yr	7.640	209.03	209.76	209.76	209.78	0.002147	0.96	22.83	105.22	0.39
2	8617	Ex_25 yr	6.580	209.03	209.76	209.76	209.77	0.001593	0.83	22.83	105.22	0.33
2	8617	Ex_10 yr	5.040	209.03	209.68	209.68	209.88	0.012145	2.07	3.17	9.67	0.90
2	8617	Ex_5 yr	3.000	209.03	209.75	209.52	209.80	0.002736	1.06	3.87	11.07	0.44
2	8617	Ex_2 yr	2.010	209.03	209.63	209.43	209.67	0.002801	0.93	2.71	8.61	0.43
2	8574	Fut_Regional	33.230	208.90	209.98	209.65	209.99	0.000513	0.62	109.87	320.79	0.20
2	8574	Fut_350 yr	29.830	208.90	209.93	209.65	209.93	0.000579	0.64	98.89	304.55	0.21
2	8574	Ex_100 yr	8.700	208.90	209.71	209.65	209.71	0.000241	0.34	58.09	204.40	0.13
2	8574	Ex_50 yr	7.640	208.90	209.71	209.65	209.71	0.000187	0.30	57.99	204.03	0.12
2	8574	Ex_25 yr	6.580	208.90	209.71	209.65	209.71	0.000139	0.26	57.90	203.68	0.10
2	8574	Ex_10 yr	5.040	208.90	209.75	209.55	209.75	0.000058	0.17	65.32	228.46	0.06
2	8574	Ex_5 yr	3.000	208.90	209.59	209.38	209.66	0.003781	1.20	2.76	7.14	0.50
2	8574	Ex_2 yr	2.010	208.90	209.50	209.29	209.54	0.003090	0.96	2.19	5.43	0.44
2	8569	Fut_Regional	33.230	209.08	209.98	209.48	209.98	0.000644	0.30	110.08	317.87	0.13
2	8569	Fut_350 yr	29.830	209.08	209.92	209.46	209.93	0.000737	0.30	98.96	304.14	0.14
2	8569	Ex_100 yr	8.700	209.08	209.71	209.31	209.71	0.000353	0.15	57.76	203.04	0.08

HEC-RAS Plan: Rev_Ex River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8569	Ex_50 yr	7.640	209.08	209.71	209.30	209.71	0.000273	0.13	57.70	202.95	0.07
2	8569	Ex_25 yr	6.580	209.08	209.71	209.29	209.71	0.000203	0.11	57.65	202.87	0.06
2	8569	Ex_10 yr	5.040	209.08	209.75	209.27	209.75	0.000081	0.08	65.22	216.46	0.04
2	8569	Ex_5 yr	3.000	209.08	209.64	209.24	209.64	0.000083	0.07	44.88	167.97	0.04
2	8569	Ex_2 yr	2.010	209.08	209.53	209.21	209.53	0.000132	0.07	29.40	128.91	0.05
2	8563	Fut_Regional	33.230	208.87	209.97	209.71	209.98	0.000522	0.61	117.25	321.29	0.20
2	8563	Fut_350 yr	29.830	208.87	209.92	209.71	209.93	0.000557	0.61	106.03	297.49	0.21
2	8563	Ex_100 yr	8.700	208.87	209.71	209.71	209.71	0.000201	0.30	66.08	201.60	0.12
2	8563	Ex_50 yr	7.640	208.87	209.71	209.71	209.71	0.000155	0.27	66.09	201.63	0.10
2	8563	Ex_25 yr	6.580	208.87	209.71	209.71	209.71	0.000115	0.23	66.09	201.65	0.09
2	8563	Ex_10 yr	5.040	208.87	209.70	209.63	209.75	0.002646	1.10	6.94	38.62	0.43
2	8563	Ex_5 yr	3.000	208.87	209.56	209.41	209.63	0.004196	1.19	3.05	15.43	0.52
2	8563	Ex_2 yr	2.010	208.87	209.46	209.31	209.52	0.005056	1.12	1.86	7.62	0.55
2	8514	Fut_Regional	33.230	208.68	209.96	209.34	209.96	0.000458	0.67	126.83	298.29	0.20
2	8514	Fut_350 yr	29.830	208.68	209.90	209.34	209.91	0.000458	0.65	116.44	280.00	0.20
2	8514	Ex_100 yr	8.700	208.68	209.47	209.34	209.47	0.000381	0.42	52.31	124.43	0.17
2	8514	Ex_50 yr	7.640	208.68	209.43	209.34	209.44	0.000369	0.40	47.77	119.89	0.16
2	8514	Ex_25 yr	6.580	208.68	209.39	209.34	209.40	0.000367	0.38	43.16	115.74	0.16
2	8514	Ex_10 yr	5.040	208.68	209.31	209.31	209.50	0.012154	2.00	3.41	11.43	0.89
2	8514	Ex_5 yr	3.000	208.68	209.22	209.17	209.33	0.009074	1.52	2.44	9.76	0.75
2	8514	Ex_2 yr	2.010	208.68	209.17	209.08	209.24	0.006392	1.17	1.99	8.37	0.61
2	8456	Fut_Regional	33.230	208.60	209.93	209.41	209.94	0.000718	0.91	104.54	353.83	0.25
2	8456	Fut_350 yr	29.830	208.60	209.87	209.38	209.88	0.000765	0.91	94.70	323.12	0.26
2	8456	Ex_100 yr	8.700	208.60	209.44	209.11	209.45	0.000746	0.67	35.00	93.16	0.24
2	8456	Ex_50 yr	7.640	208.60	209.40	209.14	209.41	0.000752	0.66	31.66	88.93	0.24
2	8456	Ex_25 yr	6.580	208.60	209.37	209.10	209.37	0.000740	0.63	28.32	84.10	0.24
2	8456	Ex_10 yr	5.040	208.60	209.30	209.06	209.31	0.000777	0.60	22.85	82.46	0.24
2	8456	Ex_5 yr	3.000	208.60	209.18	208.95	209.19	0.000877	0.57	14.06	70.37	0.24
2	8456	Ex_2 yr	2.010	208.60	209.12	208.89	209.13	0.000776	0.49	10.05	58.15	0.23
2	8395	Fut_Regional	33.230	208.50	209.89	209.14	209.90	0.000491	0.76	107.93	233.15	0.21
2	8395	Fut_350 yr	29.830	208.50	209.84	209.11	209.84	0.000483	0.73	100.38	201.11	0.21
2	8395	Ex_100 yr	8.700	208.50	209.42	208.85	209.42	0.000239	0.40	53.27	99.28	0.14
2	8395	Ex_50 yr	7.640	208.50	209.39	208.84	209.39	0.000225	0.37	49.73	97.91	0.13
2	8395	Ex_25 yr	6.580	208.50	209.35	208.82	209.35	0.000209	0.35	46.06	96.61	0.13
2	8395	Ex_10 yr	5.040	208.50	209.28	208.77	209.28	0.000187	0.31	39.91	94.88	0.12
2	8395	Ex_5 yr	3.000	208.50	209.17	208.74	209.17	0.000154	0.25	29.59	87.58	0.10
2	8395	Ex_2 yr	2.010	208.50	209.11	208.71	209.11	0.000094	0.19	24.83	80.90	0.08
2	8337	Fut_Regional	33.230	208.43	209.84	209.11	209.86	0.001034	1.14	75.31	127.45	0.31
2	8337	Fut_350 yr	29.830	208.43	209.78	209.07	209.80	0.000985	1.08	69.71	100.78	0.30
2	8337	Ex_100 yr	8.700	208.43	209.40	208.81	209.41	0.000349	0.51	40.50	64.54	0.17
2	8337	Ex_50 yr	7.640	208.43	209.37	208.79	209.37	0.000315	0.48	38.31	63.27	0.16

HEC-RAS Plan: Rev_Ex River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8337	Ex_25 yr	6.580	208.43	209.33	208.77	209.33	0.000277	0.43	36.08	61.34	0.15
2	8337	Ex_10 yr	5.040	208.43	209.27	208.74	209.27	0.000221	0.37	32.42	58.01	0.13
2	8337	Ex_5 yr	3.000	208.43	209.16	208.69	209.16	0.000141	0.27	26.37	53.71	0.10
2	8337	Ex_2 yr	2.010	208.43	209.11	208.66	209.11	0.000087	0.20	23.58	51.97	0.08
2	8290	Fut_Regional	33.230	208.40	209.53	209.46	209.74	0.006830	2.50	24.02	49.68	0.76
2	8290	Fut_350 yr	29.830	208.40	209.51		209.69	0.005922	2.31	23.27	47.21	0.71
2	8290	Ex_100 yr	8.700	208.40	209.35		209.38	0.001038	0.87	16.99	29.11	0.29
2	8290	Ex_50 yr	7.640	208.40	209.32		209.35	0.000913	0.80	16.19	28.71	0.27
2	8290	Ex_25 yr	6.580	208.40	209.29		209.31	0.000781	0.72	15.36	28.28	0.25
2	8290	Ex_10 yr	5.040	208.40	209.24		209.26	0.000595	0.60	13.92	27.22	0.21
2	8290	Ex_5 yr	3.000	208.40	209.15		209.15	0.000347	0.42	11.45	23.79	0.16
2	8290	Ex_2 yr	2.010	208.40	209.10		209.10	0.000201	0.31	10.39	22.23	0.12
2	8271	Fut_Regional	33.230	208.34	209.65		209.66	0.000353	0.63	76.88	167.45	0.18
2	8271	Fut_350 yr	29.830	208.34	209.61		209.62	0.000361	0.62	71.09	165.47	0.18
2	8271	Ex_100 yr	8.700	208.34	209.36		209.36	0.000301	0.48	32.18	135.16	0.16
2	8271	Ex_50 yr	7.640	208.34	209.33		209.33	0.000296	0.47	28.37	119.46	0.15
2	8271	Ex_25 yr	6.580	208.34	209.29		209.30	0.000318	0.48	24.79	104.72	0.16
2	8271	Ex_10 yr	5.040	208.34	209.24		209.24	0.000322	0.46	19.43	89.33	0.16
2	8271	Ex_5 yr	3.000	208.34	209.14		209.15	0.000324	0.42	12.20	58.03	0.16
2	8271	Ex_2 yr	2.010	208.34	209.09		209.10	0.000246	0.35	9.72	50.64	0.13
2	8264	Fut_Regional	33.230	208.90	209.65		209.66	0.000402	0.47	70.92	158.91	0.22
2	8264	Fut_350 yr	29.830	208.90	209.61		209.62	0.000414	0.46	65.48	156.41	0.22
2	8264	Ex_100 yr	8.700	208.90	209.35		209.36	0.000481	0.31	28.13	134.46	0.22
2	8264	Ex_50 yr	7.640	208.90	209.32		209.33	0.000604	0.32	24.08	131.35	0.24
2	8264	Ex_25 yr	6.580	208.90	209.29		209.30	0.000720	0.33	20.00	117.82	0.25
2	8264	Ex_10 yr	5.040	208.90	209.23		209.24	0.001133	0.36	13.97	100.71	0.31
2	8264	Ex_5 yr	3.000	208.90	209.12		209.14	0.003764	0.55	5.50	52.40	0.54
2	8264	Ex_2 yr	2.010	208.90	209.06	209.06	209.09	0.013931	0.77	2.62	40.03	0.96
2	8257	Fut_Regional	33.230	208.38	209.63		209.65	0.001083	1.06	57.03	119.93	0.31
2	8257	Fut_350 yr	29.830	208.38	209.59		209.62	0.000975	0.99	53.39	109.76	0.29
2	8257	Ex_100 yr	8.700	208.38	209.35		209.35	0.000541	0.63	27.82	96.23	0.21
2	8257	Ex_50 yr	7.640	208.38	209.31		209.32	0.000561	0.62	24.87	94.45	0.21
2	8257	Ex_25 yr	6.580	208.38	209.28		209.29	0.000583	0.62	21.79	91.47	0.21
2	8257	Ex_10 yr	5.040	208.38	209.22		209.23	0.000616	0.61	16.92	80.40	0.22
2	8257	Ex_5 yr	3.000	208.38	209.12		209.13	0.000704	0.59	9.29	58.45	0.23
2	8257	Ex_2 yr	2.010	208.38	209.05		209.06	0.000596	0.50	5.91	38.39	0.20
2	8224	Fut_Regional	35.790	208.28	209.59	209.34	209.61	0.001243	1.16	60.14	123.48	0.33
2	8224	Fut_350 yr	32.170	208.28	209.55	209.32	209.58	0.001234	1.13	56.23	122.98	0.33
2	8224	Ex_100 yr	12.440	208.28	209.30	209.16	209.32	0.001232	0.97	27.41	90.68	0.32
2	8224	Ex_50 yr	10.840	208.28	209.27	209.13	209.29	0.001210	0.94	24.76	84.41	0.31
2	8224	Ex_25 yr	9.260	208.28	209.24	209.10	209.26	0.001180	0.91	22.11	79.17	0.31

HEC-RAS Plan: Rev_Ex River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8224	Ex_10 yr	6.940	208.28	209.19	209.04	209.20	0.001152	0.86	17.87	73.15	0.30
2	8224	Ex_5 yr	3.870	208.28	209.08	208.77	209.10	0.001088	0.76	10.57	61.05	0.28
2	8224	Ex_2 yr	2.550	208.28	209.02	208.67	209.03	0.000843	0.63	7.47	40.91	0.25
2	8191	Fut_Regional	35.790	208.11	209.52		209.56	0.001865	1.46	51.40	123.00	0.41
2	8191	Fut_350 yr	32.170	208.11	209.48		209.53	0.001911	1.45	47.26	121.43	0.41
2	8191	Ex_100 yr	12.440	208.11	209.24		209.28	0.001675	1.18	22.34	71.67	0.37
2	8191	Ex_50 yr	10.840	208.11	209.21		209.25	0.001564	1.12	20.49	68.95	0.36
2	8191	Ex_25 yr	9.260	208.11	209.18		209.22	0.001449	1.05	18.56	68.60	0.34
2	8191	Ex_10 yr	6.940	208.11	209.14		209.16	0.001193	0.93	15.45	63.74	0.31
2	8191	Ex_5 yr	3.870	208.11	209.05		209.07	0.000678	0.66	10.75	45.86	0.23
2	8191	Ex_2 yr	2.550	208.11	209.00		209.01	0.000446	0.51	8.50	37.70	0.18
2	8158	Fut_Regional	35.790	208.06	209.46	209.30	209.50	0.001837	1.44	52.43	126.72	0.40
2	8158	Fut_350 yr	32.170	208.06	209.42	209.28	209.46	0.001920	1.44	47.84	125.23	0.41
2	8158	Ex_100 yr	12.440	208.06	209.18	209.01	209.22	0.001760	1.20	22.53	79.16	0.38
2	8158	Ex_50 yr	10.840	208.06	209.16	208.98	209.20	0.001570	1.12	20.98	75.10	0.36
2	8158	Ex_25 yr	9.260	208.06	209.14	208.93	209.17	0.001387	1.03	19.34	73.86	0.34
2	8158	Ex_10 yr	6.940	208.06	209.10	208.84	209.13	0.001054	0.88	16.79	68.79	0.29
2	8158	Ex_5 yr	3.870	208.06	209.04	208.57	209.05	0.000478	0.56	13.02	43.96	0.19
2	8158	Ex_2 yr	2.550	208.06	208.99	208.47	209.00	0.000295	0.43	11.02	40.61	0.15
2	8149	Fut_Regional	35.790	208.77	209.46	209.25	209.48	0.001580	0.62	57.55	167.54	0.34
2	8149	Fut_350 yr	32.170	208.77	209.42	209.23	209.44	0.001882	0.63	51.25	166.49	0.36
2	8149	Ex_100 yr	12.440	208.77	209.11	209.11	209.18	0.016505	1.17	10.65	76.43	1.00
2	8149	Ex_50 yr	10.840	208.77	209.09	209.09	209.16	0.013116	1.20	9.03	62.27	1.01
2	8149	Ex_25 yr	9.260	208.77	209.07	209.07	209.14	0.011998	1.15	8.07	59.95	1.00
2	8149	Ex_10 yr	6.940	208.77	209.04	209.04	209.10	0.011080	1.09	6.36	52.80	1.01
2	8149	Ex_5 yr	3.870	208.77	208.97	208.97	209.03	0.013582	1.12	3.47	29.01	1.03
2	8149	Ex_2 yr	2.550	208.77	208.93	208.93	208.99	0.013787	1.00	2.55	25.11	1.00
2	8143	Fut_Regional	35.790	207.99	209.46	209.12	209.47	0.000329	0.65	105.55	204.49	0.17
2	8143	Fut_350 yr	32.170	207.99	209.42	209.11	209.43	0.000336	0.64	97.89	202.24	0.18
2	8143	Ex_100 yr	12.440	207.99	209.01	208.64	209.05	0.001475	1.06	22.35	86.94	0.35
2	8143	Ex_50 yr	10.840	207.99	208.96	208.60	209.00	0.001463	1.02	19.00	56.42	0.34
2	8143	Ex_25 yr	9.260	207.99	208.91	208.55	208.94	0.001431	0.97	16.40	42.42	0.34
2	8143	Ex_10 yr	6.940	207.99	208.82	208.48	208.85	0.001276	0.85	13.24	29.90	0.31
2	8143	Ex_5 yr	3.870	207.99	208.68	208.35	208.70	0.000865	0.61	9.57	24.66	0.25
2	8143	Ex_2 yr	2.550	207.99	208.62	208.28	208.63	0.000553	0.46	8.17	23.57	0.19
2	8115	Fut_Regional	35.790	207.91	209.25	209.25	209.43	0.004514	2.25	30.60	96.60	0.64
2	8115	Fut_350 yr	32.170	207.91	209.22	209.22	209.39	0.004291	2.16	28.36	92.68	0.62
2	8115	Ex_100 yr	12.440	207.91	208.83	208.59	208.97	0.004461	1.71	8.28	12.65	0.59
2	8115	Ex_50 yr	10.840	207.91	208.82	208.54	208.93	0.003469	1.50	8.20	12.56	0.52
2	8115	Ex_25 yr	9.260	207.91	208.80	208.48	208.88	0.002787	1.32	7.91	12.22	0.46
2	8115	Ex_10 yr	6.940	207.91	208.75	208.39	208.80	0.001954	1.06	7.30	11.77	0.38

HEC-RAS Plan: Rev_Ex River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8115	Ex_5 yr	3.870	207.91	208.65	208.26	208.67	0.000962	0.68	6.21	10.89	0.26
2	8115	Ex_2 yr	2.550	207.91	208.61	208.19	208.62	0.000521	0.48	5.75	10.59	0.19
2	8082	Fut_Regional	35.790	207.90	209.19		209.20	0.000280	0.54	118.41	243.97	0.16
2	8082	Fut_350 yr	32.170	207.90	209.15		209.16	0.000280	0.53	108.82	242.29	0.16
2	8082	Ex_100 yr	12.440	207.90	208.91		208.91	0.000184	0.37	58.68	163.18	0.12
2	8082	Ex_50 yr	10.840	207.90	208.88		208.88	0.000169	0.35	54.48	152.70	0.12
2	8082	Ex_25 yr	9.260	207.90	208.84		208.84	0.000167	0.33	48.56	144.83	0.11
2	8082	Ex_10 yr	6.940	207.90	208.77		208.77	0.000170	0.32	38.65	135.94	0.11
2	8082	Ex_5 yr	3.870	207.90	208.65		208.65	0.000173	0.29	23.62	121.55	0.11
2	8082	Ex_2 yr	2.550	207.90	208.61		208.61	0.000131	0.24	18.30	109.00	0.10
2	8062	Fut_Regional	35.790	207.82	209.18		209.19	0.000320	0.59	131.60	254.13	0.17
2	8062	Fut_350 yr	32.170	207.82	209.15		209.15	0.000324	0.59	121.59	252.59	0.17
2	8062	Ex_100 yr	12.440	207.82	208.90		208.91	0.000285	0.48	64.25	220.57	0.15
2	8062	Ex_50 yr	10.840	207.82	208.88		208.88	0.000278	0.46	58.43	214.17	0.15
2	8062	Ex_25 yr	9.260	207.82	208.84		208.84	0.000309	0.47	50.05	199.28	0.16
2	8062	Ex_10 yr	6.940	207.82	208.76		208.77	0.000411	0.52	36.22	182.29	0.18
2	8062	Ex_5 yr	3.870	207.82	208.64		208.65	0.000782	0.64	16.20	127.12	0.24
2	8062	Ex_2 yr	2.550	207.82	208.59		208.60	0.000656	0.56	10.87	107.93	0.22
2	8056	Fut_Regional	35.790	208.44	209.19		209.19	0.000101	0.26	136.57	258.88	0.12
2	8056	Fut_350 yr	32.170	208.44	209.15		209.15	0.000103	0.25	126.44	254.87	0.12
2	8056	Ex_100 yr	12.440	208.44	208.90		208.90	0.000110	0.18	67.29	229.74	0.11
2	8056	Ex_50 yr	10.840	208.44	208.88		208.88	0.000113	0.18	61.20	227.29	0.11
2	8056	Ex_25 yr	9.260	208.44	208.84		208.84	0.000138	0.18	52.03	223.51	0.12
2	8056	Ex_10 yr	6.940	208.44	208.76		208.76	0.000251	0.19	36.04	214.98	0.15
2	8056	Ex_5 yr	3.870	208.44	208.63		208.64	0.002050	0.33	11.65	148.21	0.38
2	8056	Ex_2 yr	2.550	208.44	208.57	208.57	208.59	0.015444	0.63	4.03	88.69	0.95
2	8049	Fut_Regional	35.790	207.86	209.18		209.19	0.000336	0.60	161.19	275.45	0.17
2	8049	Fut_350 yr	32.170	207.86	209.14		209.15	0.000333	0.58	150.33	272.12	0.17
2	8049	Ex_100 yr	12.440	207.86	208.90		208.90	0.000280	0.46	85.78	257.19	0.15
2	8049	Ex_50 yr	10.840	207.86	208.87		208.88	0.000268	0.44	78.97	252.35	0.15
2	8049	Ex_25 yr	9.260	207.86	208.83		208.84	0.000295	0.45	68.72	247.88	0.15
2	8049	Ex_10 yr	6.940	207.86	208.76		208.76	0.000383	0.48	50.85	234.48	0.17
2	8049	Ex_5 yr	3.870	207.86	208.62		208.63	0.000669	0.56	23.62	169.58	0.22
2	8049	Ex_2 yr	2.550	207.86	208.57		208.57	0.000664	0.53	14.68	123.36	0.22
2	8009	Fut_Regional	35.790	207.72	209.18		209.18	0.000094	0.35	280.13	342.42	0.09
2	8009	Fut_350 yr	32.170	207.72	209.14		209.14	0.000089	0.33	266.68	339.63	0.09
2	8009	Ex_100 yr	12.440	207.72	208.90		208.90	0.000038	0.19	188.91	303.21	0.06
2	8009	Ex_50 yr	10.840	207.72	208.87		208.87	0.000033	0.17	180.96	297.16	0.05
2	8009	Ex_25 yr	9.260	207.72	208.83		208.83	0.000029	0.16	169.03	288.95	0.05
2	8009	Ex_10 yr	6.940	207.72	208.76		208.76	0.000024	0.14	148.84	266.47	0.04
2	8009	Ex_5 yr	3.870	207.72	208.63		208.63	0.000014	0.10	114.58	254.36	0.03

HEC-RAS Plan: Rev_Ex River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8009	Ex_2 yr	2.550	207.72	208.57		208.57	0.000009	0.07	100.04	246.26	0.03
2	7982	Fut_Regional	35.790	207.74	209.10		209.17	0.002769	1.74	47.61	116.75	0.50
2	7982	Fut_350 yr	32.170	207.74	209.06		209.13	0.002929	1.75	42.60	111.46	0.51
2	7982	Ex_100 yr	12.440	207.74	208.82		208.89	0.002507	1.40	19.44	85.50	0.45
2	7982	Ex_50 yr	10.840	207.74	208.81		208.86	0.002238	1.31	17.81	82.84	0.43
2	7982	Ex_25 yr	9.260	207.74	208.75		208.82	0.002508	1.34	13.79	72.63	0.45
2	7982	Ex_10 yr	6.940	207.74	208.66	208.38	208.75	0.003053	1.37	7.59	54.50	0.48
2	7982	Ex_5 yr	3.870	207.74	208.58		208.62	0.001493	0.90	4.88	11.39	0.33
2	7982	Ex_2 yr	2.550	207.74	208.55		208.57	0.000768	0.62	4.57	8.34	0.24
2	7956	Fut_Regional	35.790	207.76	208.88	208.88	209.05	0.008118	2.70	30.85	93.94	0.83
2	7956	Fut_350 yr	32.170	207.76	208.88	208.88	209.02	0.006677	2.44	30.64	92.37	0.75
2	7956	Ex_100 yr	12.440	207.76	208.69	208.69	208.80	0.004818	1.82	14.77	71.38	0.62
2	7956	Ex_50 yr	10.840	207.76	208.62	208.62	208.77	0.006315	1.97	10.22	52.30	0.70
2	7956	Ex_25 yr	9.260	207.76	208.60	208.60	208.73	0.005511	1.81	9.15	42.30	0.65
2	7956	Ex_10 yr	6.940	207.76	208.58	208.35	208.66	0.003485	1.42	8.51	38.62	0.51
2	7956	Ex_5 yr	3.870	207.76	208.55		208.58	0.001356	0.86	7.39	37.90	0.32
2	7956	Ex_2 yr	2.550	207.76	208.53		208.55	0.000686	0.60	6.63	36.79	0.23
2	7949	Fut_Regional	35.790	208.40	208.80		208.89	0.005987	1.32	27.13	97.45	0.80
2	7949	Fut_350 yr	32.170	208.40	208.74	208.74	208.86	0.010066	1.52	21.20	91.20	1.00
2	7949	Ex_100 yr	12.440	208.40	208.61	208.61	208.68	0.011874	1.19	10.42	72.61	1.01
2	7949	Ex_50 yr	10.840	208.40	208.59	208.59	208.66	0.012259	1.15	9.44	71.47	1.01
2	7949	Ex_25 yr	9.260	208.40	208.58	208.58	208.64	0.012823	1.10	8.43	70.63	1.01
2	7949	Ex_10 yr	6.940	208.40	208.56	208.56	208.61	0.013491	1.01	6.90	68.50	1.01
2	7949	Ex_5 yr	3.870	208.40	208.52	208.52	208.56	0.014908	0.86	4.49	60.72	1.01
2	7949	Ex_2 yr	2.550	208.40	208.50	208.50	208.53	0.016081	0.76	3.36	57.86	1.01
2	7937	Fut_Regional	35.790	207.67	208.83		208.84	0.001106	1.02	90.64	126.76	0.31
2	7937	Fut_350 yr	32.170	207.67	208.77		208.78	0.001173	1.01	83.10	124.49	0.31
2	7937	Ex_100 yr	12.440	207.67	208.40		208.42	0.001654	0.90	39.81	112.76	0.35
2	7937	Ex_50 yr	10.840	207.67	208.37		208.39	0.001636	0.87	36.21	112.07	0.34
2	7937	Ex_25 yr	9.260	207.67	208.34		208.35	0.001603	0.83	32.54	110.37	0.34
2	7937	Ex_10 yr	6.940	207.67	208.27		208.28	0.001849	0.82	24.87	106.57	0.35
2	7937	Ex_5 yr	3.870	207.67	208.17	208.06	208.19	0.002088	0.77	14.53	100.02	0.36
2	7937	Ex_2 yr	2.550	207.67	208.11	207.98	208.13	0.002234	0.72	9.07	83.93	0.37
2	7883	Fut_Regional	35.790	207.35	208.65		208.72	0.003765	1.97	44.83	54.35	0.57
2	7883	Fut_350 yr	32.170	207.35	208.59		208.66	0.003893	1.93	41.35	54.03	0.58
2	7883	Ex_100 yr	12.440	207.35	208.02	208.02	208.17	0.014533	2.37	12.01	44.19	1.00
2	7883	Ex_50 yr	10.840	207.35	207.97	207.97	208.13	0.016580	2.38	9.89	38.09	1.05
2	7883	Ex_25 yr	9.260	207.35	207.89	207.89	208.08	0.022790	2.50	7.26	29.74	1.20
2	7883	Ex_10 yr	6.940	207.35	207.84	207.84	207.99	0.020265	2.18	5.91	24.37	1.10
2	7883	Ex_5 yr	3.870	207.35	207.67	207.67	207.81	0.037478	2.04	2.75	13.91	1.37
2	7883	Ex_2 yr	2.550	207.35	207.57	207.57	207.70	0.062243	1.86	1.68	7.75	1.62

HEC-RAS Plan: Rev_Ex River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	7854	Fut_Regional	35.790	205.90	208.29	208.29	208.61	0.004491	3.20	31.29	46.98	0.68
2	7854	Fut_350 yr	32.170	205.90	208.22	208.22	208.54	0.004450	3.12	28.14	46.39	0.68
2	7854	Ex_100 yr	12.440	205.90	207.20	207.20	207.68	0.011024	3.23	5.09	6.30	0.96
2	7854	Ex_50 yr	10.840	205.90	207.11	207.11	207.55	0.011256	3.09	4.53	6.03	0.95
2	7854	Ex_25 yr	9.260	205.90	207.01	207.00	207.42	0.011522	2.94	3.97	5.74	0.95
2	7854	Ex_10 yr	6.940	205.90	206.93	206.84	207.21	0.008920	2.43	3.50	5.42	0.82
2	7854	Ex_5 yr	3.870	205.90	206.71		206.87	0.007415	1.84	2.41	4.61	0.72
2	7854	Ex_2 yr	2.550	205.90	206.59		206.70	0.006352	1.50	1.88	4.20	0.64
2	7807	Fut_Regional	35.790	205.65	208.13		208.16	0.000705	1.27	81.47	77.31	0.26
2	7807	Fut_350 yr	32.170	205.65	208.12		208.14	0.000591	1.16	80.36	77.26	0.24
2	7807	Ex_100 yr	12.440	205.65	206.53	206.53	206.83	0.015476	2.82	7.15	13.32	1.03
2	7807	Ex_50 yr	10.840	205.65	206.47	206.47	206.75	0.015945	2.71	6.36	12.66	1.03
2	7807	Ex_25 yr	9.260	205.65	206.41	206.41	206.67	0.016378	2.58	5.59	12.04	1.03
2	7807	Ex_10 yr	6.940	205.65	206.27	206.27	206.52	0.021425	2.50	4.03	9.75	1.13
2	7807	Ex_5 yr	3.870	205.65	206.12	206.12	206.29	0.019851	2.02	2.70	8.47	1.05
2	7807	Ex_2 yr	2.550	205.65	206.03	206.03	206.17	0.020532	1.80	1.96	7.62	1.04
2	7771	Fut_Regional	35.790	205.11	208.15		208.15	0.000038	0.37	190.56	74.23	0.07
2	7771	Fut_350 yr	32.170	205.11	208.13		208.13	0.000032	0.33	189.30	74.21	0.06
2	7771	Ex_100 yr	12.440	205.11	206.24		206.24	0.000236	0.46	54.94	63.40	0.14
2	7771	Ex_50 yr	10.840	205.11	205.78		205.80	0.001573	0.83	27.08	60.00	0.33
2	7771	Ex_25 yr	9.260	205.11	205.67		205.69	0.002731	0.95	20.20	59.06	0.43
2	7771	Ex_10 yr	6.940	205.11	205.53		205.58	0.006175	1.17	12.29	58.07	0.61
2	7771	Ex_5 yr	3.870	205.11	205.42	205.42	205.48	0.010742	1.22	5.91	56.89	0.76
2	7771	Ex_2 yr	2.550	205.11	205.38	205.38	205.44	0.010205	1.07	3.74	56.30	0.72

Appendix D PROPOSED CONDITIONS

D.1 STORMWATER MANAGEMENT CALCULATIONS

Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Runoff Coefficient Calculation

Typical Cross Section: Option 3A (30m ROW)

Area	Runoff Coefficient	Area (m width)	Weighted Runoff Coefficient R_5 [1]
Asphalt/Concrete	0.90	25.0	0.75
Gravel	0.75	0.0	0.00
Grass	0.25	5.0	0.04
TOTAL		30.0	0.79
		Imperviousness [1]	85%

Notes:

1 Per City Criteria:

$R_{10} = 0.8 * R_5 + 0.2 =$ 0.83

$R_{25} = 0.7 * R_5 + 0.3 =$ 0.85

$R_{50} = 0.6 * R_5 + 0.4 =$ 0.88

$R_{100} = 0.5 * R_5 + 0.5 =$ 0.90

2 Imperviousness = (Runoff Coefficient - 0.2) / 0.7

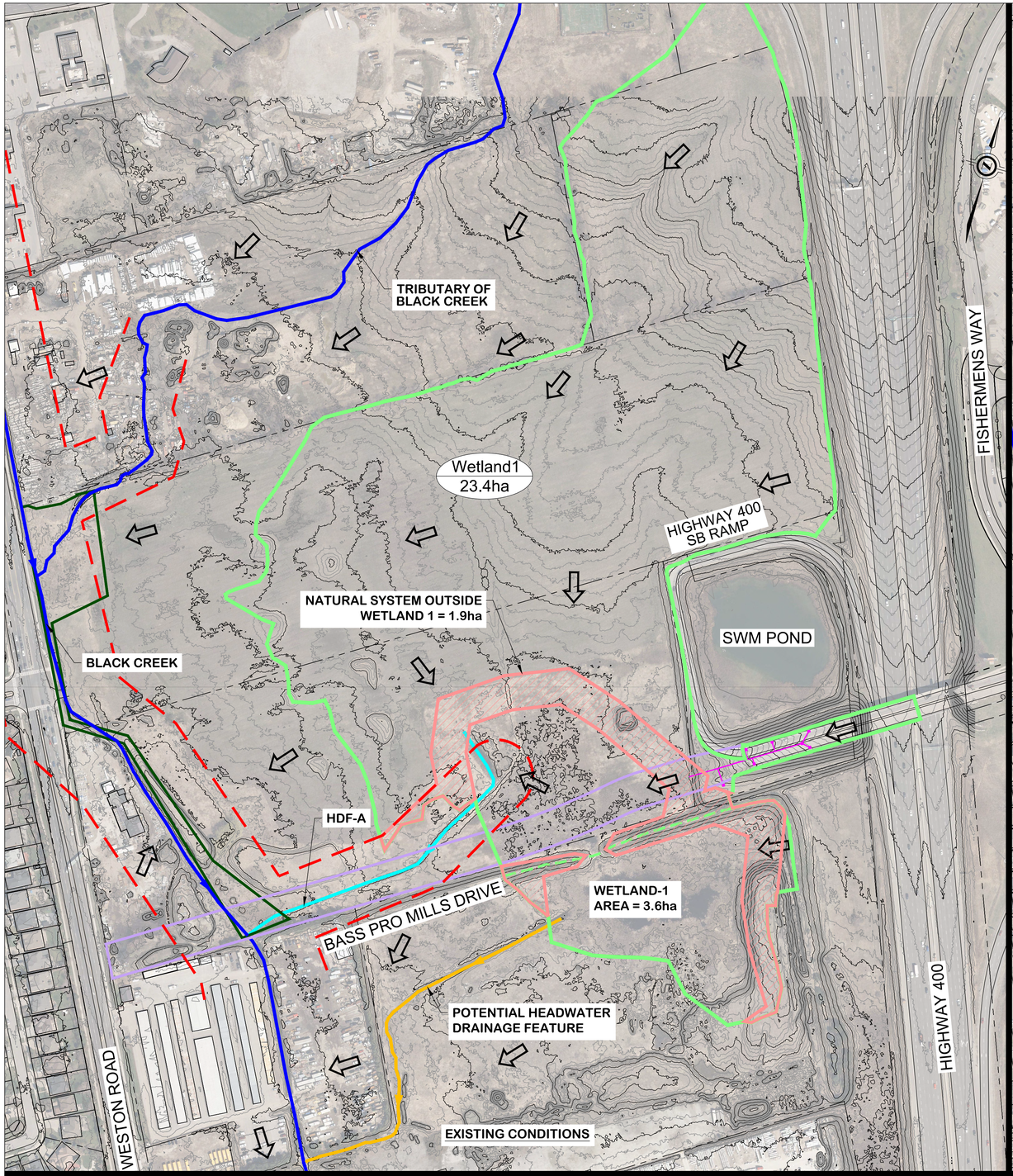
D.2 TRCA WETLAND WATER BALANCE RISK EVALUATION

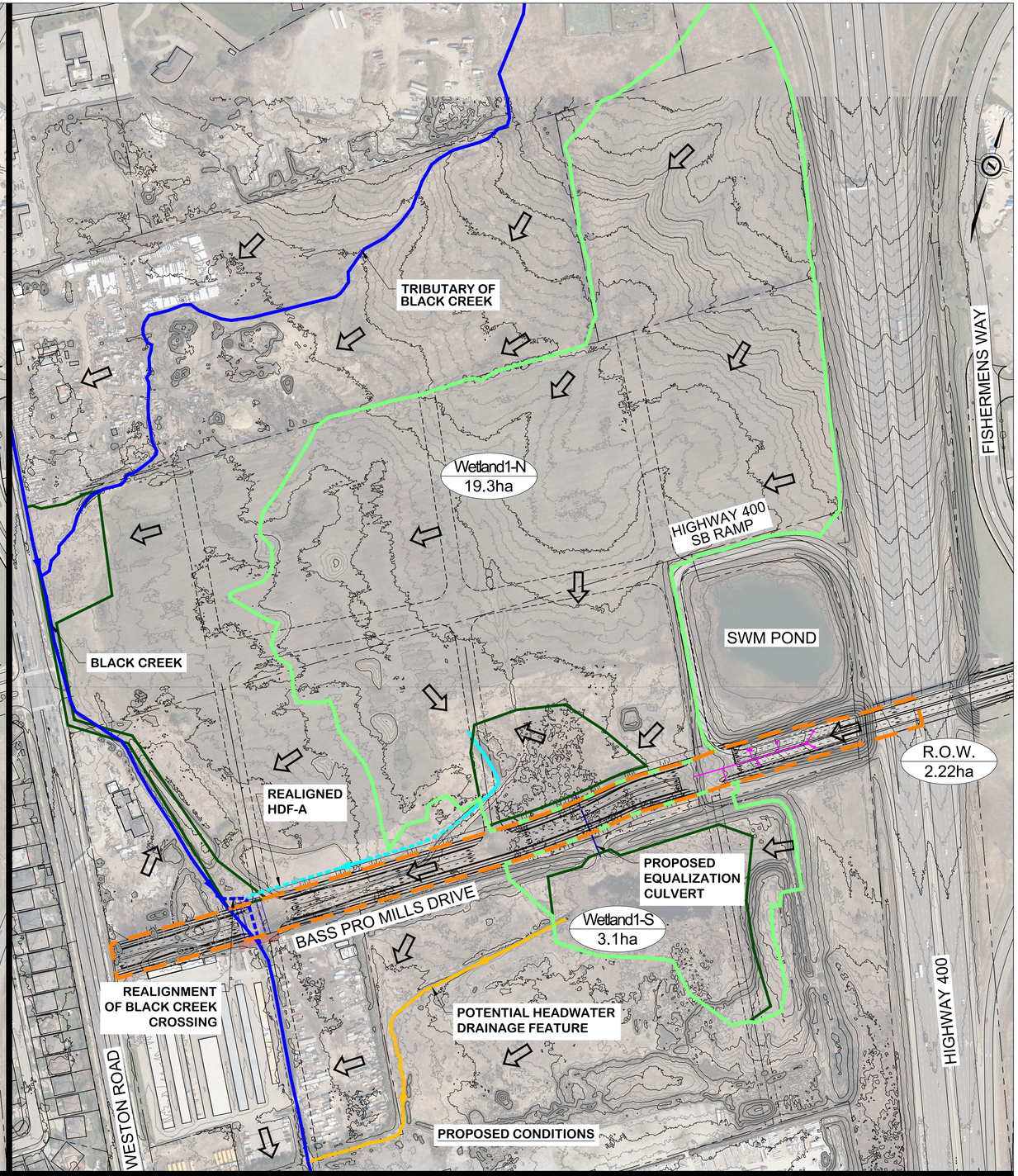
Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

TRCA Wetland Water Balance Risk Evaluation

Criteria	Data	Definition	Areas (ha)
Magnitude of potential hydrological change	Wetland feature limits	Wetland limits staked and surveyed	3.6
	Extent and size of pre-development catchment	Pre-development surface water catchment of the wetland.	23.4
	Natural System located outside of Wetland	Area of natural system (e.g. natural heritage areas, natural hazard zones, and their associated buffers) outside of the wetland	1.9
	Total development area of catchment (C_{dev})	Area of the wetland's catchment lying outside of any identified natural system (e.g. natural heritage areas, natural hazard zones, and their associated buffers)	17.9
	Area of the wetland catchment owned by the proponent	The development area of the wetland catchment (C_{dev}) that is owned by the proponent (ie. Bass Pro Mills Drive ROW within Wetland Catchment)	1.0
	Percent of impervious cover planned within the proponent's holdings (IC)	The anticipated proportion of impervious cover within the area of the wetland catchment owned by the proponent	85%
	Proposed extent and size of post-development catchment	The anticipated size of the feature's catchment resulting from grade changes and/or implementation of the stormwater management plan.	22.4
	Anticipated magnitude and duration of water taking	Approximate magnitude and duration of any water taking anticipated from groundwater or surface water bodies directly connected to the wetland	0
	Location and extent of any locally significant recharge areas	Identified through preliminary geotechnical site investigations, visual means, monitoring data, or numerical model outputs.	N/A
Inputs	Pre-dev catchment Area	Size of the wetland's catchment Pre-Dev (in ha).	23.4
	C	Size of the wetland's catchment Post Dev (in ha).	22.4
	NS	Natural System Area (in ha).	5.5
	Imp	Impervious Area within Development (in ha).	0.9
	Cdev	Total development area of catchment (in ha).	17.9
	IC	IC is the proportion of impervious cover (as a percentage between 0 and 100) proposed within the area of wetland catchment that is within the proponent's holdings	5%
Evaluation Criteria	$S = \frac{IC \cdot C_{dev}}{C}$	Where S is the impervious cover score, IC is the proportion of impervious cover (as a percentage between 0 and 100) proposed within the area of wetland catchment that is within the proponent's holdings, Cdev is the total development area of the catchment (in ha), and C is the size of the wetland's catchment (in ha)	**4%**
	Change in catchment Size	Increasing or decreasing the catchment size can change the timing, frequency, and volume of runoff reaching the wetland.	**4%**
	Water taking or discharge	For the purposes of the Risk Evaluation, a wetland within or adjacent to a proposed undertaking is considered impacted when water taking is anticipated to require MOECC EASR registration (>50,000 L/day).	
		Water taking or Discharge (L/d)	0
		Duration of Water Taking in Months	0
		Water Taking Risk	**No Risk**
	% of Replaced pervious cover to impervious cover	Impacts to recharge areas are defined here as replacement of existing soils with significantly less permeable materials.	**0%**
Overall Magnitude Decision	**Low Magnitude**		





Legend

- EXISTING CONTOURS
- OVERLAND FLOW
- WATERCOURSE
- HEADWATER DRAINAGE FEATURE-A
- POTENTIAL HEADWATER DRAINAGE FEATURE DIRECTION OF FLOW
- MARSH COMMUNITIES
- TRCA REGULATED AREA NATURAL SYSTEM OUTSIDE WETLAND1
- WETLAND 1 CONTRIBUTING DRAINAGE AREAS
- PROPOSED BASS PRO MILLS DRIVE ROW
- PROPOSED BASS PRO MILLS DRIVE DRAINAGE AREA
- TRCA REGULATION LINE
- EXISTING STORM SEWER NETWORK
- HIGH / LOW POINTS

Note:

A 30M WETLAND BUFFER HAS CONSERVATIVELY BEEN ASSUMED FOR THIS ASSESSMENT.

Stantec

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Client/Project Logo

Client/Project
CITY OF VAUGHAN

BASS PRO MILLS DRIVE EXTENSION
WESTON ROAD TO HIGHWAY 400

Vaughan, Ontario

File Name: DRAWING D.2.1 - TRCA WETLAND WATER BALANCE RISK ASSESSMENT	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
				2022.02.10

Title
TRCA WETLAND WATER BALANCE RISK ASSESSMENT

Project No.	Scale
1605 40006	1:2000
Revision Sheet	Drawing No.
	D.2.1

\\ca1215-fil01\work_group\01605\active\160540006\10_drawings\10.4_sheet_files\10_sym\drawing d.2.1 - trca wetland water balance risk assessment 2022.02.11 1:02:19 PM

ORIGINAL SHEET - ARCH D

D.3 EROSION CONTROL CALCULATIONS

Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Erosion Control Requirement

ROW Length: 740 m
ROW Width: 30 m
ROW Area: 2.22 ha

Outlet	Total Area (ha)	Imperviousness (%)	Impervious Area (ha)	Total Retention Volume (m^3)	Minimum Area, A_{min} [1] (m^2)	Maximum Allawable Depth (m)	Available Width (m)	Total Required Length (m)
Black Creek	2.22	85%	1.88	93.8	407	0.576	2.3	177

Notes:

1 Equation 4.3, MECP SWM Planning and Design Manual, March 2003,

$A_{min} = FS * 1000 * V / (IR * n * \Delta t)$ [1]

FS =	Factor of Safety (surface infiltration) =	2.5	
V =	runoff volume to be infiltrated (m^3)	5	mm/m^2
IR =	Infiltration rate of surrounding native soil =	12	mm/hr
Δt =	retention time =	48	hrs
n =	porosity of the storage media =	0.4	

D.4 QUANTITY CONTROL CALCULATIONS

Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Allowable Release Rate

ROW Length: 740 m
ROW Width: 30 m
ROW Area: 2.22 ha

Return Period	Equation G (Sub-Basin 46) (L/s/ha)	Unit Rate (L/s/ha)	Allowable Relese Rate (L/s)
2-year	Q = 7.745 - 0.762 * ln(A)	7.1	15.8
5-Year	Q = 11.468 - 1.123 * ln(A)	10.6	23.5
10-Year	Q = 13.877 - 1.342 * ln(A)	12.8	28.4
25-Year	Q = 17.381 - 1.342 * ln(A)	16.3	36.2
50-Year	Q = 20.164 - 1.973 * ln(A)	18.6	41.3
100-Year	Q = 22.973 - 2.256 * ln(A)	21.2	47.0

Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Storage Requirements

ROW Length: 740 m
ROW Width: 30 m
ROW Area: 2.22 ha

Storm Event	Allowable Release Rate (L/s)	Storage Requirements (m^3)			
		Modified Rational (m^3)	VO Modeling		
			6-hr AES (m^3)	12-hr AES (m^3)	24-hr AES (m^3)
2-year	15.8	407	**525**	551	521
5-Year	23.5	530	**707**	716	658
10-Year	28.4	652	**828**	827	754
25-Year	36.2	744	**978**	961	872
50-Year	41.3	919	**1,090**	1,061	958
100-Year	47.0	1,021	**1,202**	1,162	1,045

Oversized Pipe Options

Circular Diameter (m)	Equivalent Ellipitical Pipe		Total Required Length (m)	Volume (m^3)
	Rise (m)	Span (m)		
1.500	1.220	1.920	680	1,202
1.650	1.340	2.110	565	1,208
1.800	1.465	2.305	475	1,209
1.950	1.585	2.495	405	1,210
2.100	1.705	2.690	350	1,212
2.250	1.825	2.890	305	1,213

Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Modified Rational: 2-Year Storm Event

a, b, c = Rainfall Equation Coefficients

a = 647.7
b = 4.0
c = 0.784

2 Year IDF Parameters
as per City of Vaughan

Required Storage

Starting Time 90.0 min
Time Increment 2.0 min

Parameter	Value
Area (A)	2.22 ha
Runoff Coefficient ('C)	0.79
AC	1.76
Allowable Peak Outflow	15.8 l/s
Actual Peak Outflow	15.8 l/s
Max.Storage	**407.1** m^3

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (l/s)	Runoff Volume (m3)	Released Volume (m3)	Storage Volume (m3)
100.0	17.0	83.0	497.9	95.1	402.8
102.0	16.7	81.7	500.3	97.0	403.3
104.0	16.5	80.6	502.7	98.9	403.8
106.0	16.3	79.4	505.0	100.8	404.3
108.0	16.0	78.3	507.3	102.7	404.7
110.0	15.8	77.2	509.6	104.6	405.0
112.0	15.6	76.2	511.9	106.5	405.4
114.0	15.4	75.2	514.1	108.4	405.7
116.0	15.2	74.2	516.2	110.3	406.0
118.0	15.0	73.2	518.4	112.2	406.2
120.0	14.8	72.3	520.5	114.1	406.4
122.0	14.6	71.4	522.6	116.0	406.6
124.0	14.4	70.5	524.6	117.9	406.7
126.0	14.3	69.7	526.6	119.8	406.8
128.0	14.1	68.8	528.6	121.7	406.9
130.0	13.9	68.0	530.6	123.6	407.0
132.0	13.8	67.2	532.5	125.5	407.0
134.0	13.6	66.5	534.4	127.4	407.1
136.0	13.5	65.7	536.3	129.3	407.0
138.0	13.3	65.0	538.2	131.2	407.0
140.0	13.2	64.3	540.1	133.1	407.0
142.0	13.0	63.6	541.9	135.0	406.9
144.0	12.9	62.9	543.7	136.9	406.8
146.0	12.7	62.3	545.5	138.8	406.7
148.0	12.6	61.6	547.2	140.7	406.5
150.0	12.5	61.0	549.0	142.6	406.4

Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Modified Rational: 5-Year Storm Event

a, b, c = Rainfall Equation Coefficients

a = 929.6
b = 4.0
c = 0.8

5 Year IDF Parameters
as per City of Vaughan

Required Storage

Starting Time 90.0 min
Time Increment 2.0 min

Parameter	Value
Area (A)	2.22 ha
Runoff Coefficient ('C)	0.79
AC	1.76
Allowable Peak Outflow	23.5 l/s
Actual Peak Outflow	23.5 l/s
Max.Storage	**529.6** m^3

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (l/s)	Runoff Volume (m3)	Released Volume (m3)	Storage Volume (m3)
90.0	24.8	121.0	653.2	126.7	526.5
92.0	24.3	119.0	656.6	129.6	527.1
94.0	23.9	117.0	660.0	132.4	527.6
96.0	23.6	115.1	663.2	135.2	528.0
98.0	23.2	113.3	666.4	138.0	528.4
100.0	22.8	111.6	669.6	140.8	528.7
102.0	22.5	109.9	672.7	143.6	529.0
104.0	22.2	108.3	675.7	146.5	529.2
106.0	21.8	106.7	678.7	149.3	529.4
108.0	21.5	105.2	681.6	152.1	529.5
110.0	21.2	103.7	684.5	154.9	529.6
112.0	20.9	102.3	687.3	157.7	529.6
114.0	20.7	100.9	690.1	160.5	529.6
116.0	20.4	99.6	692.9	163.4	529.5
118.0	20.1	98.2	695.6	166.2	529.4
120.0	19.8	97.0	698.3	169.0	529.3
122.0	19.6	95.8	700.9	171.8	529.1
124.0	19.4	94.6	703.5	174.6	528.9
126.0	19.1	93.4	706.0	177.4	528.6
128.0	18.9	92.3	708.6	180.3	528.3
130.0	18.7	91.2	711.1	183.1	528.0
132.0	18.4	90.1	713.5	185.9	527.6
134.0	18.2	89.0	715.9	188.7	527.2
136.0	18.0	88.0	718.3	191.5	526.8
138.0	17.8	87.0	720.7	194.3	526.3
140.0	17.6	86.1	723.0	197.2	525.9

Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Modified Rational: 10-Year Storm Event

a, b, c = Rainfall Equation Coefficients

a = 1021.0
b = 3.0
c = 0.787

10 Year IDF Parameters as per City of Vaughan

Required Storage

Starting Time 80.0 min
Time Increment 2.0 min

Parameter	Value
Area (A)	2.22 ha
Runoff Coefficient ('C)	0.83
AC	1.85
Allowable Peak Outflow	28.4 l/s
Actual Peak Outflow	28.4 l/s
Max.Storage	**652.1** m^3

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (l/s)	Runoff Volume (m3)	Released Volume (m3)	Storage Volume (m3)
85.0	30.1	154.9	789.8	145.0	644.8
87.0	29.6	152.1	794.2	148.4	645.8
89.0	29.1	149.5	798.5	151.8	646.7
91.0	28.6	147.0	802.8	155.2	647.5
93.0	28.1	144.6	806.9	158.6	648.3
95.0	27.7	142.3	811.0	162.1	648.9
97.0	27.2	140.0	815.0	165.5	649.5
99.0	26.8	137.9	819.0	168.9	650.1
101.0	26.4	135.8	822.8	172.3	650.5
103.0	26.0	133.8	826.6	175.7	650.9
105.0	25.6	131.8	830.4	179.1	651.3
107.0	25.3	129.9	834.1	182.5	651.5
109.0	24.9	128.1	837.7	185.9	651.8
111.0	24.6	126.3	841.3	189.4	651.9
113.0	24.2	124.6	844.8	192.8	652.0
115.0	23.9	122.9	848.2	196.2	652.1
117.0	23.6	121.3	851.7	199.6	652.1
119.0	23.3	119.8	855.0	203.0	652.0
121.0	23.0	118.2	858.3	206.4	651.9
123.0	22.7	116.7	861.6	209.8	651.8
125.0	22.4	115.3	864.8	213.2	651.6
127.0	22.1	113.9	868.0	216.6	651.4
129.0	21.9	112.6	871.1	220.1	651.1
131.0	21.6	111.2	874.2	223.5	650.8
133.0	21.4	109.9	877.3	226.9	650.4
135.0	21.1	108.7	880.3	230.3	650.0

Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Modified Rational: 25-Year Storm Event

a, b, c = Rainfall Equation Coefficients

a = 1100.0
b = 2.0
c = 0.776

25 Year IDF Parameters
as per City of Vaughan

Required Storage

Starting Time 70.0 min
Time Increment 2.0 min

Parameter	Value
Area (A)	2.22 ha
Runoff Coefficient ('C)	0.85
AC	1.90
Allowable Peak Outflow	36.2 l/s
Actual Peak Outflow	36.2 l/s
Max.Storage	**744.4** m^3

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (l/s)	Runoff Volume (m3)	Released Volume (m3)	Storage Volume (m3)
75.0	37.8	199.3	896.7	162.9	733.7
77.0	37.1	195.3	902.4	167.3	735.1
79.0	36.3	191.6	908.1	171.6	736.5
81.0	35.7	188.0	913.6	176.0	737.6
83.0	35.0	184.5	919.0	180.3	738.7
85.0	34.4	181.2	924.3	184.7	739.7
87.0	33.8	178.1	929.6	189.0	740.5
89.0	33.2	175.0	934.7	193.4	741.3
91.0	32.6	172.1	939.7	197.7	742.0
93.0	32.1	169.3	944.6	202.1	742.6
95.0	31.6	166.6	949.5	206.4	743.1
97.0	31.1	164.0	954.2	210.7	743.5
99.0	30.6	161.4	958.9	215.1	743.8
101.0	30.2	159.0	963.5	219.4	744.1
103.0	29.7	156.6	968.0	223.8	744.2
105.0	29.3	154.4	972.5	228.1	744.3
107.0	28.9	152.2	976.8	232.5	744.4
109.0	28.5	150.0	981.2	236.8	744.3
111.0	28.1	148.0	985.4	241.2	744.3
113.0	27.7	146.0	989.6	245.5	744.1
115.0	27.3	144.0	993.7	249.8	743.9
117.0	27.0	142.1	997.8	254.2	743.6
119.0	26.6	140.3	1001.8	258.5	743.3
121.0	26.3	138.5	1005.8	262.9	742.9
123.0	26.0	136.8	1009.7	267.2	742.5
125.0	25.6	135.1	1013.5	271.6	742.0

Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Modified Rational: 50-Year Storm Event

a, b, c = Rainfall Equation Coefficients

a = 1488.0
b = 3.0
c = 0.803

50 Year IDF Parameters
as per City of Vaughan

Required Storage

Starting Time 70.0 min
Time Increment 2.0 min

Parameter	Value
Area (A)	2.22 ha
Runoff Coefficient ('C)	0.88
AC	1.94
Allowable Peak Outflow	41 l/s
Actual Peak Outflow	41 l/s
Max.Storage	**919.0** m^3

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (l/s)	Runoff Volume (m3)	Released Volume (m3)	Storage Volume (m3)
75.0	45.0	243.0	1093.6	185.7	907.9
77.0	44.1	238.1	1100.2	190.7	909.5
79.0	43.2	233.5	1106.6	195.6	911.0
81.0	42.4	229.0	1112.9	200.6	912.3
83.0	41.6	224.7	1119.0	205.5	913.5
85.0	40.8	220.6	1125.0	210.5	914.5
87.0	40.1	216.6	1130.9	215.4	915.5
89.0	39.4	212.9	1136.7	220.4	916.3
91.0	38.7	209.2	1142.3	225.3	917.0
93.0	38.1	205.7	1147.8	230.3	917.5
95.0	37.5	202.3	1153.3	235.2	918.0
97.0	36.9	199.1	1158.6	240.2	918.4
99.0	36.3	195.9	1163.8	245.1	918.7
101.0	35.7	192.9	1169.0	250.1	918.9
103.0	35.2	190.0	1174.0	255.1	919.0
105.0	34.7	187.1	1179.0	260.0	919.0
107.0	34.1	184.4	1183.9	265.0	918.9
109.0	33.7	181.8	1188.7	269.9	918.8
111.0	33.2	179.2	1193.4	274.9	918.5
113.0	32.7	176.7	1198.1	279.8	918.2
115.0	32.3	174.3	1202.6	284.8	917.9
117.0	31.8	172.0	1207.2	289.7	917.4
119.0	31.4	169.7	1211.6	294.7	916.9
121.0	31.0	167.5	1216.0	299.6	916.4
123.0	30.6	165.4	1220.3	304.6	915.7
125.0	30.2	163.3	1224.6	309.5	915.0

Stantec

Project: Bass Pro Mills Drive Extension
Project Location: Vaughan, ON
Project Number: 165040006
Date: August 2022

Modified Rational: 100-Year Storm Event

a, b, c = Rainfall Equation Coefficients

a = 1770.0
b = 4.0
c = 0.820

100-Year IDF Parameters as per City of Vaughan

Required Storage

Starting Time 60.0 min
Time Increment 2.0 min

Parameter	Value
Area (A)	2.22 ha
Runoff Coefficient ('C)	0.90
AC	1.99
Allowable Peak Outflow	47.0 l/s
Actual Peak Outflow	47.0 l/s
Max.Storage	**1020.6** m^3

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (l/s)	Runoff Volume (m3)	Released Volume (m3)	Storage Volume (m3)
70.0	51.9	287.0	1205.3	197.4	1007.8
72.0	50.8	280.8	1212.9	203.1	1009.8
74.0	49.7	274.8	1220.3	208.7	1011.6
76.0	48.7	269.2	1227.5	214.3	1013.2
78.0	47.7	263.8	1234.6	220.0	1014.6
80.0	46.8	258.6	1241.5	225.6	1015.8
82.0	45.9	253.7	1248.2	231.3	1016.9
84.0	45.0	249.0	1254.7	236.9	1017.8
86.0	44.2	244.4	1261.2	242.6	1018.6
88.0	43.4	240.0	1267.4	248.2	1019.2
90.0	42.7	235.8	1273.6	253.8	1019.8
92.0	41.9	231.8	1279.6	259.5	1020.1
94.0	41.2	227.9	1285.5	265.1	1020.4
96.0	40.5	224.2	1291.3	270.8	1020.5
98.0	39.9	220.6	1297.0	276.4	1020.6
100.0	39.3	217.1	1302.5	282.0	1020.5
102.0	38.7	213.7	1308.0	287.7	1020.3
104.0	38.1	210.5	1313.3	293.3	1020.0
106.0	37.5	207.3	1318.6	299.0	1019.6
108.0	37.0	204.3	1323.8	304.6	1019.2
110.0	36.4	201.3	1328.9	310.2	1018.6
112.0	35.9	198.5	1333.9	315.9	1018.0
114.0	35.4	195.7	1338.8	321.5	1017.3
116.0	34.9	193.0	1343.6	327.2	1016.5
118.0	34.4	190.5	1348.4	332.8	1015.6
120.0	34.0	187.9	1353.1	338.4	1014.6

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================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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8555-5485e0781469\scena


DATE: 10/20/2021                          TIME: 09:19:40

USER:


COMMENTS: _____________________________________________________


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  ***********************************************
  ** SIMULATION : 002yr-6hr                    **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\wburke\AppD
|                  |              ata\Local\Temp\
|                  |              71887690-086b-4776-a95b-bcc564b6e6da\a0f810e3
| Ptotal= 36.00 mm |    Comments: 2 Year 6 Hour AES (Bloor, TRCA)
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  2.00   12.24 |  3.75    5.04 |  5.50    0.72
                0.50    0.72 |  2.25   12.24 |  4.00    2.88 |  5.75    0.72
                0.75    0.72 |  2.50   33.12 |  4.25    2.88 |  6.00    0.72
                1.00    0.72 |  2.75   33.12 |  4.50    1.44 |  6.25    0.72
                1.25    0.72 |  3.00    9.36 |  4.75    1.44 |
                1.50    4.32 |  3.25    9.36 |  5.00    0.72 |
                1.75    4.32 |  3.50    5.04 |  5.25    0.72 |

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

-------------------
| CALIB            |
| STANDHYD (  1000)|   Area    (ha)=   2.22
|ID= 1 DT= 2.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.89         0.33
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     121.66         0.50
     Mannings n            =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.033    0.00 | 1.600    4.32 | 3.167    9.36 |  4.73    1.44
               0.067    0.00 | 1.633    4.32 | 3.200    9.36 |  4.77    1.08
               0.100    0.00 | 1.667    4.32 | 3.233    9.36 |  4.80    0.72
```



```
               0.133    0.00 | 1.700    4.32 | 3.267    7.20 |  4.83    0.72
               0.167    0.00 | 1.733    4.32 | 3.300    5.04 |  4.87    0.72
               0.200    0.00 | 1.767    8.28 | 3.333    5.04 |  4.90    0.72
               0.233    0.00 | 1.800   12.24 | 3.367    5.04 |  4.93    0.72
               0.267    0.36 | 1.833   12.24 | 3.400    5.04 |  4.97    0.72
               0.300    0.72 | 1.867   12.24 | 3.433    5.04 |  5.00    0.72
               0.333    0.72 | 1.900   12.24 | 3.467    5.04 |  5.03    0.72
               0.367    0.72 | 1.933   12.24 | 3.500    5.04 |  5.07    0.72
               0.400    0.72 | 1.967   12.24 | 3.533    5.04 |  5.10    0.72
               0.433    0.72 | 2.000   12.24 | 3.567    5.04 |  5.13    0.72
               0.467    0.72 | 2.033   12.24 | 3.600    5.04 |  5.17    0.72
               0.500    0.72 | 2.067   12.24 | 3.633    5.04 |  5.20    0.72
               0.533    0.72 | 2.100   12.24 | 3.667    5.04 |  5.23    0.72
               0.567    0.72 | 2.133   12.24 | 3.700    5.04 |  5.27    0.72
               0.600    0.72 | 2.167   12.24 | 3.733    5.04 |  5.30    0.72
               0.633    0.72 | 2.200   12.24 | 3.767    3.96 |  5.33    0.72
               0.667    0.72 | 2.233   12.24 | 3.800    2.88 |  5.37    0.72
               0.700    0.72 | 2.267   22.68 | 3.833    2.88 |  5.40    0.72
               0.733    0.72 | 2.300   33.12 | 3.867    2.88 |  5.43    0.72
               0.767    0.72 | 2.333   33.12 | 3.900    2.88 |  5.47    0.72
               0.800    0.72 | 2.367   33.12 | 3.933    2.88 |  5.50    0.72
               0.833    0.72 | 2.400   33.12 | 3.967    2.88 |  5.53    0.72
               0.867    0.72 | 2.433   33.12 | 4.000    2.88 |  5.57    0.72
               0.900    0.72 | 2.467   33.12 | 4.033    2.88 |  5.60    0.72
               0.933    0.72 | 2.500   33.12 | 4.067    2.88 |  5.63    0.72
               0.967    0.72 | 2.533   33.12 | 4.100    2.88 |  5.67    0.72
               1.000    0.72 | 2.567   33.12 | 4.133    2.88 |  5.70    0.72
               1.033    0.72 | 2.600   33.12 | 4.167    2.88 |  5.73    0.72
               1.067    0.72 | 2.633   33.12 | 4.200    2.88 |  5.77    0.72
               1.100    0.72 | 2.667   33.12 | 4.233    2.88 |  5.80    0.72
               1.133    0.72 | 2.700   33.12 | 4.267    2.16 |  5.83    0.72
               1.167    0.72 | 2.733   33.12 | 4.300    1.44 |  5.87    0.72
               1.200    0.72 | 2.767   21.24 | 4.333    1.44 |  5.90    0.72
               1.233    0.72 | 2.800    9.36 | 4.367    1.44 |  5.93    0.72
               1.267    2.52 | 2.833    9.36 | 4.400    1.44 |  5.97    0.72
               1.300    4.32 | 2.867    9.36 | 4.433    1.44 |  6.00    0.72
               1.333    4.32 | 2.900    9.36 | 4.467    1.44 |  6.03    0.72
               1.367    4.32 | 2.933    9.36 | 4.500    1.44 |  6.07    0.72
               1.400    4.32 | 2.967    9.36 | 4.533    1.44 |  6.10    0.72
               1.433    4.32 | 3.000    9.36 | 4.567    1.44 |  6.13    0.72
               1.467    4.32 | 3.033    9.36 | 4.600    1.44 |  6.17    0.72
               1.500    4.32 | 3.067    9.36 | 4.633    1.44 |  6.20    0.72
               1.533    4.32 | 3.100    9.36 | 4.667    1.44 |  6.23    0.72
               1.567    4.32 | 3.133    9.36 | 4.700    1.44 |  6.27    0.36

     Max.Eff.Inten.(mm/hr)=      33.12         6.99
           over (min)            5.00         6.00
     Storage Coeff.  (min)=      3.63 (ii)    4.03 (ii)
     Unit Hyd. Tpeak (min)=      4.00         6.00
     Unit Hyd. peak  (cms)=      0.30         0.24
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.17         0.01          0.180 (iii)
     TIME TO PEAK    (hrs)=      2.73         2.77          2.73
     RUNOFF VOLUME    (mm)=     34.00         5.73         29.76
     TOTAL RAINFALL   (mm)=     36.00        36.00         36.00
     RUNOFF COEFFICIENT   =      0.94         0.16          0.83


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  65.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  2000)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  2.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  0.0362     0.0980
                         0.0158     0.0530    |  0.0413     0.1090
                         0.0235     0.0700    |  0.0470     0.1205
                         0.0284     0.0830    |  0.0000     0.0000

                                   AREA     QPEAK     TPEAK       R.V.
                                   (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (  1000)      2.220     0.180      2.73      29.76
     OUTFLOW: ID= 1 (  2000)      2.220     0.016      4.23      29.38

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.70
```

TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.0525

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```


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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\8817c4b5-7870-4ae6-909d-895cd4997c34\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\8817c4b5-7870-4ae6-909d-895cd4997c34\scena

DATE: 10/20/2021 TIME: 09:19:40

USER:

COMMENTS: _____

****
** SIMULATION : 005yr-6hr **
****

READ STORM	Filename: C:\Users\wburke\AppData\Local\Temp\71887690-086b-4776-a95b-bcc564b6e6da\6277beea
Ptotal= 47.81 mm	Comments: 5 Year 6 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	2.00	16.25	3.75	6.69	5.50	0.96
0.50	0.96	2.25	16.25	4.00	3.82	5.75	0.96
0.75	0.96	2.50	43.98	4.25	3.82	6.00	0.96
1.00	0.96	2.75	43.98	4.50	1.91	6.25	0.96
1.25	0.96	3.00	12.43	4.75	1.91		
1.50	5.74	3.25	12.43	5.00	0.96		
1.75	5.74	3.50	6.69	5.25	0.96		

CALIB	
STANDHYD (1000)	Area (ha)= 2.22
ID= 1 DT= 2.0 min	Total Imp(%)= 85.00 Dir. Conn.(%)= 85.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	5.74	3.167	12.43	4.73	1.91
0.067	0.00	1.633	5.74	3.200	12.43	4.77	1.44
0.100	0.00	1.667	5.74	3.233	12.43	4.80	0.96
0.133	0.00	1.700	5.74	3.267	9.56	4.83	0.96
0.167	0.00	1.733	5.74	3.300	6.69	4.87	0.96
0.200	0.00	1.767	10.99	3.333	6.69	4.90	0.96
0.233	0.00	1.800	16.25	3.367	6.69	4.93	0.96
0.267	0.48	1.833	16.25	3.400	6.69	4.97	0.96
0.300	0.96	1.867	16.25	3.433	6.69	5.00	0.96
0.333	0.96	1.900	16.25	3.467	6.69	5.03	0.96
0.367	0.96	1.933	16.25	3.500	6.69	5.07	0.96
0.400	0.96	1.967	16.25	3.533	6.69	5.10	0.96
0.433	0.96	2.000	16.25	3.567	6.69	5.13	0.96
0.467	0.96	2.033	16.25	3.600	6.69	5.17	0.96
0.500	0.96	2.067	16.25	3.633	6.69	5.20	0.96
0.533	0.96	2.100	16.25	3.667	6.69	5.23	0.96
0.567	0.96	2.133	16.25	3.700	6.69	5.27	0.96
0.600	0.96	2.167	16.25	3.733	6.69	5.30	0.96
0.633	0.96	2.200	16.25	3.767	5.26	5.33	0.96
0.667	0.96	2.233	16.25	3.800	3.82	5.37	0.96
0.700	0.96	2.267	30.11	3.833	3.82	5.40	0.96
0.733	0.96	2.300	43.98	3.867	3.82	5.43	0.96
0.767	0.96	2.333	43.98	3.900	3.82	5.47	0.96
0.800	0.96	2.367	43.98	3.933	3.82	5.50	0.96
0.833	0.96	2.400	43.98	3.967	3.82	5.53	0.96
0.867	0.96	2.433	43.98	4.000	3.82	5.57	0.96
0.900	0.96	2.467	43.98	4.033	3.82	5.60	0.96
0.933	0.96	2.500	43.98	4.067	3.82	5.63	0.96
0.967	0.96	2.533	43.98	4.100	3.82	5.67	0.96
1.000	0.96	2.567	43.98	4.133	3.82	5.70	0.96
1.033	0.96	2.600	43.98	4.167	3.82	5.73	0.96
1.067	0.96	2.633	43.98	4.200	3.82	5.77	0.96
1.100	0.96	2.667	43.98	4.233	3.82	5.80	0.96
1.133	0.96	2.700	43.98	4.267	2.87	5.83	0.96
1.167	0.96	2.733	43.98	4.300	1.91	5.87	0.96
1.200	0.96	2.767	28.21	4.333	1.91	5.90	0.96
1.233	0.96	2.800	12.43	4.367	1.91	5.93	0.96
1.267	3.35	2.833	12.43	4.400	1.91	5.97	0.96
1.300	5.74	2.867	12.43	4.433	1.91	6.00	0.96
1.333	5.74	2.900	12.43	4.467	1.91	6.03	0.96
1.367	5.74	2.933	12.43	4.500	1.91	6.07	0.96
1.400	5.74	2.967	12.43	4.533	1.91	6.10	0.96
1.433	5.74	3.000	12.43	4.567	1.91	6.13	0.96
1.467	5.74	3.033	12.43	4.600	1.91	6.17	0.96
1.500	5.74	3.067	12.43	4.633	1.91	6.20	0.96
1.533	5.74	3.100	12.43	4.667	1.91	6.23	0.96
1.567	5.74	3.133	12.43	4.700	1.91	6.27	0.48

			TOTALS
Max.Eff.Inten.(mm/hr)=	43.98	12.35	
over (min)	5.00	4.00	
Storage Coeff. (min)=	3.24 (ii)	3.60 (ii)	
Unit Hyd. Tpeak (min)=	4.00	4.00	
Unit Hyd. peak (cms)=	0.32	0.30	
PEAK FLOW (cms)=	0.23	0.01	0.242 (iii)
TIME TO PEAK (hrs)=	2.73	2.73	2.73
RUNOFF VOLUME (mm)=	45.81	10.21	40.47
TOTAL RAINFALL (mm)=	47.81	47.81	47.81
RUNOFF COEFFICIENT =	0.96	0.21	0.85

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF
IN= 2---> OUT= 1	
DT= 2.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0362	0.0980
0.0158	0.0530	0.0413	0.1090
0.0235	0.0700	0.0470	0.1205
0.0284	0.0830	0.0000	0.0000

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

```
   INFLOW : ID= 2 (  1000)      2.220      0.242      2.73      40.47
   OUTFLOW: ID= 1 (  2000)      2.220      0.024      3.90      40.08

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.78
                TIME SHIFT OF PEAK FLOW          (min)= 70.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.0704

--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\732dc641-4044-43be-
9917-e66586384af2\scena
  Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\732dc641-4044-43be-
9917-e66586384af2\scena


DATE: 10/20/2021                          TIME: 09:19:40

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 010yr-6hr                     **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\wburke\AppD
|                  |              ata\Local\Temp\
|                  |              71887690-086b-4776-a95b-bcc564b6e6da\35fee964
| Ptotal= 55.69 mm |    Comments: 10 Year 6 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  2.00   18.94 |  3.75    7.80 |  5.50    1.11
                0.50    1.11 |  2.25   18.94 |  4.00    4.46 |  5.75    1.11
                0.75    1.11 |  2.50   51.24 |  4.25    4.46 |  6.00    1.11
                1.00    1.11 |  2.75   51.24 |  4.50    2.23 |  6.25    1.11
                1.25    1.11 |  3.00   14.48 |  4.75    2.23 |
                1.50    6.68 |  3.25   14.48 |  5.00    1.11 |
                1.75    6.68 |  3.50    7.80 |  5.25    1.11 |

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

--------------------
| CALIB            |
| STANDHYD (  1000)|   Area    (ha)=   2.22
|ID= 1 DT= 2.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.89         0.33
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     121.66         0.50
     Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
```



```
                    ---- TRANSFORMED HYETOGRAPH ----
 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.033    0.00 | 1.600    6.68 | 3.167   14.48 |  4.73    2.23
 0.067    0.00 | 1.633    6.68 | 3.200   14.48 |  4.77    1.67
 0.100    0.00 | 1.667    6.68 | 3.233   14.48 |  4.80    1.11
 0.133    0.00 | 1.700    6.68 | 3.267   11.14 |  4.83    1.11
 0.167    0.00 | 1.733    6.68 | 3.300    7.80 |  4.87    1.11
 0.200    0.00 | 1.767   12.81 | 3.333    7.80 |  4.90    1.11
 0.233    0.00 | 1.800   18.94 | 3.367    7.80 |  4.93    1.11
 0.267    0.56 | 1.833   18.94 | 3.400    7.80 |  4.97    1.11
 0.300    1.11 | 1.867   18.94 | 3.433    7.80 |  5.00    1.11
 0.333    1.11 | 1.900   18.94 | 3.467    7.80 |  5.03    1.11
 0.367    1.11 | 1.933   18.94 | 3.500    7.80 |  5.07    1.11
 0.400    1.11 | 1.967   18.94 | 3.533    7.80 |  5.10    1.11
 0.433    1.11 | 2.000   18.94 | 3.567    7.80 |  5.13    1.11
 0.467    1.11 | 2.033   18.94 | 3.600    7.80 |  5.17    1.11
 0.500    1.11 | 2.067   18.94 | 3.633    7.80 |  5.20    1.11
 0.533    1.11 | 2.100   18.94 | 3.667    7.80 |  5.23    1.11
 0.567    1.11 | 2.133   18.94 | 3.700    7.80 |  5.27    1.11
 0.600    1.11 | 2.167   18.94 | 3.733    7.80 |  5.30    1.11
 0.633    1.11 | 2.200   18.94 | 3.767    6.13 |  5.33    1.11
 0.667    1.11 | 2.233   18.94 | 3.800    4.46 |  5.37    1.11
 0.700    1.11 | 2.267   35.09 | 3.833    4.46 |  5.40    1.11
 0.733    1.11 | 2.300   51.24 | 3.867    4.46 |  5.43    1.11
 0.767    1.11 | 2.333   51.24 | 3.900    4.46 |  5.47    1.11
 0.800    1.11 | 2.367   51.24 | 3.933    4.46 |  5.50    1.11
 0.833    1.11 | 2.400   51.24 | 3.967    4.46 |  5.53    1.11
 0.867    1.11 | 2.433   51.24 | 4.000    4.46 |  5.57    1.11
 0.900    1.11 | 2.467   51.24 | 4.033    4.46 |  5.60    1.11
 0.933    1.11 | 2.500   51.24 | 4.067    4.46 |  5.63    1.11
 0.967    1.11 | 2.533   51.24 | 4.100    4.46 |  5.67    1.11
 1.000    1.11 | 2.567   51.24 | 4.133    4.46 |  5.70    1.11
 1.033    1.11 | 2.600   51.24 | 4.167    4.46 |  5.73    1.11
 1.067    1.11 | 2.633   51.24 | 4.200    4.46 |  5.77    1.11
 1.100    1.11 | 2.667   51.24 | 4.233    4.46 |  5.80    1.11
 1.133    1.11 | 2.700   51.24 | 4.267    3.35 |  5.83    1.11
 1.167    1.11 | 2.733   51.24 | 4.300    2.23 |  5.87    1.11
 1.200    1.11 | 2.767   32.86 | 4.333    2.23 |  5.90    1.11
 1.233    1.11 | 2.800   14.48 | 4.367    2.23 |  5.93    1.11
 1.267    3.90 | 2.833   14.48 | 4.400    2.23 |  5.97    1.11
 1.300    6.68 | 2.867   14.48 | 4.433    2.23 |  6.00    1.11
 1.333    6.68 | 2.900   14.48 | 4.467    2.23 |  6.03    1.11
 1.367    6.68 | 2.933   14.48 | 4.500    2.23 |  6.07    1.11
 1.400    6.68 | 2.967   14.48 | 4.533    2.23 |  6.10    1.11
 1.433    6.68 | 3.000   14.48 | 4.567    2.23 |  6.13    1.11
 1.467    6.68 | 3.033   14.48 | 4.600    2.23 |  6.17    1.11
 1.500    6.68 | 3.067   14.48 | 4.633    2.23 |  6.20    1.11
 1.533    6.68 | 3.100   14.48 | 4.667    2.23 |  6.23    1.11
 1.567    6.68 | 3.133   14.48 | 4.700    2.23 |  6.27    0.56

     Max.Eff.Inten.(mm/hr)=      51.24        16.51
               over (min)         5.00         4.00
     Storage Coeff.  (min)=       3.05 (ii)    3.38 (ii)
     Unit Hyd. Tpeak (min)=       4.00         4.00
     Unit Hyd. peak  (cms)=       0.33         0.31
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.27         0.02          0.284 (iii)
     TIME TO PEAK    (hrs)=       2.73         2.73          2.73
     RUNOFF VOLUME    (mm)=      53.69        13.71         47.69
     TOTAL RAINFALL   (mm)=      55.69        55.69         55.69
     RUNOFF COEFFICIENT   =       0.96         0.25          0.86

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  65.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2000)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  2.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  0.0362     0.0980
                         0.0158     0.0530    |  0.0413     0.1090
                         0.0235     0.0700    |  0.0470     0.1205
```

```
                        0.0284     0.0830   |   0.0000      0.0000

                              AREA      QPEAK     TPEAK       R.V.
                              (ha)      (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  1000)    2.220     0.284      2.73      47.69
   OUTFLOW: ID= 1 (  2000)    2.220     0.028      3.87      47.31

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.96
                  TIME SHIFT OF PEAK FLOW          (min)= 68.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  0.0827

--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\420f2840-463a-4cce-
aceb-34d3257d66bb\scena
  Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\420f2840-463a-4cce-
aceb-34d3257d66bb\scena


DATE: 10/20/2021                          TIME: 09:19:40

USER:


COMMENTS: _____

--------------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 025yr-6hr                     **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\wburke\AppD
|                  |              ata\Local\Temp\
|                  |              71887690-086b-4776-a95b-bcc564b6e6da\3e4e6076
| Ptotal= 65.59 mm |    Comments: 25 Year 6 Hour AES (Bloor, TRCA)
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.25     0.00 |  2.00    22.30 |  3.75     9.18 |  5.50     1.31
                0.50     1.31 |  2.25    22.30 |  4.00     5.25 |  5.75     1.31
                0.75     1.31 |  2.50    60.35 |  4.25     5.25 |  6.00     1.31
                1.00     1.31 |  2.75    60.35 |  4.50     2.62 |  6.25     1.31
                1.25     1.31 |  3.00    17.06 |  4.75     2.62 |
                1.50     7.87 |  3.25    17.06 |  5.00     1.31 |
                1.75     7.87 |  3.50     9.18 |  5.25     1.31 |

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

--------------------
| CALIB            |
| STANDHYD (  1000)|   Area    (ha)=   2.22
|ID= 1 DT= 2.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.89          0.33
     Dep. Storage     (mm)=       2.00          5.00
     Average Slope     (%)=       2.00          2.00
```



```
     Length           (m)=     121.66          0.50
     Mannings n          =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
               0.033     0.00 | 1.600     7.87 | 3.167    17.06 |  4.73     2.62
               0.067     0.00 | 1.633     7.87 | 3.200    17.06 |  4.77     1.97
               0.100     0.00 | 1.667     7.87 | 3.233    17.06 |  4.80     1.31
               0.133     0.00 | 1.700     7.87 | 3.267    13.12 |  4.83     1.31
               0.167     0.00 | 1.733     7.87 | 3.300     9.18 |  4.87     1.31
               0.200     0.00 | 1.767    15.08 | 3.333     9.18 |  4.90     1.31
               0.233     0.00 | 1.800    22.30 | 3.367     9.18 |  4.93     1.31
               0.267     0.66 | 1.833    22.30 | 3.400     9.18 |  4.97     1.31
               0.300     1.31 | 1.867    22.30 | 3.433     9.18 |  5.00     1.31
               0.333     1.31 | 1.900    22.30 | 3.467     9.18 |  5.03     1.31
               0.367     1.31 | 1.933    22.30 | 3.500     9.18 |  5.07     1.31
               0.400     1.31 | 1.967    22.30 | 3.533     9.18 |  5.10     1.31
               0.433     1.31 | 2.000    22.30 | 3.567     9.18 |  5.13     1.31
               0.467     1.31 | 2.033    22.30 | 3.600     9.18 |  5.17     1.31
               0.500     1.31 | 2.067    22.30 | 3.633     9.18 |  5.20     1.31
               0.533     1.31 | 2.100    22.30 | 3.667     9.18 |  5.23     1.31
               0.567     1.31 | 2.133    22.30 | 3.700     9.18 |  5.27     1.31
               0.600     1.31 | 2.167    22.30 | 3.733     9.18 |  5.30     1.31
               0.633     1.31 | 2.200    22.30 | 3.767     7.22 |  5.33     1.31
               0.667     1.31 | 2.233    22.30 | 3.800     5.25 |  5.37     1.31
               0.700     1.31 | 2.267    41.32 | 3.833     5.25 |  5.40     1.31
               0.733     1.31 | 2.300    60.35 | 3.867     5.25 |  5.43     1.31
               0.767     1.31 | 2.333    60.35 | 3.900     5.25 |  5.47     1.31
               0.800     1.31 | 2.367    60.35 | 3.933     5.25 |  5.50     1.31
               0.833     1.31 | 2.400    60.35 | 3.967     5.25 |  5.53     1.31
               0.867     1.31 | 2.433    60.35 | 4.000     5.25 |  5.57     1.31
               0.900     1.31 | 2.467    60.35 | 4.033     5.25 |  5.60     1.31
               0.933     1.31 | 2.500    60.35 | 4.067     5.25 |  5.63     1.31
               0.967     1.31 | 2.533    60.35 | 4.100     5.25 |  5.67     1.31
               1.000     1.31 | 2.567    60.35 | 4.133     5.25 |  5.70     1.31
               1.033     1.31 | 2.600    60.35 | 4.167     5.25 |  5.73     1.31
               1.067     1.31 | 2.633    60.35 | 4.200     5.25 |  5.77     1.31
               1.100     1.31 | 2.667    60.35 | 4.233     5.25 |  5.80     1.31
               1.133     1.31 | 2.700    60.35 | 4.267     3.94 |  5.83     1.31
               1.167     1.31 | 2.733    60.35 | 4.300     2.62 |  5.87     1.31
               1.200     1.31 | 2.767    38.71 | 4.333     2.62 |  5.90     1.31
               1.233     1.31 | 2.800    17.06 | 4.367     2.62 |  5.93     1.31
               1.267     4.59 | 2.833    17.06 | 4.400     2.62 |  5.97     1.31
               1.300     7.87 | 2.867    17.06 | 4.433     2.62 |  6.00     1.31
               1.333     7.87 | 2.900    17.06 | 4.467     2.62 |  6.03     1.31
               1.367     7.87 | 2.933    17.06 | 4.500     2.62 |  6.07     1.31
               1.400     7.87 | 2.967    17.06 | 4.533     2.62 |  6.10     1.31
               1.433     7.87 | 3.000    17.06 | 4.567     2.62 |  6.13     1.31
               1.467     7.87 | 3.033    17.06 | 4.600     2.62 |  6.17     1.31
               1.500     7.87 | 3.067    17.06 | 4.633     2.62 |  6.20     1.31
               1.533     7.87 | 3.100    17.06 | 4.667     2.62 |  6.23     1.31
               1.567     7.87 | 3.133    17.06 | 4.700     2.62 |  6.27     0.66

     Max.Eff.Inten.(mm/hr)=      60.35         22.29
               over (min)         5.00          4.00
     Storage Coeff.  (min)=       2.86 (ii)     3.17 (ii)
     Unit Hyd. Tpeak (min)=       4.00          4.00
     Unit Hyd. peak  (cms)=       0.34          0.32
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.32          0.02          0.337 (iii)
     TIME TO PEAK    (hrs)=       2.73          2.73           2.73
     RUNOFF VOLUME    (mm)=      63.59         18.60          56.84
     TOTAL RAINFALL   (mm)=      65.59         65.59          65.59
     RUNOFF COEFFICIENT   =       0.97          0.28           0.87


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  65.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2000)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  2.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
```

	(cms)	(ha.m.)		(cms)	(ha.m.)
	0.0000	0.0000	|	0.0362	0.0980
	0.0158	0.0530	|	0.0413	0.1090
	0.0235	0.0700	|	0.0470	0.1205
	0.0284	0.0830	|	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.337	2.73	56.84
OUTFLOW: ID= 1 (2000)	2.220	0.036	3.83	56.46

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.69
TIME SHIFT OF PEAK FLOW (min)= 66.00
MAXIMUM STORAGE USED (ha.m.)= 0.0977

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
         V V    I      SS   U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\8aa850ee-f459-4d48-b3ad-f21e71d274ea\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\8aa850ee-f459-4d48-b3ad-f21e71d274ea\scena

DATE: 10/20/2021 TIME: 09:19:40

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : 050yr-6hr                     **
  ************************************************
```

READ STORM	Filename: C:\Users\wburke\AppData\Local\Temp\71887690-086b-4776-a95b-bcc564b6e6da\fdaad26a
Ptotal= 73.00 mm	Comments: 50 Year 6 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	2.00	24.82	3.75	10.22	5.50	1.46
0.50	1.46	2.25	24.82	4.00	5.84	5.75	1.46
0.75	1.46	2.50	67.16	4.25	5.84	6.00	1.46
1.00	1.46	2.75	67.16	4.50	2.92	6.25	1.46
1.25	1.46	3.00	18.98	4.75	2.92		
1.50	8.76	3.25	18.98	5.00	1.46		
1.75	8.76	3.50	10.22	5.25	1.46		

CALIB	
STANDHYD (1000)	Area (ha)= 2.22
ID= 1 DT= 2.0 min	Total Imp(%)= 85.00 Dir. Conn.(%)= 85.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	1.600	8.76	3.167	18.98	4.73	2.92
0.067	0.00	1.633	8.76	3.200	18.98	4.77	2.19
0.100	0.00	1.667	8.76	3.233	18.98	4.80	1.46
0.133	0.00	1.700	8.76	3.267	14.60	4.83	1.46
0.167	0.00	1.733	8.76	3.300	10.22	4.87	1.46
0.200	0.00	1.767	16.79	3.333	10.22	4.90	1.46
0.233	0.00	1.800	24.82	3.367	10.22	4.93	1.46
0.267	0.73	1.833	24.82	3.400	10.22	4.97	1.46
0.300	1.46	1.867	24.82	3.433	10.22	5.00	1.46
0.333	1.46	1.900	24.82	3.467	10.22	5.03	1.46
0.367	1.46	1.933	24.82	3.500	10.22	5.07	1.46
0.400	1.46	1.967	24.82	3.533	10.22	5.10	1.46
0.433	1.46	2.000	24.82	3.567	10.22	5.13	1.46
0.467	1.46	2.033	24.82	3.600	10.22	5.17	1.46
0.500	1.46	2.067	24.82	3.633	10.22	5.20	1.46
0.533	1.46	2.100	24.82	3.667	10.22	5.23	1.46
0.567	1.46	2.133	24.82	3.700	10.22	5.27	1.46
0.600	1.46	2.167	24.82	3.733	10.22	5.30	1.46
0.633	1.46	2.200	24.82	3.767	8.03	5.33	1.46
0.667	1.46	2.233	24.82	3.800	5.84	5.37	1.46
0.700	1.46	2.267	45.99	3.833	5.84	5.40	1.46
0.733	1.46	2.300	67.16	3.867	5.84	5.43	1.46
0.767	1.46	2.333	67.16	3.900	5.84	5.47	1.46
0.800	1.46	2.367	67.16	3.933	5.84	5.50	1.46
0.833	1.46	2.400	67.16	3.967	5.84	5.53	1.46
0.867	1.46	2.433	67.16	4.000	5.84	5.57	1.46
0.900	1.46	2.467	67.16	4.033	5.84	5.60	1.46
0.933	1.46	2.500	67.16	4.067	5.84	5.63	1.46
0.967	1.46	2.533	67.16	4.100	5.84	5.67	1.46
1.000	1.46	2.567	67.16	4.133	5.84	5.70	1.46
1.033	1.46	2.600	67.16	4.167	5.84	5.73	1.46
1.067	1.46	2.633	67.16	4.200	5.84	5.77	1.46
1.100	1.46	2.667	67.16	4.233	5.84	5.80	1.46
1.133	1.46	2.700	67.16	4.267	4.38	5.83	1.46
1.167	1.46	2.733	67.16	4.300	2.92	5.87	1.46
1.200	1.46	2.767	43.07	4.333	2.92	5.90	1.46
1.233	1.46	2.800	18.98	4.367	2.92	5.93	1.46
1.267	5.11	2.833	18.98	4.400	2.92	5.97	1.46
1.300	8.76	2.867	18.98	4.433	2.92	6.00	1.46
1.333	8.76	2.900	18.98	4.467	2.92	6.03	1.46
1.367	8.76	2.933	18.98	4.500	2.92	6.07	1.46
1.400	8.76	2.967	18.98	4.533	2.92	6.10	1.46
1.433	8.76	3.000	18.98	4.567	2.92	6.13	1.46
1.467	8.76	3.033	18.98	4.600	2.92	6.17	1.46
1.500	8.76	3.067	18.98	4.633	2.92	6.20	1.46
1.533	8.76	3.100	18.98	4.667	2.92	6.23	1.46
1.567	8.76	3.133	18.98	4.700	2.92	6.27	0.73

				TOTALS
Max.Eff.Inten.(mm/hr)=		67.16	26.97	
over (min)		5.00	4.00	
Storage Coeff. (min)=		2.74 (ii)	3.04 (ii)	
Unit Hyd. Tpeak (min)=		4.00	4.00	
Unit Hyd. peak (cms)=		0.35	0.33	
PEAK FLOW	(cms)=	0.35	0.03	0.377 (iii)
TIME TO PEAK	(hrs)=	2.73	2.73	2.73
RUNOFF VOLUME	(mm)=	71.00	22.58	63.74
TOTAL RAINFALL	(mm)=	73.00	73.00	73.00
RUNOFF COEFFICIENT	=	0.97	0.31	0.87

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------
| RESERVOIR(  2000)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  2.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |  0.0362      0.0980
                          0.0158     0.0530   |  0.0413      0.1090
                          0.0235     0.0700   |  0.0470      0.1205
                          0.0284     0.0830   |  0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  1000)     2.220     0.377      2.73      63.74
   OUTFLOW: ID= 1 (  2000)     2.220     0.041      3.83      63.35

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.95
                  TIME SHIFT OF PEAK FLOW         (min)= 66.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1090

--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\ee638b61-c6a3-4abc-
883b-8a5fd020675b\scena
  Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\ee638b61-c6a3-4abc-
883b-8a5fd020675b\scena


DATE: 10/20/2021                          TIME: 09:19:40

USER:


COMMENTS: _____

--------------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 100yr-6hr                     **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\wburke\AppD
|                  |              ata\Local\Temp\
|                  |              71887690-086b-4776-a95b-bcc564b6e6da\5d0a47de
| Ptotal= 80.31 mm |    Comments: 100 Year 6 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  2.00   27.30 |  3.75   11.24 |  5.50    1.61
                0.50    1.61 |  2.25   27.30 |  4.00    6.42 |  5.75    1.61
                0.75    1.61 |  2.50   73.88 |  4.25    6.42 |  6.00    1.61
                1.00    1.61 |  2.75   73.88 |  4.50    3.21 |  6.25    1.61
                1.25    1.61 |  3.00   20.88 |  4.75    3.21 |
                1.50    9.64 |  3.25   20.88 |  5.00    1.61 |
                1.75    9.64 |  3.50   11.24 |  5.25    1.61 |

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| CALIB            |
| STANDHYD (  1000)|   Area    (ha)=   2.22
|ID= 1 DT= 2.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
--------------------

                                  IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=          1.89          0.33
     Dep. Storage     (mm)=          2.00          5.00
     Average Slope     (%)=          2.00          2.00
     Length            (m)=        121.66          0.50
     Mannings n             =       0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.033    0.00 | 1.600    9.64 | 3.167   20.88 |  4.73    3.21
               0.067    0.00 | 1.633    9.64 | 3.200   20.88 |  4.77    2.41
               0.100    0.00 | 1.667    9.64 | 3.233   20.88 |  4.80    1.61
               0.133    0.00 | 1.700    9.64 | 3.267   16.06 |  4.83    1.61
               0.167    0.00 | 1.733    9.64 | 3.300   11.24 |  4.87    1.61
               0.200    0.00 | 1.767   18.47 | 3.333   11.24 |  4.90    1.61
               0.233    0.00 | 1.800   27.30 | 3.367   11.24 |  4.93    1.61
               0.267    0.81 | 1.833   27.30 | 3.400   11.24 |  4.97    1.61
               0.300    1.61 | 1.867   27.30 | 3.433   11.24 |  5.00    1.61
               0.333    1.61 | 1.900   27.30 | 3.467   11.24 |  5.03    1.61
               0.367    1.61 | 1.933   27.30 | 3.500   11.24 |  5.07    1.61
               0.400    1.61 | 1.967   27.30 | 3.533   11.24 |  5.10    1.61
               0.433    1.61 | 2.000   27.30 | 3.567   11.24 |  5.13    1.61
               0.467    1.61 | 2.033   27.30 | 3.600   11.24 |  5.17    1.61
               0.500    1.61 | 2.067   27.30 | 3.633   11.24 |  5.20    1.61
               0.533    1.61 | 2.100   27.30 | 3.667   11.24 |  5.23    1.61
               0.567    1.61 | 2.133   27.30 | 3.700   11.24 |  5.27    1.61
               0.600    1.61 | 2.167   27.30 | 3.733   11.24 |  5.30    1.61
               0.633    1.61 | 2.200   27.30 | 3.767    8.83 |  5.33    1.61
               0.667    1.61 | 2.233   27.30 | 3.800    6.42 |  5.37    1.61
               0.700    1.61 | 2.267   50.59 | 3.833    6.42 |  5.40    1.61
               0.733    1.61 | 2.300   73.88 | 3.867    6.42 |  5.43    1.61
               0.767    1.61 | 2.333   73.88 | 3.900    6.42 |  5.47    1.61
               0.800    1.61 | 2.367   73.88 | 3.933    6.42 |  5.50    1.61
               0.833    1.61 | 2.400   73.88 | 3.967    6.42 |  5.53    1.61
               0.867    1.61 | 2.433   73.88 | 4.000    6.42 |  5.57    1.61
               0.900    1.61 | 2.467   73.88 | 4.033    6.42 |  5.60    1.61
               0.933    1.61 | 2.500   73.88 | 4.067    6.42 |  5.63    1.61
               0.967    1.61 | 2.533   73.88 | 4.100    6.42 |  5.67    1.61
               1.000    1.61 | 2.567   73.88 | 4.133    6.42 |  5.70    1.61
               1.033    1.61 | 2.600   73.88 | 4.167    6.42 |  5.73    1.61
               1.067    1.61 | 2.633   73.88 | 4.200    6.42 |  5.77    1.61
               1.100    1.61 | 2.667   73.88 | 4.233    6.42 |  5.80    1.61
               1.133    1.61 | 2.700   73.88 | 4.267    4.82 |  5.83    1.61
               1.167    1.61 | 2.733   73.88 | 4.300    3.21 |  5.87    1.61
               1.200    1.61 | 2.767   47.38 | 4.333    3.21 |  5.90    1.61
               1.233    1.61 | 2.800   20.88 | 4.367    3.21 |  5.93    1.61
               1.267    5.63 | 2.833   20.88 | 4.400    3.21 |  5.97    1.61
               1.300    9.64 | 2.867   20.88 | 4.433    3.21 |  6.00    1.61
               1.333    9.64 | 2.900   20.88 | 4.467    3.21 |  6.03    1.61
               1.367    9.64 | 2.933   20.88 | 4.500    3.21 |  6.07    1.61
               1.400    9.64 | 2.967   20.88 | 4.533    3.21 |  6.10    1.61
               1.433    9.64 | 3.000   20.88 | 4.567    3.21 |  6.13    1.61
               1.467    9.64 | 3.033   20.88 | 4.600    3.21 |  6.17    1.61
               1.500    9.64 | 3.067   20.88 | 4.633    3.21 |  6.20    1.61
               1.533    9.64 | 3.100   20.88 | 4.667    3.21 |  6.23    1.61
               1.567    9.64 | 3.133   20.88 | 4.700    3.21 |  6.27    0.81

     Max.Eff.Inten.(mm/hr)=      73.88         31.83
               over (min)         5.00          4.00
     Storage Coeff.  (min)=       2.63 (ii)     2.92 (ii)
     Unit Hyd. Tpeak (min)=       4.00          4.00
     Unit Hyd. peak  (cms)=       0.36          0.34
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.39          0.03          0.417 (iii)
     TIME TO PEAK    (hrs)=       2.73          2.73          2.73
     RUNOFF VOLUME    (mm)=      78.31         26.74         70.57
     TOTAL RAINFALL   (mm)=      80.31         80.31         80.31
     RUNOFF COEFFICIENT   =       0.98          0.33          0.88


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  65.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
```

THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000) IN= 2---> OUT= 1 DT= 2.0 min	OVERFLOW IS OFF			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0980
	0.0158	0.0530	0.0413	0.1090
	0.0235	0.0700	0.0470	0.1205
	0.0284	0.0830	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.417	2.73	70.57
OUTFLOW: ID= 1 (2000)	2.220	0.047	3.83	70.19

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.23
TIME SHIFT OF PEAK FLOW (min)= 66.00
MAXIMUM STORAGE USED (ha.m.)= 0.1202

FINISH

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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DATE: 10/20/2021                          TIME: 09:22:59

USER:


COMMENTS: _____________________________________________________


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  ***********************************************
  ** SIMULATION : 002yr-12hr                   **
  ***********************************************


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|                  |              ata\Local\Temp\
|                  |              9a4bedd3-a6fb-4e8b-aed5-2f8cdb8f4dfa\2bd245c3
| Ptotal= 42.00 mm |    Comments: 2 Year 12 Hour AES (Bloor, TRCA)
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  3.50    7.14 |  6.75    2.94 | 10.00    0.42
                0.50    0.42 |  3.75    7.14 |  7.00    2.94 | 10.25    0.42
                0.75    0.42 |  4.00    7.14 |  7.25    2.94 | 10.50    0.42
                1.00    0.42 |  4.25    7.14 |  7.50    1.68 | 10.75    0.42
                1.25    0.42 |  4.50   19.32 |  7.75    1.68 | 11.00    0.42
                1.50    0.42 |  4.75   19.32 |  8.00    1.68 | 11.25    0.42
                1.75    0.42 |  5.00   19.32 |  8.25    1.68 | 11.50    0.42
                2.00    0.42 |  5.25   19.32 |  8.50    0.84 | 11.75    0.42
                2.25    0.42 |  5.50    5.46 |  8.75    0.84 | 12.00    0.42
                2.50    2.52 |  5.75    5.46 |  9.00    0.84 | 12.25    0.42
                2.75    2.52 |  6.00    5.46 |  9.25    0.84 |
                3.00    2.52 |  6.25    5.46 |  9.50    0.42 |
                3.25    2.52 |  6.50    2.94 |  9.75    0.42 |

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| CALIB            |
| STANDHYD (  1000)|   Area    (ha)=   2.22
|ID= 1 DT= 2.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
-------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.89         0.33
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     121.66         0.50
     Mannings n             =     0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
```


---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	2.52	6.167	5.46	9.23	0.84
0.067	0.00	3.133	2.52	6.200	5.46	9.27	0.63
0.100	0.00	3.167	2.52	6.233	5.46	9.30	0.42
0.133	0.00	3.200	2.52	6.267	4.20	9.33	0.42
0.167	0.00	3.233	2.52	6.300	2.94	9.37	0.42
0.200	0.00	3.267	4.83	6.333	2.94	9.40	0.42
0.233	0.00	3.300	7.14	6.367	2.94	9.43	0.42
0.267	0.21	3.333	7.14	6.400	2.94	9.47	0.42
0.300	0.42	3.367	7.14	6.433	2.94	9.50	0.42
0.333	0.42	3.400	7.14	6.467	2.94	9.53	0.42
0.367	0.42	3.433	7.14	6.500	2.94	9.57	0.42
0.400	0.42	3.467	7.14	6.533	2.94	9.60	0.42
0.433	0.42	3.500	7.14	6.567	2.94	9.63	0.42
0.467	0.42	3.533	7.14	6.600	2.94	9.67	0.42
0.500	0.42	3.567	7.14	6.633	2.94	9.70	0.42
0.533	0.42	3.600	7.14	6.667	2.94	9.73	0.42
0.567	0.42	3.633	7.14	6.700	2.94	9.77	0.42
0.600	0.42	3.667	7.14	6.733	2.94	9.80	0.42
0.633	0.42	3.700	7.14	6.767	2.94	9.83	0.42
0.667	0.42	3.733	7.14	6.800	2.94	9.87	0.42
0.700	0.42	3.767	7.14	6.833	2.94	9.90	0.42
0.733	0.42	3.800	7.14	6.867	2.94	9.93	0.42
0.767	0.42	3.833	7.14	6.900	2.94	9.97	0.42
0.800	0.42	3.867	7.14	6.933	2.94	10.00	0.42
0.833	0.42	3.900	7.14	6.967	2.94	10.03	0.42
0.867	0.42	3.933	7.14	7.000	2.94	10.07	0.42
0.900	0.42	3.967	7.14	7.033	2.94	10.10	0.42
0.933	0.42	4.000	7.14	7.067	2.94	10.13	0.42
0.967	0.42	4.033	7.14	7.100	2.94	10.17	0.42
1.000	0.42	4.067	7.14	7.133	2.94	10.20	0.42
1.033	0.42	4.100	7.14	7.167	2.94	10.23	0.42
1.067	0.42	4.133	7.14	7.200	2.94	10.27	0.42
1.100	0.42	4.167	7.14	7.233	2.94	10.30	0.42
1.133	0.42	4.200	7.14	7.267	2.31	10.33	0.42
1.167	0.42	4.233	7.14	7.300	1.68	10.37	0.42
1.200	0.42	4.267	13.23	7.333	1.68	10.40	0.42
1.233	0.42	4.300	19.32	7.367	1.68	10.43	0.42
1.267	0.42	4.333	19.32	7.400	1.68	10.47	0.42
1.300	0.42	4.367	19.32	7.433	1.68	10.50	0.42
1.333	0.42	4.400	19.32	7.467	1.68	10.53	0.42
1.367	0.42	4.433	19.32	7.500	1.68	10.57	0.42
1.400	0.42	4.467	19.32	7.533	1.68	10.60	0.42
1.433	0.42	4.500	19.32	7.567	1.68	10.63	0.42
1.467	0.42	4.533	19.32	7.600	1.68	10.67	0.42
1.500	0.42	4.567	19.32	7.633	1.68	10.70	0.42
1.533	0.42	4.600	19.32	7.667	1.68	10.73	0.42
1.567	0.42	4.633	19.32	7.700	1.68	10.77	0.42
1.600	0.42	4.667	19.32	7.733	1.68	10.80	0.42
1.633	0.42	4.700	19.32	7.767	1.68	10.83	0.42
1.667	0.42	4.733	19.32	7.800	1.68	10.87	0.42
1.700	0.42	4.767	19.32	7.833	1.68	10.90	0.42
1.733	0.42	4.800	19.32	7.867	1.68	10.93	0.42
1.767	0.42	4.833	19.32	7.900	1.68	10.97	0.42
1.800	0.42	4.867	19.32	7.933	1.68	11.00	0.42
1.833	0.42	4.900	19.32	7.967	1.68	11.03	0.42
1.867	0.42	4.933	19.32	8.000	1.68	11.07	0.42
1.900	0.42	4.967	19.32	8.033	1.68	11.10	0.42
1.933	0.42	5.000	19.32	8.067	1.68	11.13	0.42
1.967	0.42	5.033	19.32	8.100	1.68	11.17	0.42
2.000	0.42	5.067	19.32	8.133	1.68	11.20	0.42
2.033	0.42	5.100	19.32	8.167	1.68	11.23	0.42
2.067	0.42	5.133	19.32	8.200	1.68	11.27	0.42
2.100	0.42	5.167	19.32	8.233	1.68	11.30	0.42
2.133	0.42	5.200	19.32	8.267	1.26	11.33	0.42
2.167	0.42	5.233	19.32	8.300	0.84	11.37	0.42
2.200	0.42	5.267	12.39	8.333	0.84	11.40	0.42
2.233	0.42	5.300	5.46	8.367	0.84	11.43	0.42
2.267	1.47	5.333	5.46	8.400	0.84	11.47	0.42
2.300	2.52	5.367	5.46	8.433	0.84	11.50	0.42
2.333	2.52	5.400	5.46	8.467	0.84	11.53	0.42
2.367	2.52	5.433	5.46	8.500	0.84	11.57	0.42
2.400	2.52	5.467	5.46	8.533	0.84	11.60	0.42
2.433	2.52	5.500	5.46	8.567	0.84	11.63	0.42
2.467	2.52	5.533	5.46	8.600	0.84	11.67	0.42
2.500	2.52	5.567	5.46	8.633	0.84	11.70	0.42
2.533	2.52	5.600	5.46	8.667	0.84	11.73	0.42
2.567	2.52	5.633	5.46	8.700	0.84	11.77	0.42
2.600	2.52	5.667	5.46	8.733	0.84	11.80	0.42

2.633	2.52	5.700	5.46	8.767	0.84	11.83	0.42
2.667	2.52	5.733	5.46	8.800	0.84	11.87	0.42
2.700	2.52	5.767	5.46	8.833	0.84	11.90	0.42
2.733	2.52	5.800	5.46	8.867	0.84	11.93	0.42
2.767	2.52	5.833	5.46	8.900	0.84	11.97	0.42
2.800	2.52	5.867	5.46	8.933	0.84	12.00	0.42
2.833	2.52	5.900	5.46	8.967	0.84	12.03	0.42
2.867	2.52	5.933	5.46	9.000	0.84	12.07	0.42
2.900	2.52	5.967	5.46	9.033	0.84	12.10	0.42
2.933	2.52	6.000	5.46	9.067	0.84	12.13	0.42
2.967	2.52	6.033	5.46	9.100	0.84	12.17	0.42
3.000	2.52	6.067	5.46	9.133	0.84	12.20	0.42
3.033	2.52	6.100	5.46	9.167	0.84	12.23	0.42
3.067	2.52	6.133	5.46	9.200	0.84	12.27	0.21

Max.Eff.Inten.(mm/hr)=	19.32	5.14	
over (min)	5.00	6.00	
Storage Coeff. (min)=	4.51 (ii)	5.00 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.26	0.21	
			TOTALS
PEAK FLOW (cms)=	0.10	0.00	0.106 (iii)
TIME TO PEAK (hrs)=	5.23	5.23	5.23
RUNOFF VOLUME (mm)=	40.00	7.88	35.18
TOTAL RAINFALL (mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT =	0.95	0.19	0.84

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000) IN= 2---> OUT= 1 DT= 2.0 min	OVERFLOW IS OFF			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0960
	0.0158	0.0550	0.0413	0.1060
	0.0235	0.0715	0.0470	0.1170
	0.0284	0.0830	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.106	5.23	35.18
OUTFLOW: ID= 1 (2000)	2.220	0.016	7.27	34.78

PEAK FLOW REDUCTION [Qout/Qin](%)= 14.94
TIME SHIFT OF PEAK FLOW (min)=122.00
MAXIMUM STORAGE USED (ha.m.)= 0.0551

```
       V    V   I    SSSSS  U   U    A    L             (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I       SS  U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\58e61328-6dae-48f2-ble0-a297656547ba\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\58e61328-6dae-48f2-ble0-a297656547ba\scena

DATE: 10/20/2021 TIME: 09:22:59

USER:

COMMENTS: _____

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  ************************************************
  ** SIMULATION : 005yr-12hr                    **
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READ STORM	Filename: C:\Users\wburke\AppData\Local\Temp\9a4bedd3-a6fb-4e8b-aed5-2f8cdb8f4dfa\369eff41
Ptotal= 54.38 mm	Comments: 5 Year 12 Hour AES (Bloor, TRCA)

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

CALIB STANDHYD (1000) ID= 1 DT= 2.0 min	Area (ha)= 2.22	Total Imp(%)= 85.00	Dir. Conn.(%)= 85.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	3.26	6.167	7.07	9.23	1.09
0.067	0.00	3.133	3.26	6.200	7.07	9.27	0.81
0.100	0.00	3.167	3.26	6.233	7.07	9.30	0.54
0.133	0.00	3.200	3.26	6.267	5.44	9.33	0.54
0.167	0.00	3.233	3.26	6.300	3.81	9.37	0.54
0.200	0.00	3.267	6.25	6.333	3.81	9.40	0.54
0.233	0.00	3.300	9.25	6.367	3.81	9.43	0.54
0.267	0.27	3.333	9.25	6.400	3.81	9.47	0.54
0.300	0.54	3.367	9.25	6.433	3.81	9.50	0.54
0.333	0.54	3.400	9.25	6.467	3.81	9.53	0.54
0.367	0.54	3.433	9.25	6.500	3.81	9.57	0.54
0.400	0.54	3.467	9.25	6.533	3.81	9.60	0.54
0.433	0.54	3.500	9.25	6.567	3.81	9.63	0.54
0.467	0.54	3.533	9.25	6.600	3.81	9.67	0.54
0.500	0.54	3.567	9.25	6.633	3.81	9.70	0.54
0.533	0.54	3.600	9.25	6.667	3.81	9.73	0.54
0.567	0.54	3.633	9.25	6.700	3.81	9.77	0.54
0.600	0.54	3.667	9.25	6.733	3.81	9.80	0.54
0.633	0.54	3.700	9.25	6.767	3.81	9.83	0.54
0.667	0.54	3.733	9.25	6.800	3.81	9.87	0.54
0.700	0.54	3.767	9.25	6.833	3.81	9.90	0.54
0.733	0.54	3.800	9.25	6.867	3.81	9.93	0.54
0.767	0.54	3.833	9.25	6.900	3.81	9.97	0.54

0.800	0.54	3.867	9.25	6.933	3.81	10.00	0.54
0.833	0.54	3.900	9.25	6.967	3.81	10.03	0.54
0.867	0.54	3.933	9.25	7.000	3.81	10.07	0.54
0.900	0.54	3.967	9.25	7.033	3.81	10.10	0.54
0.933	0.54	4.000	9.25	7.067	3.81	10.13	0.54
0.967	0.54	4.033	9.25	7.100	3.81	10.17	0.54
1.000	0.54	4.067	9.25	7.133	3.81	10.20	0.54
1.033	0.54	4.100	9.25	7.167	3.81	10.23	0.54
1.067	0.54	4.133	9.25	7.200	3.81	10.27	0.54
1.100	0.54	4.167	9.25	7.233	3.81	10.30	0.54
1.133	0.54	4.200	9.25	7.267	3.00	10.33	0.54
1.167	0.54	4.233	9.25	7.300	2.18	10.37	0.54
1.200	0.54	4.267	17.13	7.333	2.18	10.40	0.54
1.233	0.54	4.300	25.02	7.367	2.18	10.43	0.54
1.267	0.54	4.333	25.02	7.400	2.18	10.47	0.54
1.300	0.54	4.367	25.02	7.433	2.18	10.50	0.54
1.333	0.54	4.400	25.02	7.467	2.18	10.53	0.54
1.367	0.54	4.433	25.02	7.500	2.18	10.57	0.54
1.400	0.54	4.467	25.02	7.533	2.18	10.60	0.54
1.433	0.54	4.500	25.02	7.567	2.18	10.63	0.54
1.467	0.54	4.533	25.02	7.600	2.18	10.67	0.54
1.500	0.54	4.567	25.02	7.633	2.18	10.70	0.54
1.533	0.54	4.600	25.02	7.667	2.18	10.73	0.54
1.567	0.54	4.633	25.02	7.700	2.18	10.77	0.54
1.600	0.54	4.667	25.02	7.733	2.18	10.80	0.54
1.633	0.54	4.700	25.02	7.767	2.18	10.83	0.54
1.667	0.54	4.733	25.02	7.800	2.18	10.87	0.54
1.700	0.54	4.767	25.02	7.833	2.18	10.90	0.54
1.733	0.54	4.800	25.02	7.867	2.18	10.93	0.54
1.767	0.54	4.833	25.02	7.900	2.18	10.97	0.54
1.800	0.54	4.867	25.02	7.933	2.18	11.00	0.54
1.833	0.54	4.900	25.02	7.967	2.18	11.03	0.54
1.867	0.54	4.933	25.02	8.000	2.18	11.07	0.54
1.900	0.54	4.967	25.02	8.033	2.18	11.10	0.54
1.933	0.54	5.000	25.02	8.067	2.18	11.13	0.54
1.967	0.54	5.033	25.02	8.100	2.18	11.17	0.54
2.000	0.54	5.067	25.02	8.133	2.18	11.20	0.54
2.033	0.54	5.100	25.02	8.167	2.18	11.23	0.54
2.067	0.54	5.133	25.02	8.200	2.18	11.27	0.54
2.100	0.54	5.167	25.02	8.233	2.18	11.30	0.54
2.133	0.54	5.200	25.02	8.267	1.64	11.33	0.54
2.167	0.54	5.233	25.02	8.300	1.09	11.37	0.54
2.200	0.54	5.267	16.05	8.333	1.09	11.40	0.54
2.233	0.54	5.300	7.07	8.367	1.09	11.43	0.54
2.267	1.90	5.333	7.07	8.400	1.09	11.47	0.54
2.300	3.26	5.367	7.07	8.433	1.09	11.50	0.54
2.333	3.26	5.400	7.07	8.467	1.09	11.53	0.54
2.367	3.26	5.433	7.07	8.500	1.09	11.57	0.54
2.400	3.26	5.467	7.07	8.533	1.09	11.60	0.54
2.433	3.26	5.500	7.07	8.567	1.09	11.63	0.54
2.467	3.26	5.533	7.07	8.600	1.09	11.67	0.54
2.500	3.26	5.567	7.07	8.633	1.09	11.70	0.54
2.533	3.26	5.600	7.07	8.667	1.09	11.73	0.54
2.567	3.26	5.633	7.07	8.700	1.09	11.77	0.54
2.600	3.26	5.667	7.07	8.733	1.09	11.80	0.54
2.633	3.26	5.700	7.07	8.767	1.09	11.83	0.54
2.667	3.26	5.733	7.07	8.800	1.09	11.87	0.54
2.700	3.26	5.767	7.07	8.833	1.09	11.90	0.54
2.733	3.26	5.800	7.07	8.867	1.09	11.93	0.54
2.767	3.26	5.833	7.07	8.900	1.09	11.97	0.54
2.800	3.26	5.867	7.07	8.933	1.09	12.00	0.54
2.833	3.26	5.900	7.07	8.967	1.09	12.03	0.54
2.867	3.26	5.933	7.07	9.000	1.09	12.07	0.54
2.900	3.26	5.967	7.07	9.033	1.09	12.10	0.54
2.933	3.26	6.000	7.07	9.067	1.09	12.13	0.54
2.967	3.26	6.033	7.07	9.100	1.09	12.17	0.54
3.000	3.26	6.067	7.07	9.133	1.09	12.20	0.54
3.033	3.26	6.100	7.07	9.167	1.09	12.23	0.54
3.067	3.26	6.133	7.07	9.200	1.09	12.27	0.27

Max.Eff.Inten.(mm/hr)=	25.02	8.41	
over (min)	5.00	6.00	
Storage Coeff. (min)=	4.06 (ii)	4.51 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.28	0.22	
		TOTALS	
PEAK FLOW (cms)=	0.13	0.01	0.139 (iii)
TIME TO PEAK (hrs)=	5.20	5.23	5.23
RUNOFF VOLUME (mm)=	52.38	13.10	46.49
TOTAL RAINFALL (mm)=	54.38	54.38	54.38
RUNOFF COEFFICIENT =	0.96	0.24	0.85

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0960
	0.0158	0.0550	0.0413	0.1060
	0.0235	0.0715	0.0470	0.1170
	0.0284	0.0830	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.139	5.23	46.49
OUTFLOW: ID= 1 (2000)	2.220	0.023	6.43	46.09

PEAK FLOW REDUCTION [Qout/Qin](%)= 16.92
TIME SHIFT OF PEAK FLOW (min)= 72.00
MAXIMUM STORAGE USED (ha.m.)= 0.0715

V V I SSSSS U U A L (v 6.2.2005)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\4e5f82f6-6f45-48c5-995a-e1aad0250cd8\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\4e5f82f6-6f45-48c5-995a-e1aad0250cd8\scena

DATE: 10/20/2021 TIME: 09:22:59

USER:

COMMENTS: _____

****
** SIMULATION : 010yr-12hr **
****

READ STORM	Filename: C:\Users\wburke\AppD ata\Local\Temp\ 9a4bedd3-a6fb-4e8b-aed5-2f8cdb8f4dfa\23cb3106
Ptotal= 62.71 mm	Comments: 10 Year 12 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	3.50	10.66	6.75	4.39	10.00	0.63
0.50	0.63	3.75	10.66	7.00	4.39	10.25	0.63

0.75	0.63	4.00	10.66	7.25	4.39	10.50	0.63
1.00	0.63	4.25	10.66	7.50	2.51	10.75	0.63
1.25	0.63	4.50	28.84	7.75	2.51	11.00	0.63
1.50	0.63	4.75	28.84	8.00	2.51	11.25	0.63
1.75	0.63	5.00	28.84	8.25	2.51	11.50	0.63
2.00	0.63	5.25	28.84	8.50	1.25	11.75	0.63
2.25	0.63	5.50	8.15	8.75	1.25	12.00	0.63
2.50	3.76	5.75	8.15	9.00	1.25	12.25	0.63
2.75	3.76	6.00	8.15	9.25	1.25		
3.00	3.76	6.25	8.15	9.50	0.63		
3.25	3.76	6.50	4.39	9.75	0.63		

CALIB			
STANDHYD (1000)	Area (ha)= 2.22		
ID= 1 DT= 2.0 min	Total Imp(%)= 85.00	Dir. Conn.(%)= 85.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	3.76	6.167	8.15	9.23	1.25
0.067	0.00	3.133	3.76	6.200	8.15	9.27	0.94
0.100	0.00	3.167	3.76	6.233	8.15	9.30	0.63
0.133	0.00	3.200	3.76	6.267	6.27	9.33	0.63
0.167	0.00	3.233	3.76	6.300	4.39	9.37	0.63
0.200	0.00	3.267	7.21	6.333	4.39	9.40	0.63
0.233	0.00	3.300	10.66	6.367	4.39	9.43	0.63
0.267	0.32	3.333	10.66	6.400	4.39	9.47	0.63
0.300	0.63	3.367	10.66	6.433	4.39	9.50	0.63
0.333	0.63	3.400	10.66	6.467	4.39	9.53	0.63
0.367	0.63	3.433	10.66	6.500	4.39	9.57	0.63
0.400	0.63	3.467	10.66	6.533	4.39	9.60	0.63
0.433	0.63	3.500	10.66	6.567	4.39	9.63	0.63
0.467	0.63	3.533	10.66	6.600	4.39	9.67	0.63
0.500	0.63	3.567	10.66	6.633	4.39	9.70	0.63
0.533	0.63	3.600	10.66	6.667	4.39	9.73	0.63
0.567	0.63	3.633	10.66	6.700	4.39	9.77	0.63
0.600	0.63	3.667	10.66	6.733	4.39	9.80	0.63
0.633	0.63	3.700	10.66	6.767	4.39	9.83	0.63
0.667	0.63	3.733	10.66	6.800	4.39	9.87	0.63
0.700	0.63	3.767	10.66	6.833	4.39	9.90	0.63
0.733	0.63	3.800	10.66	6.867	4.39	9.93	0.63
0.767	0.63	3.833	10.66	6.900	4.39	9.97	0.63
0.800	0.63	3.867	10.66	6.933	4.39	10.00	0.63
0.833	0.63	3.900	10.66	6.967	4.39	10.03	0.63
0.867	0.63	3.933	10.66	7.000	4.39	10.07	0.63
0.900	0.63	3.967	10.66	7.033	4.39	10.10	0.63
0.933	0.63	4.000	10.66	7.067	4.39	10.13	0.63
0.967	0.63	4.033	10.66	7.100	4.39	10.17	0.63
1.000	0.63	4.067	10.66	7.133	4.39	10.20	0.63
1.033	0.63	4.100	10.66	7.167	4.39	10.23	0.63
1.067	0.63	4.133	10.66	7.200	4.39	10.27	0.63
1.100	0.63	4.167	10.66	7.233	4.39	10.30	0.63
1.133	0.63	4.200	10.66	7.267	3.45	10.33	0.63
1.167	0.63	4.233	10.66	7.300	2.51	10.37	0.63
1.200	0.63	4.267	19.75	7.333	2.51	10.40	0.63
1.233	0.63	4.300	28.84	7.367	2.51	10.43	0.63
1.267	0.63	4.333	28.84	7.400	2.51	10.47	0.63
1.300	0.63	4.367	28.84	7.433	2.51	10.50	0.63
1.333	0.63	4.400	28.84	7.467	2.51	10.53	0.63
1.367	0.63	4.433	28.84	7.500	2.51	10.57	0.63
1.400	0.63	4.467	28.84	7.533	2.51	10.60	0.63
1.433	0.63	4.500	28.84	7.567	2.51	10.63	0.63
1.467	0.63	4.533	28.84	7.600	2.51	10.67	0.63
1.500	0.63	4.567	28.84	7.633	2.51	10.70	0.63
1.533	0.63	4.600	28.84	7.667	2.51	10.73	0.63
1.567	0.63	4.633	28.84	7.700	2.51	10.77	0.63
1.600	0.63	4.667	28.84	7.733	2.51	10.80	0.63
1.633	0.63	4.700	28.84	7.767	2.51	10.83	0.63

1.667	0.63	4.733	28.84	7.800	2.51	10.87	0.63
1.700	0.63	4.767	28.84	7.833	2.51	10.90	0.63
1.733	0.63	4.800	28.84	7.867	2.51	10.93	0.63
1.767	0.63	4.833	28.84	7.900	2.51	10.97	0.63
1.800	0.63	4.867	28.84	7.933	2.51	11.00	0.63
1.833	0.63	4.900	28.84	7.967	2.51	11.03	0.63
1.867	0.63	4.933	28.84	8.000	2.51	11.07	0.63
1.900	0.63	4.967	28.84	8.033	2.51	11.10	0.63
1.933	0.63	5.000	28.84	8.067	2.51	11.13	0.63
1.967	0.63	5.033	28.84	8.100	2.51	11.17	0.63
2.000	0.63	5.067	28.84	8.133	2.51	11.20	0.63
2.033	0.63	5.100	28.84	8.167	2.51	11.23	0.63
2.067	0.63	5.133	28.84	8.200	2.51	11.27	0.63
2.100	0.63	5.167	28.84	8.233	2.51	11.30	0.63
2.133	0.63	5.200	28.84	8.267	1.88	11.33	0.63
2.167	0.63	5.233	28.84	8.300	1.25	11.37	0.63
2.200	0.63	5.267	18.50	8.333	1.25	11.40	0.63
2.233	0.63	5.300	8.15	8.367	1.25	11.43	0.63
2.267	2.19	5.333	8.15	8.400	1.25	11.47	0.63
2.300	3.76	5.367	8.15	8.433	1.25	11.50	0.63
2.333	3.76	5.400	8.15	8.467	1.25	11.53	0.63
2.367	3.76	5.433	8.15	8.500	1.25	11.57	0.63
2.400	3.76	5.467	8.15	8.533	1.25	11.60	0.63
2.433	3.76	5.500	8.15	8.567	1.25	11.63	0.63
2.467	3.76	5.533	8.15	8.600	1.25	11.67	0.63
2.500	3.76	5.567	8.15	8.633	1.25	11.70	0.63
2.533	3.76	5.600	8.15	8.667	1.25	11.73	0.63
2.567	3.76	5.633	8.15	8.700	1.25	11.77	0.63
2.600	3.76	5.667	8.15	8.733	1.25	11.80	0.63
2.633	3.76	5.700	8.15	8.767	1.25	11.83	0.63
2.667	3.76	5.733	8.15	8.800	1.25	11.87	0.63
2.700	3.76	5.767	8.15	8.833	1.25	11.90	0.63
2.733	3.76	5.800	8.15	8.867	1.25	11.93	0.63
2.767	3.76	5.833	8.15	8.900	1.25	11.97	0.63
2.800	3.76	5.867	8.15	8.933	1.25	12.00	0.63
2.833	3.76	5.900	8.15	8.967	1.25	12.03	0.63
2.867	3.76	5.933	8.15	9.000	1.25	12.07	0.63
2.900	3.76	5.967	8.15	9.033	1.25	12.10	0.63
2.933	3.76	6.000	8.15	9.067	1.25	12.13	0.63
2.967	3.76	6.033	8.15	9.100	1.25	12.17	0.63
3.000	3.76	6.067	8.15	9.133	1.25	12.20	0.63
3.033	3.76	6.100	8.15	9.167	1.25	12.23	0.63
3.067	3.76	6.133	8.15	9.200	1.25	12.27	0.31

Max.Eff.Inten.(mm/hr)=		28.84	10.90	
over (min)		5.00	6.00	
Storage Coeff. (min)=		3.84 (ii)	4.26 (ii)	
Unit Hyd. Tpeak (min)=		4.00	6.00	
Unit Hyd. peak (cms)=		0.29	0.23	
				TOTALS
PEAK FLOW	(cms)=	0.15	0.01	0.161 (iii)
TIME TO PEAK	(hrs)=	5.23	5.23	5.23
RUNOFF VOLUME	(mm)=	60.71	17.12	54.17
TOTAL RAINFALL	(mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT	=	0.97	0.27	0.86

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0960
	0.0158	0.0550	0.0413	0.1060
	0.0235	0.0715	0.0470	0.1170
	0.0284	0.0830	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.161	5.23	54.17
OUTFLOW: ID= 1 (2000)	2.220	0.028	6.40	53.77

PEAK FLOW REDUCTION [Qout/Qin](%)= 17.53
TIME SHIFT OF PEAK FLOW (min)= 70.00

MAXIMUM STORAGE USED (ha.m.)= 0.0826

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
         V V    I      SS   U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\9f977fa7-69a9-4735-a66e-b2103c4680bb\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\9f977fa7-69a9-4735-a66e-b2103c4680bb\scena

DATE: 10/20/2021 TIME: 09:22:59

USER:

COMMENTS: _____

** SIMULATION : 025yr-12hr **

READ STORM	Filename: C:\Users\wburke\AppData\Local\Temp\9a4bedd3-a6fb-4e8b-aed5-2f8cdb8f4dfa\2c6efae9
Ptotal= 73.10 mm	Comments: 25 Year 12 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	3.50	12.43	6.75	5.12	10.00	0.73
0.50	0.73	3.75	12.43	7.00	5.12	10.25	0.73
0.75	0.73	4.00	12.43	7.25	5.12	10.50	0.73
1.00	0.73	4.25	12.43	7.50	2.92	10.75	0.73
1.25	0.73	4.50	33.63	7.75	2.92	11.00	0.73
1.50	0.73	4.75	33.63	8.00	2.92	11.25	0.73
1.75	0.73	5.00	33.63	8.25	2.92	11.50	0.73
2.00	0.73	5.25	33.63	8.50	1.46	11.75	0.73
2.25	0.73	5.50	9.50	8.75	1.46	12.00	0.73
2.50	4.39	5.75	9.50	9.00	1.46	12.25	0.73
2.75	4.39	6.00	9.50	9.25	1.46		
3.00	4.39	6.25	9.50	9.50	0.73		
3.25	4.39	6.50	5.12	9.75	0.73		

CALIB	
STANDHYD (1000)	Area (ha)= 2.22
ID= 1 DT= 2.0 min	Total Imp(%)= 85.00 Dir. Conn.(%)= 85.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	4.39	6.167	9.50	9.23	1.46
0.067	0.00	3.133	4.39	6.200	9.50	9.27	1.09
0.100	0.00	3.167	4.39	6.233	9.50	9.30	0.73
0.133	0.00	3.200	4.39	6.267	7.31	9.33	0.73
0.167	0.00	3.233	4.39	6.300	5.12	9.37	0.73
0.200	0.00	3.267	8.41	6.333	5.12	9.40	0.73
0.233	0.00	3.300	12.43	6.367	5.12	9.43	0.73
0.267	0.37	3.333	12.43	6.400	5.12	9.47	0.73
0.300	0.73	3.367	12.43	6.433	5.12	9.50	0.73
0.333	0.73	3.400	12.43	6.467	5.12	9.53	0.73
0.367	0.73	3.433	12.43	6.500	5.12	9.57	0.73
0.400	0.73	3.467	12.43	6.533	5.12	9.60	0.73
0.433	0.73	3.500	12.43	6.567	5.12	9.63	0.73
0.467	0.73	3.533	12.43	6.600	5.12	9.67	0.73
0.500	0.73	3.567	12.43	6.633	5.12	9.70	0.73
0.533	0.73	3.600	12.43	6.667	5.12	9.73	0.73
0.567	0.73	3.633	12.43	6.700	5.12	9.77	0.73
0.600	0.73	3.667	12.43	6.733	5.12	9.80	0.73
0.633	0.73	3.700	12.43	6.767	5.12	9.83	0.73
0.667	0.73	3.733	12.43	6.800	5.12	9.87	0.73
0.700	0.73	3.767	12.43	6.833	5.12	9.90	0.73
0.733	0.73	3.800	12.43	6.867	5.12	9.93	0.73
0.767	0.73	3.833	12.43	6.900	5.12	9.97	0.73
0.800	0.73	3.867	12.43	6.933	5.12	10.00	0.73
0.833	0.73	3.900	12.43	6.967	5.12	10.03	0.73
0.867	0.73	3.933	12.43	7.000	5.12	10.07	0.73
0.900	0.73	3.967	12.43	7.033	5.12	10.10	0.73
0.933	0.73	4.000	12.43	7.067	5.12	10.13	0.73
0.967	0.73	4.033	12.43	7.100	5.12	10.17	0.73
1.000	0.73	4.067	12.43	7.133	5.12	10.20	0.73
1.033	0.73	4.100	12.43	7.167	5.12	10.23	0.73
1.067	0.73	4.133	12.43	7.200	5.12	10.27	0.73
1.100	0.73	4.167	12.43	7.233	5.12	10.30	0.73
1.133	0.73	4.200	12.43	7.267	4.02	10.33	0.73
1.167	0.73	4.233	12.43	7.300	2.92	10.37	0.73
1.200	0.73	4.267	23.03	7.333	2.92	10.40	0.73
1.233	0.73	4.300	33.63	7.367	2.92	10.43	0.73
1.267	0.73	4.333	33.63	7.400	2.92	10.47	0.73
1.300	0.73	4.367	33.63	7.433	2.92	10.50	0.73
1.333	0.73	4.400	33.63	7.467	2.92	10.53	0.73
1.367	0.73	4.433	33.63	7.500	2.92	10.57	0.73
1.400	0.73	4.467	33.63	7.533	2.92	10.60	0.73
1.433	0.73	4.500	33.63	7.567	2.92	10.63	0.73
1.467	0.73	4.533	33.63	7.600	2.92	10.67	0.73
1.500	0.73	4.567	33.63	7.633	2.92	10.70	0.73
1.533	0.73	4.600	33.63	7.667	2.92	10.73	0.73
1.567	0.73	4.633	33.63	7.700	2.92	10.77	0.73
1.600	0.73	4.667	33.63	7.733	2.92	10.80	0.73
1.633	0.73	4.700	33.63	7.767	2.92	10.83	0.73
1.667	0.73	4.733	33.63	7.800	2.92	10.87	0.73
1.700	0.73	4.767	33.63	7.833	2.92	10.90	0.73
1.733	0.73	4.800	33.63	7.867	2.92	10.93	0.73
1.767	0.73	4.833	33.63	7.900	2.92	10.97	0.73
1.800	0.73	4.867	33.63	7.933	2.92	11.00	0.73
1.833	0.73	4.900	33.63	7.967	2.92	11.03	0.73
1.867	0.73	4.933	33.63	8.000	2.92	11.07	0.73
1.900	0.73	4.967	33.63	8.033	2.92	11.10	0.73
1.933	0.73	5.000	33.63	8.067	2.92	11.13	0.73
1.967	0.73	5.033	33.63	8.100	2.92	11.17	0.73
2.000	0.73	5.067	33.63	8.133	2.92	11.20	0.73
2.033	0.73	5.100	33.63	8.167	2.92	11.23	0.73
2.067	0.73	5.133	33.63	8.200	2.92	11.27	0.73
2.100	0.73	5.167	33.63	8.233	2.92	11.30	0.73
2.133	0.73	5.200	33.63	8.267	2.19	11.33	0.73
2.167	0.73	5.233	33.63	8.300	1.46	11.37	0.73
2.200	0.73	5.267	21.57	8.333	1.46	11.40	0.73
2.233	0.73	5.300	9.50	8.367	1.46	11.43	0.73
2.267	2.56	5.333	9.50	8.400	1.46	11.47	0.73
2.300	4.39	5.367	9.50	8.433	1.46	11.50	0.73
2.333	4.39	5.400	9.50	8.467	1.46	11.53	0.73
2.367	4.39	5.433	9.50	8.500	1.46	11.57	0.73
2.400	4.39	5.467	9.50	8.533	1.46	11.60	0.73
2.433	4.39	5.500	9.50	8.567	1.46	11.63	0.73
2.467	4.39	5.533	9.50	8.600	1.46	11.67	0.73
2.500	4.39	5.567	9.50	8.633	1.46	11.70	0.73

2.533	4.39	5.600	9.50	8.667	1.46	11.73	0.73
2.567	4.39	5.633	9.50	8.700	1.46	11.77	0.73
2.600	4.39	5.667	9.50	8.733	1.46	11.80	0.73
2.633	4.39	5.700	9.50	8.767	1.46	11.83	0.73
2.667	4.39	5.733	9.50	8.800	1.46	11.87	0.73
2.700	4.39	5.767	9.50	8.833	1.46	11.90	0.73
2.733	4.39	5.800	9.50	8.867	1.46	11.93	0.73
2.767	4.39	5.833	9.50	8.900	1.46	11.97	0.73
2.800	4.39	5.867	9.50	8.933	1.46	12.00	0.73
2.833	4.39	5.900	9.50	8.967	1.46	12.03	0.73
2.867	4.39	5.933	9.50	9.000	1.46	12.07	0.73
2.900	4.39	5.967	9.50	9.033	1.46	12.10	0.73
2.933	4.39	6.000	9.50	9.067	1.46	12.13	0.73
2.967	4.39	6.033	9.50	9.100	1.46	12.17	0.73
3.000	4.39	6.067	9.50	9.133	1.46	12.20	0.73
3.033	4.39	6.100	9.50	9.167	1.46	12.23	0.73
3.067	4.39	6.133	9.50	9.200	1.46	12.27	0.36

Max.Eff.Inten.(mm/hr)=	33.63	14.28	
over (min)	5.00	6.00	
Storage Coeff. (min)=	3.61 (ii)	4.00 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.30	0.24	
			TOTALS
PEAK FLOW (cms)=	0.18	0.01	0.189 (iii)
TIME TO PEAK (hrs)=	5.13	5.23	5.23
RUNOFF VOLUME (mm)=	71.10	22.64	63.83
TOTAL RAINFALL (mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT =	0.97	0.31	0.87

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0960
	0.0158	0.0550	0.0413	0.1060
	0.0235	0.0715	0.0470	0.1170
	0.0284	0.0830	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.189	5.23	63.83
OUTFLOW: ID= 1 (2000)	2.220	0.036	6.37	63.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 19.14
TIME SHIFT OF PEAK FLOW (min)= 68.00
MAXIMUM STORAGE USED (ha.m.)= 0.0961

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\b2e2552b-af7c-487b-bb3d-3c10861e06a8\scena

Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\b2e2552b-af7c-487b-bb3d-3c10861e06a8\scena

DATE: 10/20/2021 TIME: 09:22:59

USER:

COMMENTS: _____

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  ************************************************
  ** SIMULATION : 050yr-12hr                    **
  ************************************************
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READ STORM	Filename: C:\Users\wburke\AppData\Local\Temp\9a4bedd3-a6fb-4e8b-aed5-2f8cdb8f4dfa\4a30faeb
Ptotal= 80.82 mm	Comments: 50 Year 12 Hour AES (Bloor, TRCA)

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

CALIB			
STANDHYD (1000)	Area (ha)= 2.22		
ID= 1 DT= 2.0 min	Total Imp(%)= 85.00	Dir. Conn.(%)= 85.00	
		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	4.85	6.167	10.50	9.23	1.62
0.067	0.00	3.133	4.85	6.200	10.50	9.27	1.21
0.100	0.00	3.167	4.85	6.233	10.50	9.30	0.81
0.133	0.00	3.200	4.85	6.267	8.08	9.33	0.81
0.167	0.00	3.233	4.85	6.300	5.66	9.37	0.81
0.200	0.00	3.267	9.29	6.333	5.66	9.40	0.81
0.233	0.00	3.300	13.74	6.367	5.66	9.43	0.81
0.267	0.41	3.333	13.74	6.400	5.66	9.47	0.81
0.300	0.81	3.367	13.74	6.433	5.66	9.50	0.81
0.333	0.81	3.400	13.74	6.467	5.66	9.53	0.81
0.367	0.81	3.433	13.74	6.500	5.66	9.57	0.81
0.400	0.81	3.467	13.74	6.533	5.66	9.60	0.81
0.433	0.81	3.500	13.74	6.567	5.66	9.63	0.81
0.467	0.81	3.533	13.74	6.600	5.66	9.67	0.81
0.500	0.81	3.567	13.74	6.633	5.66	9.70	0.81
0.533	0.81	3.600	13.74	6.667	5.66	9.73	0.81
0.567	0.81	3.633	13.74	6.700	5.66	9.77	0.81
0.600	0.81	3.667	13.74	6.733	5.66	9.80	0.81
0.633	0.81	3.700	13.74	6.767	5.66	9.83	0.81
0.667	0.81	3.733	13.74	6.800	5.66	9.87	0.81

0.700	0.81	3.767	13.74	6.833	5.66	9.90	0.81
0.733	0.81	3.800	13.74	6.867	5.66	9.93	0.81
0.767	0.81	3.833	13.74	6.900	5.66	9.97	0.81
0.800	0.81	3.867	13.74	6.933	5.66	10.00	0.81
0.833	0.81	3.900	13.74	6.967	5.66	10.03	0.81
0.867	0.81	3.933	13.74	7.000	5.66	10.07	0.81
0.900	0.81	3.967	13.74	7.033	5.66	10.10	0.81
0.933	0.81	4.000	13.74	7.067	5.66	10.13	0.81
0.967	0.81	4.033	13.74	7.100	5.66	10.17	0.81
1.000	0.81	4.067	13.74	7.133	5.66	10.20	0.81
1.033	0.81	4.100	13.74	7.167	5.66	10.23	0.81
1.067	0.81	4.133	13.74	7.200	5.66	10.27	0.81
1.100	0.81	4.167	13.74	7.233	5.66	10.30	0.81
1.133	0.81	4.200	13.74	7.267	4.45	10.33	0.81
1.167	0.81	4.233	13.74	7.300	3.23	10.37	0.81
1.200	0.81	4.267	25.45	7.333	3.23	10.40	0.81
1.233	0.81	4.300	37.17	7.367	3.23	10.43	0.81
1.267	0.81	4.333	37.17	7.400	3.23	10.47	0.81
1.300	0.81	4.367	37.17	7.433	3.23	10.50	0.81
1.333	0.81	4.400	37.17	7.467	3.23	10.53	0.81
1.367	0.81	4.433	37.17	7.500	3.23	10.57	0.81
1.400	0.81	4.467	37.17	7.533	3.23	10.60	0.81
1.433	0.81	4.500	37.17	7.567	3.23	10.63	0.81
1.467	0.81	4.533	37.17	7.600	3.23	10.67	0.81
1.500	0.81	4.567	37.17	7.633	3.23	10.70	0.81
1.533	0.81	4.600	37.17	7.667	3.23	10.73	0.81
1.567	0.81	4.633	37.17	7.700	3.23	10.77	0.81
1.600	0.81	4.667	37.17	7.733	3.23	10.80	0.81
1.633	0.81	4.700	37.17	7.767	3.23	10.83	0.81
1.667	0.81	4.733	37.17	7.800	3.23	10.87	0.81
1.700	0.81	4.767	37.17	7.833	3.23	10.90	0.81
1.733	0.81	4.800	37.17	7.867	3.23	10.93	0.81
1.767	0.81	4.833	37.17	7.900	3.23	10.97	0.81
1.800	0.81	4.867	37.17	7.933	3.23	11.00	0.81
1.833	0.81	4.900	37.17	7.967	3.23	11.03	0.81
1.867	0.81	4.933	37.17	8.000	3.23	11.07	0.81
1.900	0.81	4.967	37.17	8.033	3.23	11.10	0.81
1.933	0.81	5.000	37.17	8.067	3.23	11.13	0.81
1.967	0.81	5.033	37.17	8.100	3.23	11.17	0.81
2.000	0.81	5.067	37.17	8.133	3.23	11.20	0.81
2.033	0.81	5.100	37.17	8.167	3.23	11.23	0.81
2.067	0.81	5.133	37.17	8.200	3.23	11.27	0.81
2.100	0.81	5.167	37.17	8.233	3.23	11.30	0.81
2.133	0.81	5.200	37.17	8.267	2.43	11.33	0.81
2.167	0.81	5.233	37.17	8.300	1.62	11.37	0.81
2.200	0.81	5.267	23.84	8.333	1.62	11.40	0.81
2.233	0.81	5.300	10.50	8.367	1.62	11.43	0.81
2.267	2.83	5.333	10.50	8.400	1.62	11.47	0.81
2.300	4.85	5.367	10.50	8.433	1.62	11.50	0.81
2.333	4.85	5.400	10.50	8.467	1.62	11.53	0.81
2.367	4.85	5.433	10.50	8.500	1.62	11.57	0.81
2.400	4.85	5.467	10.50	8.533	1.62	11.60	0.81
2.433	4.85	5.500	10.50	8.567	1.62	11.63	0.81
2.467	4.85	5.533	10.50	8.600	1.62	11.67	0.81
2.500	4.85	5.567	10.50	8.633	1.62	11.70	0.81
2.533	4.85	5.600	10.50	8.667	1.62	11.73	0.81
2.567	4.85	5.633	10.50	8.700	1.62	11.77	0.81
2.600	4.85	5.667	10.50	8.733	1.62	11.80	0.81
2.633	4.85	5.700	10.50	8.767	1.62	11.83	0.81
2.667	4.85	5.733	10.50	8.800	1.62	11.87	0.81
2.700	4.85	5.767	10.50	8.833	1.62	11.90	0.81
2.733	4.85	5.800	10.50	8.867	1.62	11.93	0.81
2.767	4.85	5.833	10.50	8.900	1.62	11.97	0.81
2.800	4.85	5.867	10.50	8.933	1.62	12.00	0.81
2.833	4.85	5.900	10.50	8.967	1.62	12.03	0.81
2.867	4.85	5.933	10.50	9.000	1.62	12.07	0.81
2.900	4.85	5.967	10.50	9.033	1.62	12.10	0.81
2.933	4.85	6.000	10.50	9.067	1.62	12.13	0.81
2.967	4.85	6.033	10.50	9.100	1.62	12.17	0.81
3.000	4.85	6.067	10.50	9.133	1.62	12.20	0.81
3.033	4.85	6.100	10.50	9.167	1.62	12.23	0.81
3.067	4.85	6.133	10.50	9.200	1.62	12.27	0.40

Max.Eff.Inten.(mm/hr)=	37.17	16.94	
over (min)	5.00	4.00	
Storage Coeff. (min)=	3.47 (ii)	3.85 (ii)	
Unit Hyd. Tpeak (min)=	4.00	4.00	
Unit Hyd. peak (cms)=	0.31	0.29	
		TOTALS	
PEAK FLOW (cms)=	0.19	0.02	0.210 (iii)
TIME TO PEAK (hrs)=	5.20	5.23	5.23

RUNOFF VOLUME (mm)=	78.82	27.04	71.05
TOTAL RAINFALL (mm)=	80.82	80.82	80.82
RUNOFF COEFFICIENT =	0.98	0.33	0.88

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0960
	0.0158	0.0550	0.0413	0.1060
	0.0235	0.0715	0.0470	0.1170
	0.0284	0.0830	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.210	5.23	71.05
OUTFLOW: ID= 1 (2000)	2.220	0.041	6.33	70.65

PEAK FLOW REDUCTION [Qout/Qin](%)= 19.64
TIME SHIFT OF PEAK FLOW (min)= 66.00
MAXIMUM STORAGE USED (ha.m.)= 0.1061

FINISH

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      V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M M M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\922bf4ef-85a8-4b0d-8780-fea4d13f9952\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\922bf4ef-85a8-4b0d-8780-fea4d13f9952\scena

DATE: 10/20/2021 TIME: 09:22:59

USER:

COMMENTS: _____

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  ************************************************
  ** SIMULATION : 100yr-12hr                    **
  ************************************************
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READ STORM	Filename: C:\Users\wburke\AppD ata\Local\Temp\

	9a4bedd3-a6fb-4e8b-aed5-2f8cdb8f4dfa\eb7441f0
Ptotal= 88.54 mm	Comments: 100 Year 12 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	3.50	15.05	6.75	6.20	10.00	0.89
0.50	0.89	3.75	15.05	7.00	6.20	10.25	0.89
0.75	0.89	4.00	15.05	7.25	6.20	10.50	0.89
1.00	0.89	4.25	15.05	7.50	3.54	10.75	0.89
1.25	0.89	4.50	40.71	7.75	3.54	11.00	0.89
1.50	0.89	4.75	40.71	8.00	3.54	11.25	0.89
1.75	0.89	5.00	40.71	8.25	3.54	11.50	0.89
2.00	0.89	5.25	40.71	8.50	1.77	11.75	0.89
2.25	0.89	5.50	11.51	8.75	1.77	12.00	0.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	0.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	0.89		
3.25	5.31	6.50	6.20	9.75	0.89		

CALIB	
STANDHYD (1000)	Area (ha)= 2.22
ID= 1 DT= 2.0 min	Total Imp(%)= 85.00 Dir. Conn.(%)= 85.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	3.100	5.31	6.167	11.51	9.23	1.77
0.067	0.00	3.133	5.31	6.200	11.51	9.27	1.33
0.100	0.00	3.167	5.31	6.233	11.51	9.30	0.89
0.133	0.00	3.200	5.31	6.267	8.86	9.33	0.89
0.167	0.00	3.233	5.31	6.300	6.20	9.37	0.89
0.200	0.00	3.267	10.18	6.333	6.20	9.40	0.89
0.233	0.00	3.300	15.05	6.367	6.20	9.43	0.89
0.267	0.45	3.333	15.05	6.400	6.20	9.47	0.89
0.300	0.89	3.367	15.05	6.433	6.20	9.50	0.89
0.333	0.89	3.400	15.05	6.467	6.20	9.53	0.89
0.367	0.89	3.433	15.05	6.500	6.20	9.57	0.89
0.400	0.89	3.467	15.05	6.533	6.20	9.60	0.89
0.433	0.89	3.500	15.05	6.567	6.20	9.63	0.89
0.467	0.89	3.533	15.05	6.600	6.20	9.67	0.89
0.500	0.89	3.567	15.05	6.633	6.20	9.70	0.89
0.533	0.89	3.600	15.05	6.667	6.20	9.73	0.89
0.567	0.89	3.633	15.05	6.700	6.20	9.77	0.89
0.600	0.89	3.667	15.05	6.733	6.20	9.80	0.89
0.633	0.89	3.700	15.05	6.767	6.20	9.83	0.89
0.667	0.89	3.733	15.05	6.800	6.20	9.87	0.89
0.700	0.89	3.767	15.05	6.833	6.20	9.90	0.89
0.733	0.89	3.800	15.05	6.867	6.20	9.93	0.89
0.767	0.89	3.833	15.05	6.900	6.20	9.97	0.89
0.800	0.89	3.867	15.05	6.933	6.20	10.00	0.89
0.833	0.89	3.900	15.05	6.967	6.20	10.03	0.89
0.867	0.89	3.933	15.05	7.000	6.20	10.07	0.89
0.900	0.89	3.967	15.05	7.033	6.20	10.10	0.89
0.933	0.89	4.000	15.05	7.067	6.20	10.13	0.89
0.967	0.89	4.033	15.05	7.100	6.20	10.17	0.89
1.000	0.89	4.067	15.05	7.133	6.20	10.20	0.89
1.033	0.89	4.100	15.05	7.167	6.20	10.23	0.89
1.067	0.89	4.133	15.05	7.200	6.20	10.27	0.89
1.100	0.89	4.167	15.05	7.233	6.20	10.30	0.89
1.133	0.89	4.200	15.05	7.267	4.87	10.33	0.89
1.167	0.89	4.233	15.05	7.300	3.54	10.37	0.89
1.200	0.89	4.267	27.88	7.333	3.54	10.40	0.89
1.233	0.89	4.300	40.71	7.367	3.54	10.43	0.89
1.267	0.89	4.333	40.71	7.400	3.54	10.47	0.89
1.300	0.89	4.367	40.71	7.433	3.54	10.50	0.89
1.333	0.89	4.400	40.71	7.467	3.54	10.53	0.89
1.367	0.89	4.433	40.71	7.500	3.54	10.57	0.89
1.400	0.89	4.467	40.71	7.533	3.54	10.60	0.89

1.433	0.89	4.500	40.71	7.567	3.54	10.63	0.89
1.467	0.89	4.533	40.71	7.600	3.54	10.67	0.89
1.500	0.89	4.567	40.71	7.633	3.54	10.70	0.89
1.533	0.89	4.600	40.71	7.667	3.54	10.73	0.89
1.567	0.89	4.633	40.71	7.700	3.54	10.77	0.89
1.600	0.89	4.667	40.71	7.733	3.54	10.80	0.89
1.633	0.89	4.700	40.71	7.767	3.54	10.83	0.89
1.667	0.89	4.733	40.71	7.800	3.54	10.87	0.89
1.700	0.89	4.767	40.71	7.833	3.54	10.90	0.89
1.733	0.89	4.800	40.71	7.867	3.54	10.93	0.89
1.767	0.89	4.833	40.71	7.900	3.54	10.97	0.89
1.800	0.89	4.867	40.71	7.933	3.54	11.00	0.89
1.833	0.89	4.900	40.71	7.967	3.54	11.03	0.89
1.867	0.89	4.933	40.71	8.000	3.54	11.07	0.89
1.900	0.89	4.967	40.71	8.033	3.54	11.10	0.89
1.933	0.89	5.000	40.71	8.067	3.54	11.13	0.89
1.967	0.89	5.033	40.71	8.100	3.54	11.17	0.89
2.000	0.89	5.067	40.71	8.133	3.54	11.20	0.89
2.033	0.89	5.100	40.71	8.167	3.54	11.23	0.89
2.067	0.89	5.133	40.71	8.200	3.54	11.27	0.89
2.100	0.89	5.167	40.71	8.233	3.54	11.30	0.89
2.133	0.89	5.200	40.71	8.267	2.66	11.33	0.89
2.167	0.89	5.233	40.71	8.300	1.77	11.37	0.89
2.200	0.89	5.267	26.11	8.333	1.77	11.40	0.89
2.233	0.89	5.300	11.51	8.367	1.77	11.43	0.89
2.267	3.10	5.333	11.51	8.400	1.77	11.47	0.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	0.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	0.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	0.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	0.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	0.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	0.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	0.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	0.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	0.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	0.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	0.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	0.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	0.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	0.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	0.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	0.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	0.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	0.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	0.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	0.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	0.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	0.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	0.89
3.067	5.31	6.133	11.51	9.200	1.77	12.27	0.44

				TOTALS
Max.Eff.Inten.(mm/hr)	=	40.71	19.73	
over	(min)	5.00	4.00	
Storage Coeff.	(min)=	3.34 (ii)	3.71 (ii)	
Unit Hyd. Tpeak	(min)=	4.00	4.00	
Unit Hyd. peak	(cms)=	0.31	0.29	
PEAK FLOW	(cms)=	0.21	0.02	0.232 (iii)
TIME TO PEAK	(hrs)=	5.23	5.23	5.23
RUNOFF VOLUME	(mm)=	86.54	31.68	78.31
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	0.98	0.36	0.88

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF
IN= 2---> OUT= 1	
DT= 2.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0362	0.0960
0.0158	0.0550	0.0413	0.1060
0.0235	0.0715	0.0470	0.1170
0.0284	0.0830	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.232	5.23	78.31
OUTFLOW: ID= 1 (2000)	2.220	0.047	6.33	77.91

PEAK FLOW REDUCTION [Qout/Qin](%)= 20.11
TIME SHIFT OF PEAK FLOW (min)= 66.00
MAXIMUM STORAGE USED (ha.m.)= 0.1162

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                    *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\31c8b816-a6a3-46ba-
9744-03ad25b79932\scena
  Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\31c8b816-a6a3-46ba-
9744-03ad25b79932\scena


DATE: 10/20/2021                          TIME: 09:23:45

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 002yr-24hr                   **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\wburke\AppD
|                  |              ata\Local\Temp\
|                  |              436f8689-d7f8-4833-9a4f-3c530aef3e9e\6fb9f58c
| Ptotal= 47.08 mm |    Comments: 2 Year 24 Hour AES (Bloor, TRCA)
-------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	6.50	4.00	12.75	1.65	19.00	0.24
0.50	0.24	6.75	4.00	13.00	1.65	19.25	0.24
0.75	0.24	7.00	4.00	13.25	1.65	19.50	0.24
1.00	0.24	7.25	4.00	13.50	1.65	19.75	0.24
1.25	0.24	7.50	4.00	13.75	1.65	20.00	0.24
1.50	0.24	7.75	4.00	14.00	1.65	20.25	0.24
1.75	0.24	8.00	4.00	14.25	1.65	20.50	0.24
2.00	0.24	8.25	4.00	14.50	0.94	20.75	0.24
2.25	0.24	8.50	10.81	14.75	0.94	21.00	0.24
2.50	0.24	8.75	10.81	15.00	0.94	21.25	0.24
2.75	0.24	9.00	10.81	15.25	0.94	21.50	0.24
3.00	0.24	9.25	10.81	15.50	0.94	21.75	0.24
3.25	0.24	9.50	10.81	15.75	0.94	22.00	0.24
3.50	0.24	9.75	10.81	16.00	0.94	22.25	0.24
3.75	0.24	10.00	10.81	16.25	0.94	22.50	0.24
4.00	0.24	10.25	10.81	16.50	0.47	22.75	0.24
4.25	0.24	10.50	3.06	16.75	0.47	23.00	0.24
4.50	1.41	10.75	3.06	17.00	0.47	23.25	0.24
4.75	1.41	11.00	3.06	17.25	0.47	23.50	0.24
5.00	1.41	11.25	3.06	17.50	0.47	23.75	0.24
5.25	1.41	11.50	3.06	17.75	0.47	24.00	0.24
5.50	1.41	11.75	3.06	18.00	0.47	24.25	0.24
5.75	1.41	12.00	3.06	18.25	0.47		
6.00	1.41	12.25	3.06	18.50	0.24		
6.25	1.41	12.50	1.65	18.75	0.24		

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| CALIB            |
| STANDHYD (  1000)|   Area    (ha)=   2.22
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```
|ID= 1 DT= 2.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
-------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.89          0.33
     Dep. Storage     (mm)=       2.00          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     121.66          0.50
     Mannings n           =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.41	12.167	3.06	18.23	0.47
0.067	0.00	6.133	1.41	12.200	3.06	18.27	0.35
0.100	0.00	6.167	1.41	12.233	3.06	18.30	0.24
0.133	0.00	6.200	1.41	12.267	2.35	18.33	0.24
0.167	0.00	6.233	1.41	12.300	1.65	18.37	0.24
0.200	0.00	6.267	2.70	12.333	1.65	18.40	0.24
0.233	0.00	6.300	4.00	12.367	1.65	18.43	0.24
0.267	0.12	6.333	4.00	12.400	1.65	18.47	0.24
0.300	0.24	6.367	4.00	12.433	1.65	18.50	0.24
0.333	0.24	6.400	4.00	12.467	1.65	18.53	0.24
0.367	0.24	6.433	4.00	12.500	1.65	18.57	0.24
0.400	0.24	6.467	4.00	12.533	1.65	18.60	0.24
0.433	0.24	6.500	4.00	12.567	1.65	18.63	0.24
0.467	0.24	6.533	4.00	12.600	1.65	18.67	0.24
0.500	0.24	6.567	4.00	12.633	1.65	18.70	0.24
0.533	0.24	6.600	4.00	12.667	1.65	18.73	0.24
0.567	0.24	6.633	4.00	12.700	1.65	18.77	0.24
0.600	0.24	6.667	4.00	12.733	1.65	18.80	0.24
0.633	0.24	6.700	4.00	12.767	1.65	18.83	0.24
0.667	0.24	6.733	4.00	12.800	1.65	18.87	0.24
0.700	0.24	6.767	4.00	12.833	1.65	18.90	0.24
0.733	0.24	6.800	4.00	12.867	1.65	18.93	0.24
0.767	0.24	6.833	4.00	12.900	1.65	18.97	0.24
0.800	0.24	6.867	4.00	12.933	1.65	19.00	0.24
0.833	0.24	6.900	4.00	12.967	1.65	19.03	0.24
0.867	0.24	6.933	4.00	13.000	1.65	19.07	0.24
0.900	0.24	6.967	4.00	13.033	1.65	19.10	0.24
0.933	0.24	7.000	4.00	13.067	1.65	19.13	0.24
0.967	0.24	7.033	4.00	13.100	1.65	19.17	0.24
1.000	0.24	7.067	4.00	13.133	1.65	19.20	0.24
1.033	0.24	7.100	4.00	13.167	1.65	19.23	0.24
1.067	0.24	7.133	4.00	13.200	1.65	19.27	0.24
1.100	0.24	7.167	4.00	13.233	1.65	19.30	0.24
1.133	0.24	7.200	4.00	13.267	1.65	19.33	0.24
1.167	0.24	7.233	4.00	13.300	1.65	19.37	0.24
1.200	0.24	7.267	4.00	13.333	1.65	19.40	0.24
1.233	0.24	7.300	4.00	13.367	1.65	19.43	0.24
1.267	0.24	7.333	4.00	13.400	1.65	19.47	0.24
1.300	0.24	7.367	4.00	13.433	1.65	19.50	0.24
1.333	0.24	7.400	4.00	13.467	1.65	19.53	0.24
1.367	0.24	7.433	4.00	13.500	1.65	19.57	0.24
1.400	0.24	7.467	4.00	13.533	1.65	19.60	0.24
1.433	0.24	7.500	4.00	13.567	1.65	19.63	0.24
1.467	0.24	7.533	4.00	13.600	1.65	19.67	0.24
1.500	0.24	7.567	4.00	13.633	1.65	19.70	0.24
1.533	0.24	7.600	4.00	13.667	1.65	19.73	0.24
1.567	0.24	7.633	4.00	13.700	1.65	19.77	0.24
1.600	0.24	7.667	4.00	13.733	1.65	19.80	0.24
1.633	0.24	7.700	4.00	13.767	1.65	19.83	0.24
1.667	0.24	7.733	4.00	13.800	1.65	19.87	0.24
1.700	0.24	7.767	4.00	13.833	1.65	19.90	0.24
1.733	0.24	7.800	4.00	13.867	1.65	19.93	0.24
1.767	0.24	7.833	4.00	13.900	1.65	19.97	0.24
1.800	0.24	7.867	4.00	13.933	1.65	20.00	0.24
1.833	0.24	7.900	4.00	13.967	1.65	20.03	0.24
1.867	0.24	7.933	4.00	14.000	1.65	20.07	0.24
1.900	0.24	7.967	4.00	14.033	1.65	20.10	0.24
1.933	0.24	8.000	4.00	14.067	1.65	20.13	0.24
1.967	0.24	8.033	4.00	14.100	1.65	20.17	0.24
2.000	0.24	8.067	4.00	14.133	1.65	20.20	0.24
2.033	0.24	8.100	4.00	14.167	1.65	20.23	0.24
2.067	0.24	8.133	4.00	14.200	1.65	20.27	0.24
2.100	0.24	8.167	4.00	14.233	1.65	20.30	0.24
2.133	0.24	8.200	4.00	14.267	1.29	20.33	0.24
2.167	0.24	8.233	4.00	14.300	0.94	20.37	0.24
2.200	0.24	8.267	7.40	14.333	0.94	20.40	0.24

2.233	0.24	8.300	10.81	14.367	0.94	20.43	0.24
2.267	0.24	8.333	10.81	14.400	0.94	20.47	0.24
2.300	0.24	8.367	10.81	14.433	0.94	20.50	0.24
2.333	0.24	8.400	10.81	14.467	0.94	20.53	0.24
2.367	0.24	8.433	10.81	14.500	0.94	20.57	0.24
2.400	0.24	8.467	10.81	14.533	0.94	20.60	0.24
2.433	0.24	8.500	10.81	14.567	0.94	20.63	0.24
2.467	0.24	8.533	10.81	14.600	0.94	20.67	0.24
2.500	0.24	8.567	10.81	14.633	0.94	20.70	0.24
2.533	0.24	8.600	10.81	14.667	0.94	20.73	0.24
2.567	0.24	8.633	10.81	14.700	0.94	20.77	0.24
2.600	0.24	8.667	10.81	14.733	0.94	20.80	0.24
2.633	0.24	8.700	10.81	14.767	0.94	20.83	0.24
2.667	0.24	8.733	10.81	14.800	0.94	20.87	0.24
2.700	0.24	8.767	10.81	14.833	0.94	20.90	0.24
2.733	0.24	8.800	10.81	14.867	0.94	20.93	0.24
2.767	0.24	8.833	10.81	14.900	0.94	20.97	0.24
2.800	0.24	8.867	10.81	14.933	0.94	21.00	0.24
2.833	0.24	8.900	10.81	14.967	0.94	21.03	0.24
2.867	0.24	8.933	10.81	15.000	0.94	21.07	0.24
2.900	0.24	8.967	10.81	15.033	0.94	21.10	0.24
2.933	0.24	9.000	10.81	15.067	0.94	21.13	0.24
2.967	0.24	9.033	10.81	15.100	0.94	21.17	0.24
3.000	0.24	9.067	10.81	15.133	0.94	21.20	0.24
3.033	0.24	9.100	10.81	15.167	0.94	21.23	0.24
3.067	0.24	9.133	10.81	15.200	0.94	21.27	0.24
3.100	0.24	9.167	10.81	15.233	0.94	21.30	0.24
3.133	0.24	9.200	10.81	15.267	0.94	21.33	0.24
3.167	0.24	9.233	10.81	15.300	0.94	21.37	0.24
3.200	0.24	9.267	10.81	15.333	0.94	21.40	0.24
3.233	0.24	9.300	10.81	15.367	0.94	21.43	0.24
3.267	0.24	9.333	10.81	15.400	0.94	21.47	0.24
3.300	0.24	9.367	10.81	15.433	0.94	21.50	0.24
3.333	0.24	9.400	10.81	15.467	0.94	21.53	0.24
3.367	0.24	9.433	10.81	15.500	0.94	21.57	0.24
3.400	0.24	9.467	10.81	15.533	0.94	21.60	0.24
3.433	0.24	9.500	10.81	15.567	0.94	21.63	0.24
3.467	0.24	9.533	10.81	15.600	0.94	21.67	0.24
3.500	0.24	9.567	10.81	15.633	0.94	21.70	0.24
3.533	0.24	9.600	10.81	15.667	0.94	21.73	0.24
3.567	0.24	9.633	10.81	15.700	0.94	21.77	0.24
3.600	0.24	9.667	10.81	15.733	0.94	21.80	0.24
3.633	0.24	9.700	10.81	15.767	0.94	21.83	0.24
3.667	0.24	9.733	10.81	15.800	0.94	21.87	0.24
3.700	0.24	9.767	10.81	15.833	0.94	21.90	0.24
3.733	0.24	9.800	10.81	15.867	0.94	21.93	0.24
3.767	0.24	9.833	10.81	15.900	0.94	21.97	0.24
3.800	0.24	9.867	10.81	15.933	0.94	22.00	0.24
3.833	0.24	9.900	10.81	15.967	0.94	22.03	0.24
3.867	0.24	9.933	10.81	16.000	0.94	22.07	0.24
3.900	0.24	9.967	10.81	16.033	0.94	22.10	0.24
3.933	0.24	10.000	10.81	16.067	0.94	22.13	0.24
3.967	0.24	10.033	10.81	16.100	0.94	22.17	0.24
4.000	0.24	10.067	10.81	16.133	0.94	22.20	0.24
4.033	0.24	10.100	10.81	16.167	0.94	22.23	0.24
4.067	0.24	10.133	10.81	16.200	0.94	22.27	0.24
4.100	0.24	10.167	10.81	16.233	0.94	22.30	0.24
4.133	0.24	10.200	10.81	16.267	0.70	22.33	0.24
4.167	0.24	10.233	10.81	16.300	0.47	22.37	0.24
4.200	0.24	10.267	6.93	16.333	0.47	22.40	0.24
4.233	0.24	10.300	3.06	16.367	0.47	22.43	0.24
4.267	0.82	10.333	3.06	16.400	0.47	22.47	0.24
4.300	1.41	10.367	3.06	16.433	0.47	22.50	0.24
4.333	1.41	10.400	3.06	16.467	0.47	22.53	0.24
4.367	1.41	10.433	3.06	16.500	0.47	22.57	0.24
4.400	1.41	10.467	3.06	16.533	0.47	22.60	0.24
4.433	1.41	10.500	3.06	16.567	0.47	22.63	0.24
4.467	1.41	10.533	3.06	16.600	0.47	22.67	0.24
4.500	1.41	10.567	3.06	16.633	0.47	22.70	0.24
4.533	1.41	10.600	3.06	16.667	0.47	22.73	0.24
4.567	1.41	10.633	3.06	16.700	0.47	22.77	0.24
4.600	1.41	10.667	3.06	16.733	0.47	22.80	0.24
4.633	1.41	10.700	3.06	16.767	0.47	22.83	0.24
4.667	1.41	10.733	3.06	16.800	0.47	22.87	0.24
4.700	1.41	10.767	3.06	16.833	0.47	22.90	0.24
4.733	1.41	10.800	3.06	16.867	0.47	22.93	0.24
4.767	1.41	10.833	3.06	16.900	0.47	22.97	0.24
4.800	1.41	10.867	3.06	16.933	0.47	23.00	0.24
4.833	1.41	10.900	3.06	16.967	0.47	23.03	0.24
4.867	1.41	10.933	3.06	17.000	0.47	23.07	0.24
4.900	1.41	10.967	3.06	17.033	0.47	23.10	0.24

4.933	1.41	11.000	3.06	17.067	0.47	23.13	0.24
4.967	1.41	11.033	3.06	17.100	0.47	23.17	0.24
5.000	1.41	11.067	3.06	17.133	0.47	23.20	0.24
5.033	1.41	11.100	3.06	17.167	0.47	23.23	0.24
5.067	1.41	11.133	3.06	17.200	0.47	23.27	0.24
5.100	1.41	11.167	3.06	17.233	0.47	23.30	0.24
5.133	1.41	11.200	3.06	17.267	0.47	23.33	0.24
5.167	1.41	11.233	3.06	17.300	0.47	23.37	0.24
5.200	1.41	11.267	3.06	17.333	0.47	23.40	0.24
5.233	1.41	11.300	3.06	17.367	0.47	23.43	0.24
5.267	1.41	11.333	3.06	17.400	0.47	23.47	0.24
5.300	1.41	11.367	3.06	17.433	0.47	23.50	0.24
5.333	1.41	11.400	3.06	17.467	0.47	23.53	0.24
5.367	1.41	11.433	3.06	17.500	0.47	23.57	0.24
5.400	1.41	11.467	3.06	17.533	0.47	23.60	0.24
5.433	1.41	11.500	3.06	17.567	0.47	23.63	0.24
5.467	1.41	11.533	3.06	17.600	0.47	23.67	0.24
5.500	1.41	11.567	3.06	17.633	0.47	23.70	0.24
5.533	1.41	11.600	3.06	17.667	0.47	23.73	0.24
5.567	1.41	11.633	3.06	17.700	0.47	23.77	0.24
5.600	1.41	11.667	3.06	17.733	0.47	23.80	0.24
5.633	1.41	11.700	3.06	17.767	0.47	23.83	0.24
5.667	1.41	11.733	3.06	17.800	0.47	23.87	0.24
5.700	1.41	11.767	3.06	17.833	0.47	23.90	0.24
5.733	1.41	11.800	3.06	17.867	0.47	23.93	0.24
5.767	1.41	11.833	3.06	17.900	0.47	23.97	0.24
5.800	1.41	11.867	3.06	17.933	0.47	24.00	0.24
5.833	1.41	11.900	3.06	17.967	0.47	24.03	0.24
5.867	1.41	11.933	3.06	18.000	0.47	24.07	0.24
5.900	1.41	11.967	3.06	18.033	0.47	24.10	0.24
5.933	1.41	12.000	3.06	18.067	0.47	24.13	0.24
5.967	1.41	12.033	3.06	18.100	0.47	24.17	0.24
6.000	1.41	12.067	3.06	18.133	0.47	24.20	0.24
6.033	1.41	12.100	3.06	18.167	0.47	24.23	0.24
6.067	1.41	12.133	3.06	18.200	0.47	24.27	0.12

Max.Eff.Inten.(mm/hr)=	10.81	3.30		
over (min)	6.00	8.00		
Storage Coeff. (min)=	5.68 (ii)	6.30 (ii)		
Unit Hyd. Tpeak (min)=	6.00	8.00		
Unit Hyd. peak (cms)=	0.19	0.16		
			TOTALS	
PEAK FLOW (cms)=	0.06	0.00	0.060	(iii)
TIME TO PEAK (hrs)=	9.57	10.23	10.23	
RUNOFF VOLUME (mm)=	45.08	9.90	39.80	
TOTAL RAINFALL (mm)=	47.08	47.08	47.08	
RUNOFF COEFFICIENT =	0.96	0.21	0.85	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0870
	0.0158	0.0525	0.0413	0.0960
	0.0235	0.0658	0.0470	0.1045
	0.0284	0.0760	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.060	10.23	39.80
OUTFLOW: ID= 1 (2000)	2.220	0.016	12.30	39.42

PEAK FLOW REDUCTION [Qout/Qin](%)= 26.29
TIME SHIFT OF PEAK FLOW (min)=124.00
MAXIMUM STORAGE USED (ha.m.)= 0.0521

```
V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
```

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

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
 OOO     T      T    H   H    Y    M   M   OOO
```


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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\d5883110-4a0b-4364-9960-0ff48ddd0f0f\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\d5883110-4a0b-4364-9960-0ff48ddd0f0f\scena

DATE: 10/20/2021 TIME: 09:23:45

USER:

COMMENTS: _____

```
**********************************************
** SIMULATION : 005yr-24hr                   **
**********************************************
```

```
--------------------
|    READ STORM    |    Filename: C:\Users\wburke\AppD
|                  |              ata\Local\Temp\
|                  |              436f8689-d7f8-4833-9a4f-3c530aef3e9e\30495b75
| Ptotal= 60.08 mm |    Comments: 5 Year 24 Hour AES (Bloor, TRCA)
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	6.50	5.11	12.75	2.10	19.00	0.30
0.50	0.30	6.75	5.11	13.00	2.10	19.25	0.30
0.75	0.30	7.00	5.11	13.25	2.10	19.50	0.30
1.00	0.30	7.25	5.11	13.50	2.10	19.75	0.30
1.25	0.30	7.50	5.11	13.75	2.10	20.00	0.30
1.50	0.30	7.75	5.11	14.00	2.10	20.25	0.30
1.75	0.30	8.00	5.11	14.25	2.10	20.50	0.30
2.00	0.30	8.25	5.11	14.50	1.20	20.75	0.30
2.25	0.30	8.50	13.82	14.75	1.20	21.00	0.30
2.50	0.30	8.75	13.82	15.00	1.20	21.25	0.30
2.75	0.30	9.00	13.82	15.25	1.20	21.50	0.30
3.00	0.30	9.25	13.82	15.50	1.20	21.75	0.30
3.25	0.30	9.50	13.82	15.75	1.20	22.00	0.30
3.50	0.30	9.75	13.82	16.00	1.20	22.25	0.30
3.75	0.30	10.00	13.82	16.25	1.20	22.50	0.30
4.00	0.30	10.25	13.82	16.50	0.60	22.75	0.30
4.25	0.30	10.50	3.91	16.75	0.60	23.00	0.30
4.50	1.80	10.75	3.91	17.00	0.60	23.25	0.30
4.75	1.80	11.00	3.91	17.25	0.60	23.50	0.30
5.00	1.80	11.25	3.91	17.50	0.60	23.75	0.30
5.25	1.80	11.50	3.91	17.75	0.60	24.00	0.30
5.50	1.80	11.75	3.91	18.00	0.60	24.25	0.30
5.75	1.80	12.00	3.91	18.25	0.60		
6.00	1.80	12.25	3.91	18.50	0.30		
6.25	1.80	12.50	2.10	18.75	0.30		

```
--------------------
| CALIB            |
| STANDHYD (  1000)|   Area    (ha)=   2.22
|ID= 1 DT= 2.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00

Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	1.80	12.167	3.91	18.23	0.60
0.067	0.00	6.133	1.80	12.200	3.91	18.27	0.45
0.100	0.00	6.167	1.80	12.233	3.91	18.30	0.30
0.133	0.00	6.200	1.80	12.267	3.00	18.33	0.30
0.167	0.00	6.233	1.80	12.300	2.10	18.37	0.30
0.200	0.00	6.267	3.45	12.333	2.10	18.40	0.30
0.233	0.00	6.300	5.11	12.367	2.10	18.43	0.30
0.267	0.15	6.333	5.11	12.400	2.10	18.47	0.30
0.300	0.30	6.367	5.11	12.433	2.10	18.50	0.30
0.333	0.30	6.400	5.11	12.467	2.10	18.53	0.30
0.367	0.30	6.433	5.11	12.500	2.10	18.57	0.30
0.400	0.30	6.467	5.11	12.533	2.10	18.60	0.30
0.433	0.30	6.500	5.11	12.567	2.10	18.63	0.30
0.467	0.30	6.533	5.11	12.600	2.10	18.67	0.30
0.500	0.30	6.567	5.11	12.633	2.10	18.70	0.30
0.533	0.30	6.600	5.11	12.667	2.10	18.73	0.30
0.567	0.30	6.633	5.11	12.700	2.10	18.77	0.30
0.600	0.30	6.667	5.11	12.733	2.10	18.80	0.30
0.633	0.30	6.700	5.11	12.767	2.10	18.83	0.30
0.667	0.30	6.733	5.11	12.800	2.10	18.87	0.30
0.700	0.30	6.767	5.11	12.833	2.10	18.90	0.30
0.733	0.30	6.800	5.11	12.867	2.10	18.93	0.30
0.767	0.30	6.833	5.11	12.900	2.10	18.97	0.30
0.800	0.30	6.867	5.11	12.933	2.10	19.00	0.30
0.833	0.30	6.900	5.11	12.967	2.10	19.03	0.30
0.867	0.30	6.933	5.11	13.000	2.10	19.07	0.30
0.900	0.30	6.967	5.11	13.033	2.10	19.10	0.30
0.933	0.30	7.000	5.11	13.067	2.10	19.13	0.30
0.967	0.30	7.033	5.11	13.100	2.10	19.17	0.30
1.000	0.30	7.067	5.11	13.133	2.10	19.20	0.30
1.033	0.30	7.100	5.11	13.167	2.10	19.23	0.30
1.067	0.30	7.133	5.11	13.200	2.10	19.27	0.30
1.100	0.30	7.167	5.11	13.233	2.10	19.30	0.30
1.133	0.30	7.200	5.11	13.267	2.10	19.33	0.30
1.167	0.30	7.233	5.11	13.300	2.10	19.37	0.30
1.200	0.30	7.267	5.11	13.333	2.10	19.40	0.30
1.233	0.30	7.300	5.11	13.367	2.10	19.43	0.30
1.267	0.30	7.333	5.11	13.400	2.10	19.47	0.30
1.300	0.30	7.367	5.11	13.433	2.10	19.50	0.30
1.333	0.30	7.400	5.11	13.467	2.10	19.53	0.30
1.367	0.30	7.433	5.11	13.500	2.10	19.57	0.30
1.400	0.30	7.467	5.11	13.533	2.10	19.60	0.30
1.433	0.30	7.500	5.11	13.567	2.10	19.63	0.30
1.467	0.30	7.533	5.11	13.600	2.10	19.67	0.30
1.500	0.30	7.567	5.11	13.633	2.10	19.70	0.30
1.533	0.30	7.600	5.11	13.667	2.10	19.73	0.30
1.567	0.30	7.633	5.11	13.700	2.10	19.77	0.30
1.600	0.30	7.667	5.11	13.733	2.10	19.80	0.30
1.633	0.30	7.700	5.11	13.767	2.10	19.83	0.30
1.667	0.30	7.733	5.11	13.800	2.10	19.87	0.30
1.700	0.30	7.767	5.11	13.833	2.10	19.90	0.30
1.733	0.30	7.800	5.11	13.867	2.10	19.93	0.30
1.767	0.30	7.833	5.11	13.900	2.10	19.97	0.30
1.800	0.30	7.867	5.11	13.933	2.10	20.00	0.30
1.833	0.30	7.900	5.11	13.967	2.10	20.03	0.30
1.867	0.30	7.933	5.11	14.000	2.10	20.07	0.30
1.900	0.30	7.967	5.11	14.033	2.10	20.10	0.30
1.933	0.30	8.000	5.11	14.067	2.10	20.13	0.30
1.967	0.30	8.033	5.11	14.100	2.10	20.17	0.30
2.000	0.30	8.067	5.11	14.133	2.10	20.20	0.30
2.033	0.30	8.100	5.11	14.167	2.10	20.23	0.30
2.067	0.30	8.133	5.11	14.200	2.10	20.27	0.30
2.100	0.30	8.167	5.11	14.233	2.10	20.30	0.30
2.133	0.30	8.200	5.11	14.267	1.65	20.33	0.30
2.167	0.30	8.233	5.11	14.300	1.20	20.37	0.30
2.200	0.30	8.267	9.46	14.333	1.20	20.40	0.30
2.233	0.30	8.300	13.82	14.367	1.20	20.43	0.30
2.267	0.30	8.333	13.82	14.400	1.20	20.47	0.30
2.300	0.30	8.367	13.82	14.433	1.20	20.50	0.30
2.333	0.30	8.400	13.82	14.467	1.20	20.53	0.30
2.367	0.30	8.433	13.82	14.500	1.20	20.57	0.30

2.400	0.30	8.467	13.82	14.533	1.20	20.60	0.30
2.433	0.30	8.500	13.82	14.567	1.20	20.63	0.30
2.467	0.30	8.533	13.82	14.600	1.20	20.67	0.30
2.500	0.30	8.567	13.82	14.633	1.20	20.70	0.30
2.533	0.30	8.600	13.82	14.667	1.20	20.73	0.30
2.567	0.30	8.633	13.82	14.700	1.20	20.77	0.30
2.600	0.30	8.667	13.82	14.733	1.20	20.80	0.30
2.633	0.30	8.700	13.82	14.767	1.20	20.83	0.30
2.667	0.30	8.733	13.82	14.800	1.20	20.87	0.30
2.700	0.30	8.767	13.82	14.833	1.20	20.90	0.30
2.733	0.30	8.800	13.82	14.867	1.20	20.93	0.30
2.767	0.30	8.833	13.82	14.900	1.20	20.97	0.30
2.800	0.30	8.867	13.82	14.933	1.20	21.00	0.30
2.833	0.30	8.900	13.82	14.967	1.20	21.03	0.30
2.867	0.30	8.933	13.82	15.000	1.20	21.07	0.30
2.900	0.30	8.967	13.82	15.033	1.20	21.10	0.30
2.933	0.30	9.000	13.82	15.067	1.20	21.13	0.30
2.967	0.30	9.033	13.82	15.100	1.20	21.17	0.30
3.000	0.30	9.067	13.82	15.133	1.20	21.20	0.30
3.033	0.30	9.100	13.82	15.167	1.20	21.23	0.30
3.067	0.30	9.133	13.82	15.200	1.20	21.27	0.30
3.100	0.30	9.167	13.82	15.233	1.20	21.30	0.30
3.133	0.30	9.200	13.82	15.267	1.20	21.33	0.30
3.167	0.30	9.233	13.82	15.300	1.20	21.37	0.30
3.200	0.30	9.267	13.82	15.333	1.20	21.40	0.30
3.233	0.30	9.300	13.82	15.367	1.20	21.43	0.30
3.267	0.30	9.333	13.82	15.400	1.20	21.47	0.30
3.300	0.30	9.367	13.82	15.433	1.20	21.50	0.30
3.333	0.30	9.400	13.82	15.467	1.20	21.53	0.30
3.367	0.30	9.433	13.82	15.500	1.20	21.57	0.30
3.400	0.30	9.467	13.82	15.533	1.20	21.60	0.30
3.433	0.30	9.500	13.82	15.567	1.20	21.63	0.30
3.467	0.30	9.533	13.82	15.600	1.20	21.67	0.30
3.500	0.30	9.567	13.82	15.633	1.20	21.70	0.30
3.533	0.30	9.600	13.82	15.667	1.20	21.73	0.30
3.567	0.30	9.633	13.82	15.700	1.20	21.77	0.30
3.600	0.30	9.667	13.82	15.733	1.20	21.80	0.30
3.633	0.30	9.700	13.82	15.767	1.20	21.83	0.30
3.667	0.30	9.733	13.82	15.800	1.20	21.87	0.30
3.700	0.30	9.767	13.82	15.833	1.20	21.90	0.30
3.733	0.30	9.800	13.82	15.867	1.20	21.93	0.30
3.767	0.30	9.833	13.82	15.900	1.20	21.97	0.30
3.800	0.30	9.867	13.82	15.933	1.20	22.00	0.30
3.833	0.30	9.900	13.82	15.967	1.20	22.03	0.30
3.867	0.30	9.933	13.82	16.000	1.20	22.07	0.30
3.900	0.30	9.967	13.82	16.033	1.20	22.10	0.30
3.933	0.30	10.000	13.82	16.067	1.20	22.13	0.30
3.967	0.30	10.033	13.82	16.100	1.20	22.17	0.30
4.000	0.30	10.067	13.82	16.133	1.20	22.20	0.30
4.033	0.30	10.100	13.82	16.167	1.20	22.23	0.30
4.067	0.30	10.133	13.82	16.200	1.20	22.27	0.30
4.100	0.30	10.167	13.82	16.233	1.20	22.30	0.30
4.133	0.30	10.200	13.82	16.267	0.90	22.33	0.30
4.167	0.30	10.233	13.82	16.300	0.60	22.37	0.30
4.200	0.30	10.267	8.86	16.333	0.60	22.40	0.30
4.233	0.30	10.300	3.91	16.367	0.60	22.43	0.30
4.267	1.05	10.333	3.91	16.400	0.60	22.47	0.30
4.300	1.80	10.367	3.91	16.433	0.60	22.50	0.30
4.333	1.80	10.400	3.91	16.467	0.60	22.53	0.30
4.367	1.80	10.433	3.91	16.500	0.60	22.57	0.30
4.400	1.80	10.467	3.91	16.533	0.60	22.60	0.30
4.433	1.80	10.500	3.91	16.567	0.60	22.63	0.30
4.467	1.80	10.533	3.91	16.600	0.60	22.67	0.30
4.500	1.80	10.567	3.91	16.633	0.60	22.70	0.30
4.533	1.80	10.600	3.91	16.667	0.60	22.73	0.30
4.567	1.80	10.633	3.91	16.700	0.60	22.77	0.30
4.600	1.80	10.667	3.91	16.733	0.60	22.80	0.30
4.633	1.80	10.700	3.91	16.767	0.60	22.83	0.30
4.667	1.80	10.733	3.91	16.800	0.60	22.87	0.30
4.700	1.80	10.767	3.91	16.833	0.60	22.90	0.30
4.733	1.80	10.800	3.91	16.867	0.60	22.93	0.30
4.767	1.80	10.833	3.91	16.900	0.60	22.97	0.30
4.800	1.80	10.867	3.91	16.933	0.60	23.00	0.30
4.833	1.80	10.900	3.91	16.967	0.60	23.03	0.30
4.867	1.80	10.933	3.91	17.000	0.60	23.07	0.30
4.900	1.80	10.967	3.91	17.033	0.60	23.10	0.30
4.933	1.80	11.000	3.91	17.067	0.60	23.13	0.30
4.967	1.80	11.033	3.91	17.100	0.60	23.17	0.30
5.000	1.80	11.067	3.91	17.133	0.60	23.20	0.30
5.033	1.80	11.100	3.91	17.167	0.60	23.23	0.30
5.067	1.80	11.133	3.91	17.200	0.60	23.27	0.30

5.100	1.80	11.167	3.91	17.233	0.60	23.30	0.30
5.133	1.80	11.200	3.91	17.267	0.60	23.33	0.30
5.167	1.80	11.233	3.91	17.300	0.60	23.37	0.30
5.200	1.80	11.267	3.91	17.333	0.60	23.40	0.30
5.233	1.80	11.300	3.91	17.367	0.60	23.43	0.30
5.267	1.80	11.333	3.91	17.400	0.60	23.47	0.30
5.300	1.80	11.367	3.91	17.433	0.60	23.50	0.30
5.333	1.80	11.400	3.91	17.467	0.60	23.53	0.30
5.367	1.80	11.433	3.91	17.500	0.60	23.57	0.30
5.400	1.80	11.467	3.91	17.533	0.60	23.60	0.30
5.433	1.80	11.500	3.91	17.567	0.60	23.63	0.30
5.467	1.80	11.533	3.91	17.600	0.60	23.67	0.30
5.500	1.80	11.567	3.91	17.633	0.60	23.70	0.30
5.533	1.80	11.600	3.91	17.667	0.60	23.73	0.30
5.567	1.80	11.633	3.91	17.700	0.60	23.77	0.30
5.600	1.80	11.667	3.91	17.733	0.60	23.80	0.30
5.633	1.80	11.700	3.91	17.767	0.60	23.83	0.30
5.667	1.80	11.733	3.91	17.800	0.60	23.87	0.30
5.700	1.80	11.767	3.91	17.833	0.60	23.90	0.30
5.733	1.80	11.800	3.91	17.867	0.60	23.93	0.30
5.767	1.80	11.833	3.91	17.900	0.60	23.97	0.30
5.800	1.80	11.867	3.91	17.933	0.60	24.00	0.30
5.833	1.80	11.900	3.91	17.967	0.60	24.03	0.30
5.867	1.80	11.933	3.91	18.000	0.60	24.07	0.30
5.900	1.80	11.967	3.91	18.033	0.60	24.10	0.30
5.933	1.80	12.000	3.91	18.067	0.60	24.13	0.30
5.967	1.80	12.033	3.91	18.100	0.60	24.17	0.30
6.000	1.80	12.067	3.91	18.133	0.60	24.20	0.30
6.033	1.80	12.100	3.91	18.167	0.60	24.23	0.30
6.067	1.80	12.133	3.91	18.200	0.60	24.27	0.15

Max.Eff.Inten.(mm/hr)=	13.82	5.19	
over (min)	6.00	6.00	
Storage Coeff. (min)=	5.15 (ii)	5.71 (ii)	
Unit Hyd. Tpeak (min)=	6.00	6.00	
Unit Hyd. peak (cms)=	0.21	0.19	
			TOTALS
PEAK FLOW (cms)=	0.07	0.00	0.077 (iii)
TIME TO PEAK (hrs)=	9.57	10.23	10.23
RUNOFF VOLUME (mm)=	58.08	15.81	51.74
TOTAL RAINFALL (mm)=	60.08	60.08	60.08
RUNOFF COEFFICIENT =	0.97	0.26	0.86

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0870
	0.0158	0.0525	0.0413	0.0960
	0.0235	0.0658	0.0470	0.1045
	0.0284	0.0760	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.077	10.23	51.74
OUTFLOW: ID= 1 (2000)	2.220	0.024	10.60	51.36

PEAK FLOW REDUCTION [Qout/Qin](%)= 30.47
TIME SHIFT OF PEAK FLOW (min)= 22.00
MAXIMUM STORAGE USED (ha.m.)= 0.0658

```
      V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
```

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


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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\3a93d97b-3023-4872-b608-fb216a9b9c56\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\3a93d97b-3023-4872-b608-fb216a9b9c56\scena

DATE: 10/20/2021 TIME: 09:23:45

USER:

COMMENTS: _____

****
** SIMULATION : 010yr-24hr **
****

READ STORM	Filename: C:\Users\wburke\AppData\Local\Temp\436f8689-d7f8-4833-9a4f-3c530aef3e9e\5beaf2fa
Ptotal= 68.76 mm	Comments: 10 Year 24 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	6.50	5.85	12.75	2.41	19.00	0.34
0.50	0.34	6.75	5.85	13.00	2.41	19.25	0.34
0.75	0.34	7.00	5.85	13.25	2.41	19.50	0.34
1.00	0.34	7.25	5.85	13.50	2.41	19.75	0.34
1.25	0.34	7.50	5.85	13.75	2.41	20.00	0.34
1.50	0.34	7.75	5.85	14.00	2.41	20.25	0.34
1.75	0.34	8.00	5.85	14.25	2.41	20.50	0.34
2.00	0.34	8.25	5.85	14.50	1.38	20.75	0.34
2.25	0.34	8.50	15.82	14.75	1.38	21.00	0.34
2.50	0.34	8.75	15.82	15.00	1.38	21.25	0.34
2.75	0.34	9.00	15.82	15.25	1.38	21.50	0.34
3.00	0.34	9.25	15.82	15.50	1.38	21.75	0.34
3.25	0.34	9.50	15.82	15.75	1.38	22.00	0.34
3.50	0.34	9.75	15.82	16.00	1.38	22.25	0.34
3.75	0.34	10.00	15.82	16.25	1.38	22.50	0.34
4.00	0.34	10.25	15.82	16.50	0.69	22.75	0.34
4.25	0.34	10.50	4.47	16.75	0.69	23.00	0.34
4.50	2.06	10.75	4.47	17.00	0.69	23.25	0.34
4.75	2.06	11.00	4.47	17.25	0.69	23.50	0.34
5.00	2.06	11.25	4.47	17.50	0.69	23.75	0.34
5.25	2.06	11.50	4.47	17.75	0.69	24.00	0.34
5.50	2.06	11.75	4.47	18.00	0.69	24.25	0.34
5.75	2.06	12.00	4.47	18.25	0.69		
6.00	2.06	12.25	4.47	18.50	0.34		
6.25	2.06	12.50	2.41	18.75	0.34		

CALIB	
STANDHYD (1000)	Area (ha)= 2.22
ID= 1 DT= 2.0 min	Total Imp(%)= 85.00 Dir. Conn.(%)= 85.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	2.06	12.167	4.47	18.23	0.69
0.067	0.00	6.133	2.06	12.200	4.47	18.27	0.51
0.100	0.00	6.167	2.06	12.233	4.47	18.30	0.34
0.133	0.00	6.200	2.06	12.267	3.44	18.33	0.34
0.167	0.00	6.233	2.06	12.300	2.41	18.37	0.34
0.200	0.00	6.267	3.95	12.333	2.41	18.40	0.34
0.233	0.00	6.300	5.85	12.367	2.41	18.43	0.34
0.267	0.17	6.333	5.85	12.400	2.41	18.47	0.34
0.300	0.34	6.367	5.85	12.433	2.41	18.50	0.34
0.333	0.34	6.400	5.85	12.467	2.41	18.53	0.34
0.367	0.34	6.433	5.85	12.500	2.41	18.57	0.34
0.400	0.34	6.467	5.85	12.533	2.41	18.60	0.34
0.433	0.34	6.500	5.85	12.567	2.41	18.63	0.34
0.467	0.34	6.533	5.85	12.600	2.41	18.67	0.34
0.500	0.34	6.567	5.85	12.633	2.41	18.70	0.34
0.533	0.34	6.600	5.85	12.667	2.41	18.73	0.34
0.567	0.34	6.633	5.85	12.700	2.41	18.77	0.34
0.600	0.34	6.667	5.85	12.733	2.41	18.80	0.34
0.633	0.34	6.700	5.85	12.767	2.41	18.83	0.34
0.667	0.34	6.733	5.85	12.800	2.41	18.87	0.34
0.700	0.34	6.767	5.85	12.833	2.41	18.90	0.34
0.733	0.34	6.800	5.85	12.867	2.41	18.93	0.34
0.767	0.34	6.833	5.85	12.900	2.41	18.97	0.34
0.800	0.34	6.867	5.85	12.933	2.41	19.00	0.34
0.833	0.34	6.900	5.85	12.967	2.41	19.03	0.34
0.867	0.34	6.933	5.85	13.000	2.41	19.07	0.34
0.900	0.34	6.967	5.85	13.033	2.41	19.10	0.34
0.933	0.34	7.000	5.85	13.067	2.41	19.13	0.34
0.967	0.34	7.033	5.85	13.100	2.41	19.17	0.34
1.000	0.34	7.067	5.85	13.133	2.41	19.20	0.34
1.033	0.34	7.100	5.85	13.167	2.41	19.23	0.34
1.067	0.34	7.133	5.85	13.200	2.41	19.27	0.34
1.100	0.34	7.167	5.85	13.233	2.41	19.30	0.34
1.133	0.34	7.200	5.85	13.267	2.41	19.33	0.34
1.167	0.34	7.233	5.85	13.300	2.41	19.37	0.34
1.200	0.34	7.267	5.85	13.333	2.41	19.40	0.34
1.233	0.34	7.300	5.85	13.367	2.41	19.43	0.34
1.267	0.34	7.333	5.85	13.400	2.41	19.47	0.34
1.300	0.34	7.367	5.85	13.433	2.41	19.50	0.34
1.333	0.34	7.400	5.85	13.467	2.41	19.53	0.34
1.367	0.34	7.433	5.85	13.500	2.41	19.57	0.34
1.400	0.34	7.467	5.85	13.533	2.41	19.60	0.34
1.433	0.34	7.500	5.85	13.567	2.41	19.63	0.34
1.467	0.34	7.533	5.85	13.600	2.41	19.67	0.34
1.500	0.34	7.567	5.85	13.633	2.41	19.70	0.34
1.533	0.34	7.600	5.85	13.667	2.41	19.73	0.34
1.567	0.34	7.633	5.85	13.700	2.41	19.77	0.34
1.600	0.34	7.667	5.85	13.733	2.41	19.80	0.34
1.633	0.34	7.700	5.85	13.767	2.41	19.83	0.34
1.667	0.34	7.733	5.85	13.800	2.41	19.87	0.34
1.700	0.34	7.767	5.85	13.833	2.41	19.90	0.34
1.733	0.34	7.800	5.85	13.867	2.41	19.93	0.34
1.767	0.34	7.833	5.85	13.900	2.41	19.97	0.34
1.800	0.34	7.867	5.85	13.933	2.41	20.00	0.34
1.833	0.34	7.900	5.85	13.967	2.41	20.03	0.34
1.867	0.34	7.933	5.85	14.000	2.41	20.07	0.34
1.900	0.34	7.967	5.85	14.033	2.41	20.10	0.34
1.933	0.34	8.000	5.85	14.067	2.41	20.13	0.34
1.967	0.34	8.033	5.85	14.100	2.41	20.17	0.34
2.000	0.34	8.067	5.85	14.133	2.41	20.20	0.34
2.033	0.34	8.100	5.85	14.167	2.41	20.23	0.34
2.067	0.34	8.133	5.85	14.200	2.41	20.27	0.34
2.100	0.34	8.167	5.85	14.233	2.41	20.30	0.34
2.133	0.34	8.200	5.85	14.267	1.89	20.33	0.34
2.167	0.34	8.233	5.85	14.300	1.38	20.37	0.34
2.200	0.34	8.267	10.83	14.333	1.38	20.40	0.34
2.233	0.34	8.300	15.82	14.367	1.38	20.43	0.34
2.267	0.34	8.333	15.82	14.400	1.38	20.47	0.34
2.300	0.34	8.367	15.82	14.433	1.38	20.50	0.34
2.333	0.34	8.400	15.82	14.467	1.38	20.53	0.34
2.367	0.34	8.433	15.82	14.500	1.38	20.57	0.34
2.400	0.34	8.467	15.82	14.533	1.38	20.60	0.34
2.433	0.34	8.500	15.82	14.567	1.38	20.63	0.34
2.467	0.34	8.533	15.82	14.600	1.38	20.67	0.34
2.500	0.34	8.567	15.82	14.633	1.38	20.70	0.34
2.533	0.34	8.600	15.82	14.667	1.38	20.73	0.34

2.567	0.34	8.633	15.82	14.700	1.38	20.77	0.34
2.600	0.34	8.667	15.82	14.733	1.38	20.80	0.34
2.633	0.34	8.700	15.82	14.767	1.38	20.83	0.34
2.667	0.34	8.733	15.82	14.800	1.38	20.87	0.34
2.700	0.34	8.767	15.82	14.833	1.38	20.90	0.34
2.733	0.34	8.800	15.82	14.867	1.38	20.93	0.34
2.767	0.34	8.833	15.82	14.900	1.38	20.97	0.34
2.800	0.34	8.867	15.82	14.933	1.38	21.00	0.34
2.833	0.34	8.900	15.82	14.967	1.38	21.03	0.34
2.867	0.34	8.933	15.82	15.000	1.38	21.07	0.34
2.900	0.34	8.967	15.82	15.033	1.38	21.10	0.34
2.933	0.34	9.000	15.82	15.067	1.38	21.13	0.34
2.967	0.34	9.033	15.82	15.100	1.38	21.17	0.34
3.000	0.34	9.067	15.82	15.133	1.38	21.20	0.34
3.033	0.34	9.100	15.82	15.167	1.38	21.23	0.34
3.067	0.34	9.133	15.82	15.200	1.38	21.27	0.34
3.100	0.34	9.167	15.82	15.233	1.38	21.30	0.34
3.133	0.34	9.200	15.82	15.267	1.38	21.33	0.34
3.167	0.34	9.233	15.82	15.300	1.38	21.37	0.34
3.200	0.34	9.267	15.82	15.333	1.38	21.40	0.34
3.233	0.34	9.300	15.82	15.367	1.38	21.43	0.34
3.267	0.34	9.333	15.82	15.400	1.38	21.47	0.34
3.300	0.34	9.367	15.82	15.433	1.38	21.50	0.34
3.333	0.34	9.400	15.82	15.467	1.38	21.53	0.34
3.367	0.34	9.433	15.82	15.500	1.38	21.57	0.34
3.400	0.34	9.467	15.82	15.533	1.38	21.60	0.34
3.433	0.34	9.500	15.82	15.567	1.38	21.63	0.34
3.467	0.34	9.533	15.82	15.600	1.38	21.67	0.34
3.500	0.34	9.567	15.82	15.633	1.38	21.70	0.34
3.533	0.34	9.600	15.82	15.667	1.38	21.73	0.34
3.567	0.34	9.633	15.82	15.700	1.38	21.77	0.34
3.600	0.34	9.667	15.82	15.733	1.38	21.80	0.34
3.633	0.34	9.700	15.82	15.767	1.38	21.83	0.34
3.667	0.34	9.733	15.82	15.800	1.38	21.87	0.34
3.700	0.34	9.767	15.82	15.833	1.38	21.90	0.34
3.733	0.34	9.800	15.82	15.867	1.38	21.93	0.34
3.767	0.34	9.833	15.82	15.900	1.38	21.97	0.34
3.800	0.34	9.867	15.82	15.933	1.38	22.00	0.34
3.833	0.34	9.900	15.82	15.967	1.38	22.03	0.34
3.867	0.34	9.933	15.82	16.000	1.38	22.07	0.34
3.900	0.34	9.967	15.82	16.033	1.38	22.10	0.34
3.933	0.34	10.000	15.82	16.067	1.38	22.13	0.34
3.967	0.34	10.033	15.82	16.100	1.38	22.17	0.34
4.000	0.34	10.067	15.82	16.133	1.38	22.20	0.34
4.033	0.34	10.100	15.82	16.167	1.38	22.23	0.34
4.067	0.34	10.133	15.82	16.200	1.38	22.27	0.34
4.100	0.34	10.167	15.82	16.233	1.38	22.30	0.34
4.133	0.34	10.200	15.82	16.267	1.03	22.33	0.34
4.167	0.34	10.233	15.82	16.300	0.69	22.37	0.34
4.200	0.34	10.267	10.14	16.333	0.69	22.40	0.34
4.233	0.34	10.300	4.47	16.367	0.69	22.43	0.34
4.267	1.20	10.333	4.47	16.400	0.69	22.47	0.34
4.300	2.06	10.367	4.47	16.433	0.69	22.50	0.34
4.333	2.06	10.400	4.47	16.467	0.69	22.53	0.34
4.367	2.06	10.433	4.47	16.500	0.69	22.57	0.34
4.400	2.06	10.467	4.47	16.533	0.69	22.60	0.34
4.433	2.06	10.500	4.47	16.567	0.69	22.63	0.34
4.467	2.06	10.533	4.47	16.600	0.69	22.67	0.34
4.500	2.06	10.567	4.47	16.633	0.69	22.70	0.34
4.533	2.06	10.600	4.47	16.667	0.69	22.73	0.34
4.567	2.06	10.633	4.47	16.700	0.69	22.77	0.34
4.600	2.06	10.667	4.47	16.733	0.69	22.80	0.34
4.633	2.06	10.700	4.47	16.767	0.69	22.83	0.34
4.667	2.06	10.733	4.47	16.800	0.69	22.87	0.34
4.700	2.06	10.767	4.47	16.833	0.69	22.90	0.34
4.733	2.06	10.800	4.47	16.867	0.69	22.93	0.34
4.767	2.06	10.833	4.47	16.900	0.69	22.97	0.34
4.800	2.06	10.867	4.47	16.933	0.69	23.00	0.34
4.833	2.06	10.900	4.47	16.967	0.69	23.03	0.34
4.867	2.06	10.933	4.47	17.000	0.69	23.07	0.34
4.900	2.06	10.967	4.47	17.033	0.69	23.10	0.34
4.933	2.06	11.000	4.47	17.067	0.69	23.13	0.34
4.967	2.06	11.033	4.47	17.100	0.69	23.17	0.34
5.000	2.06	11.067	4.47	17.133	0.69	23.20	0.34
5.033	2.06	11.100	4.47	17.167	0.69	23.23	0.34
5.067	2.06	11.133	4.47	17.200	0.69	23.27	0.34
5.100	2.06	11.167	4.47	17.233	0.69	23.30	0.34
5.133	2.06	11.200	4.47	17.267	0.69	23.33	0.34
5.167	2.06	11.233	4.47	17.300	0.69	23.37	0.34
5.200	2.06	11.267	4.47	17.333	0.69	23.40	0.34
5.233	2.06	11.300	4.47	17.367	0.69	23.43	0.34

5.267	2.06	11.333	4.47	17.400	0.69	23.47	0.34
5.300	2.06	11.367	4.47	17.433	0.69	23.50	0.34
5.333	2.06	11.400	4.47	17.467	0.69	23.53	0.34
5.367	2.06	11.433	4.47	17.500	0.69	23.57	0.34
5.400	2.06	11.467	4.47	17.533	0.69	23.60	0.34
5.433	2.06	11.500	4.47	17.567	0.69	23.63	0.34
5.467	2.06	11.533	4.47	17.600	0.69	23.67	0.34
5.500	2.06	11.567	4.47	17.633	0.69	23.70	0.34
5.533	2.06	11.600	4.47	17.667	0.69	23.73	0.34
5.567	2.06	11.633	4.47	17.700	0.69	23.77	0.34
5.600	2.06	11.667	4.47	17.733	0.69	23.80	0.34
5.633	2.06	11.700	4.47	17.767	0.69	23.83	0.34
5.667	2.06	11.733	4.47	17.800	0.69	23.87	0.34
5.700	2.06	11.767	4.47	17.833	0.69	23.90	0.34
5.733	2.06	11.800	4.47	17.867	0.69	23.93	0.34
5.767	2.06	11.833	4.47	17.900	0.69	23.97	0.34
5.800	2.06	11.867	4.47	17.933	0.69	24.00	0.34
5.833	2.06	11.900	4.47	17.967	0.69	24.03	0.34
5.867	2.06	11.933	4.47	18.000	0.69	24.07	0.34
5.900	2.06	11.967	4.47	18.033	0.69	24.10	0.34
5.933	2.06	12.000	4.47	18.067	0.69	24.13	0.34
5.967	2.06	12.033	4.47	18.100	0.69	24.17	0.34
6.000	2.06	12.067	4.47	18.133	0.69	24.20	0.34
6.033	2.06	12.100	4.47	18.167	0.69	24.23	0.34
6.067	2.06	12.133	4.47	18.200	0.69	24.27	0.17

Max.Eff.Inten.(mm/hr)=	15.82	6.58		
over (min)	5.00	6.00		
Storage Coeff. (min)=	4.88 (ii)	5.41 (ii)		
Unit Hyd. Tpeak (min)=	4.00	6.00		
Unit Hyd. peak (cms)=	0.24	0.20		
			TOTALS	
PEAK FLOW (cms)=	0.08	0.01	0.089 (iii)	
TIME TO PEAK (hrs)=	10.03	10.23	10.23	
RUNOFF VOLUME (mm)=	66.76	20.27	59.79	
TOTAL RAINFALL (mm)=	68.76	68.76	68.76	
RUNOFF COEFFICIENT =	0.97	0.29	0.87	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0870
	0.0158	0.0525	0.0413	0.0960
	0.0235	0.0658	0.0470	0.1045
	0.0284	0.0760	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.089	10.23	59.79
OUTFLOW: ID= 1 (2000)	2.220	0.028	10.53	59.41

PEAK FLOW REDUCTION [Qout/Qin](%)= 31.61
TIME SHIFT OF PEAK FLOW (min)= 18.00
MAXIMUM STORAGE USED (ha.m.)= 0.0754

```
      V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
```

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\2026920f-55cc-4a4c-af4c-76c2251ff705\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\2026920f-55cc-4a4c-af4c-76c2251ff705\scena

DATE: 10/20/2021 TIME: 09:23:45

USER:

COMMENTS: _____

****
** SIMULATION : 025yr-24hr **
****

| READ STORM | Filename: C:\Users\wburke\AppData\Local\Temp\436f8689-d7f8-4833-9a4f-3c530aef3e9e\b9449ef5
| Ptotal= 79.70 mm | Comments: 25 Year 24 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	6.50	6.77	12.75	2.79	19.00	0.40
0.50	0.40	6.75	6.77	13.00	2.79	19.25	0.40
0.75	0.40	7.00	6.77	13.25	2.79	19.50	0.40
1.00	0.40	7.25	6.77	13.50	2.79	19.75	0.40
1.25	0.40	7.50	6.77	13.75	2.79	20.00	0.40
1.50	0.40	7.75	6.77	14.00	2.79	20.25	0.40
1.75	0.40	8.00	6.77	14.25	2.79	20.50	0.40
2.00	0.40	8.25	6.77	14.50	1.59	20.75	0.40
2.25	0.40	8.50	18.33	14.75	1.59	21.00	0.40
2.50	0.40	8.75	18.33	15.00	1.59	21.25	0.40
2.75	0.40	9.00	18.33	15.25	1.59	21.50	0.40
3.00	0.40	9.25	18.33	15.50	1.59	21.75	0.40
3.25	0.40	9.50	18.33	15.75	1.59	22.00	0.40
3.50	0.40	9.75	18.33	16.00	1.59	22.25	0.40
3.75	0.40	10.00	18.33	16.25	1.59	22.50	0.40
4.00	0.40	10.25	18.33	16.50	0.80	22.75	0.40
4.25	0.40	10.50	5.18	16.75	0.80	23.00	0.40
4.50	2.39	10.75	5.18	17.00	0.80	23.25	0.40
4.75	2.39	11.00	5.18	17.25	0.80	23.50	0.40
5.00	2.39	11.25	5.18	17.50	0.80	23.75	0.40
5.25	2.39	11.50	5.18	17.75	0.80	24.00	0.40
5.50	2.39	11.75	5.18	18.00	0.80	24.25	0.40
5.75	2.39	12.00	5.18	18.25	0.80		
6.00	2.39	12.25	5.18	18.50	0.40		
6.25	2.39	12.50	2.79	18.75	0.40		

CALIB	STANDHYD (1000)	ID= 1 DT= 2.0 min	Area (ha)= 2.22	Total Imp(%)= 85.00	Dir. Conn.(%)= 85.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	2.39	12.167	5.18	18.23	0.80
0.067	0.00	6.133	2.39	12.200	5.18	18.27	0.60
0.100	0.00	6.167	2.39	12.233	5.18	18.30	0.40
0.133	0.00	6.200	2.39	12.267	3.98	18.33	0.40
0.167	0.00	6.233	2.39	12.300	2.79	18.37	0.40
0.200	0.00	6.267	4.58	12.333	2.79	18.40	0.40
0.233	0.00	6.300	6.77	12.367	2.79	18.43	0.40
0.267	0.20	6.333	6.77	12.400	2.79	18.47	0.40
0.300	0.40	6.367	6.77	12.433	2.79	18.50	0.40
0.333	0.40	6.400	6.77	12.467	2.79	18.53	0.40
0.367	0.40	6.433	6.77	12.500	2.79	18.57	0.40
0.400	0.40	6.467	6.77	12.533	2.79	18.60	0.40
0.433	0.40	6.500	6.77	12.567	2.79	18.63	0.40
0.467	0.40	6.533	6.77	12.600	2.79	18.67	0.40
0.500	0.40	6.567	6.77	12.633	2.79	18.70	0.40
0.533	0.40	6.600	6.77	12.667	2.79	18.73	0.40
0.567	0.40	6.633	6.77	12.700	2.79	18.77	0.40
0.600	0.40	6.667	6.77	12.733	2.79	18.80	0.40
0.633	0.40	6.700	6.77	12.767	2.79	18.83	0.40
0.667	0.40	6.733	6.77	12.800	2.79	18.87	0.40
0.700	0.40	6.767	6.77	12.833	2.79	18.90	0.40
0.733	0.40	6.800	6.77	12.867	2.79	18.93	0.40
0.767	0.40	6.833	6.77	12.900	2.79	18.97	0.40
0.800	0.40	6.867	6.77	12.933	2.79	19.00	0.40
0.833	0.40	6.900	6.77	12.967	2.79	19.03	0.40
0.867	0.40	6.933	6.77	13.000	2.79	19.07	0.40
0.900	0.40	6.967	6.77	13.033	2.79	19.10	0.40
0.933	0.40	7.000	6.77	13.067	2.79	19.13	0.40
0.967	0.40	7.033	6.77	13.100	2.79	19.17	0.40
1.000	0.40	7.067	6.77	13.133	2.79	19.20	0.40
1.033	0.40	7.100	6.77	13.167	2.79	19.23	0.40
1.067	0.40	7.133	6.77	13.200	2.79	19.27	0.40
1.100	0.40	7.167	6.77	13.233	2.79	19.30	0.40
1.133	0.40	7.200	6.77	13.267	2.79	19.33	0.40
1.167	0.40	7.233	6.77	13.300	2.79	19.37	0.40
1.200	0.40	7.267	6.77	13.333	2.79	19.40	0.40
1.233	0.40	7.300	6.77	13.367	2.79	19.43	0.40
1.267	0.40	7.333	6.77	13.400	2.79	19.47	0.40
1.300	0.40	7.367	6.77	13.433	2.79	19.50	0.40
1.333	0.40	7.400	6.77	13.467	2.79	19.53	0.40
1.367	0.40	7.433	6.77	13.500	2.79	19.57	0.40
1.400	0.40	7.467	6.77	13.533	2.79	19.60	0.40
1.433	0.40	7.500	6.77	13.567	2.79	19.63	0.40
1.467	0.40	7.533	6.77	13.600	2.79	19.67	0.40
1.500	0.40	7.567	6.77	13.633	2.79	19.70	0.40
1.533	0.40	7.600	6.77	13.667	2.79	19.73	0.40
1.567	0.40	7.633	6.77	13.700	2.79	19.77	0.40
1.600	0.40	7.667	6.77	13.733	2.79	19.80	0.40
1.633	0.40	7.700	6.77	13.767	2.79	19.83	0.40
1.667	0.40	7.733	6.77	13.800	2.79	19.87	0.40
1.700	0.40	7.767	6.77	13.833	2.79	19.90	0.40
1.733	0.40	7.800	6.77	13.867	2.79	19.93	0.40
1.767	0.40	7.833	6.77	13.900	2.79	19.97	0.40
1.800	0.40	7.867	6.77	13.933	2.79	20.00	0.40
1.833	0.40	7.900	6.77	13.967	2.79	20.03	0.40
1.867	0.40	7.933	6.77	14.000	2.79	20.07	0.40
1.900	0.40	7.967	6.77	14.033	2.79	20.10	0.40
1.933	0.40	8.000	6.77	14.067	2.79	20.13	0.40
1.967	0.40	8.033	6.77	14.100	2.79	20.17	0.40
2.000	0.40	8.067	6.77	14.133	2.79	20.20	0.40
2.033	0.40	8.100	6.77	14.167	2.79	20.23	0.40
2.067	0.40	8.133	6.77	14.200	2.79	20.27	0.40
2.100	0.40	8.167	6.77	14.233	2.79	20.30	0.40
2.133	0.40	8.200	6.77	14.267	2.19	20.33	0.40
2.167	0.40	8.233	6.77	14.300	1.59	20.37	0.40
2.200	0.40	8.267	12.55	14.333	1.59	20.40	0.40
2.233	0.40	8.300	18.33	14.367	1.59	20.43	0.40
2.267	0.40	8.333	18.33	14.400	1.59	20.47	0.40
2.300	0.40	8.367	18.33	14.433	1.59	20.50	0.40
2.333	0.40	8.400	18.33	14.467	1.59	20.53	0.40
2.367	0.40	8.433	18.33	14.500	1.59	20.57	0.40
2.400	0.40	8.467	18.33	14.533	1.59	20.60	0.40
2.433	0.40	8.500	18.33	14.567	1.59	20.63	0.40
2.467	0.40	8.533	18.33	14.600	1.59	20.67	0.40
2.500	0.40	8.567	18.33	14.633	1.59	20.70	0.40
2.533	0.40	8.600	18.33	14.667	1.59	20.73	0.40
2.567	0.40	8.633	18.33	14.700	1.59	20.77	0.40
2.600	0.40	8.667	18.33	14.733	1.59	20.80	0.40
2.633	0.40	8.700	18.33	14.767	1.59	20.83	0.40
2.667	0.40	8.733	18.33	14.800	1.59	20.87	0.40
2.700	0.40	8.767	18.33	14.833	1.59	20.90	0.40

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2.733    0.40 | 8.800   18.33 |14.867    1.59 | 20.93    0.40
2.767    0.40 | 8.833   18.33 |14.900    1.59 | 20.97    0.40
2.800    0.40 | 8.867   18.33 |14.933    1.59 | 21.00    0.40
2.833    0.40 | 8.900   18.33 |14.967    1.59 | 21.03    0.40
2.867    0.40 | 8.933   18.33 |15.000    1.59 | 21.07    0.40
2.900    0.40 | 8.967   18.33 |15.033    1.59 | 21.10    0.40
2.933    0.40 | 9.000   18.33 |15.067    1.59 | 21.13    0.40
2.967    0.40 | 9.033   18.33 |15.100    1.59 | 21.17    0.40
3.000    0.40 | 9.067   18.33 |15.133    1.59 | 21.20    0.40
3.033    0.40 | 9.100   18.33 |15.167    1.59 | 21.23    0.40
3.067    0.40 | 9.133   18.33 |15.200    1.59 | 21.27    0.40
3.100    0.40 | 9.167   18.33 |15.233    1.59 | 21.30    0.40
3.133    0.40 | 9.200   18.33 |15.267    1.59 | 21.33    0.40
3.167    0.40 | 9.233   18.33 |15.300    1.59 | 21.37    0.40
3.200    0.40 | 9.267   18.33 |15.333    1.59 | 21.40    0.40
3.233    0.40 | 9.300   18.33 |15.367    1.59 | 21.43    0.40
3.267    0.40 | 9.333   18.33 |15.400    1.59 | 21.47    0.40
3.300    0.40 | 9.367   18.33 |15.433    1.59 | 21.50    0.40
3.333    0.40 | 9.400   18.33 |15.467    1.59 | 21.53    0.40
3.367    0.40 | 9.433   18.33 |15.500    1.59 | 21.57    0.40
3.400    0.40 | 9.467   18.33 |15.533    1.59 | 21.60    0.40
3.433    0.40 | 9.500   18.33 |15.567    1.59 | 21.63    0.40
3.467    0.40 | 9.533   18.33 |15.600    1.59 | 21.67    0.40
3.500    0.40 | 9.567   18.33 |15.633    1.59 | 21.70    0.40
3.533    0.40 | 9.600   18.33 |15.667    1.59 | 21.73    0.40
3.567    0.40 | 9.633   18.33 |15.700    1.59 | 21.77    0.40
3.600    0.40 | 9.667   18.33 |15.733    1.59 | 21.80    0.40
3.633    0.40 | 9.700   18.33 |15.767    1.59 | 21.83    0.40
3.667    0.40 | 9.733   18.33 |15.800    1.59 | 21.87    0.40
3.700    0.40 | 9.767   18.33 |15.833    1.59 | 21.90    0.40
3.733    0.40 | 9.800   18.33 |15.867    1.59 | 21.93    0.40
3.767    0.40 | 9.833   18.33 |15.900    1.59 | 21.97    0.40
3.800    0.40 | 9.867   18.33 |15.933    1.59 | 22.00    0.40
3.833    0.40 | 9.900   18.33 |15.967    1.59 | 22.03    0.40
3.867    0.40 | 9.933   18.33 |16.000    1.59 | 22.07    0.40
3.900    0.40 | 9.967   18.33 |16.033    1.59 | 22.10    0.40
3.933    0.40 |10.000   18.33 |16.067    1.59 | 22.13    0.40
3.967    0.40 |10.033   18.33 |16.100    1.59 | 22.17    0.40
4.000    0.40 |10.067   18.33 |16.133    1.59 | 22.20    0.40
4.033    0.40 |10.100   18.33 |16.167    1.59 | 22.23    0.40
4.067    0.40 |10.133   18.33 |16.200    1.59 | 22.27    0.40
4.100    0.40 |10.167   18.33 |16.233    1.59 | 22.30    0.40
4.133    0.40 |10.200   18.33 |16.267    1.19 | 22.33    0.40
4.167    0.40 |10.233   18.33 |16.300    0.80 | 22.37    0.40
4.200    0.40 |10.267   11.75 |16.333    0.80 | 22.40    0.40
4.233    0.40 |10.300    5.18 |16.367    0.80 | 22.43    0.40
4.267    1.39 |10.333    5.18 |16.400    0.80 | 22.47    0.40
4.300    2.39 |10.367    5.18 |16.433    0.80 | 22.50    0.40
4.333    2.39 |10.400    5.18 |16.467    0.80 | 22.53    0.40
4.367    2.39 |10.433    5.18 |16.500    0.80 | 22.57    0.40
4.400    2.39 |10.467    5.18 |16.533    0.80 | 22.60    0.40
4.433    2.39 |10.500    5.18 |16.567    0.80 | 22.63    0.40
4.467    2.39 |10.533    5.18 |16.600    0.80 | 22.67    0.40
4.500    2.39 |10.567    5.18 |16.633    0.80 | 22.70    0.40
4.533    2.39 |10.600    5.18 |16.667    0.80 | 22.73    0.40
4.567    2.39 |10.633    5.18 |16.700    0.80 | 22.77    0.40
4.600    2.39 |10.667    5.18 |16.733    0.80 | 22.80    0.40
4.633    2.39 |10.700    5.18 |16.767    0.80 | 22.83    0.40
4.667    2.39 |10.733    5.18 |16.800    0.80 | 22.87    0.40
4.700    2.39 |10.767    5.18 |16.833    0.80 | 22.90    0.40
4.733    2.39 |10.800    5.18 |16.867    0.80 | 22.93    0.40
4.767    2.39 |10.833    5.18 |16.900    0.80 | 22.97    0.40
4.800    2.39 |10.867    5.18 |16.933    0.80 | 23.00    0.40
4.833    2.39 |10.900    5.18 |16.967    0.80 | 23.03    0.40
4.867    2.39 |10.933    5.18 |17.000    0.80 | 23.07    0.40
4.900    2.39 |10.967    5.18 |17.033    0.80 | 23.10    0.40
4.933    2.39 |11.000    5.18 |17.067    0.80 | 23.13    0.40
4.967    2.39 |11.033    5.18 |17.100    0.80 | 23.17    0.40
5.000    2.39 |11.067    5.18 |17.133    0.80 | 23.20    0.40
5.033    2.39 |11.100    5.18 |17.167    0.80 | 23.23    0.40
5.067    2.39 |11.133    5.18 |17.200    0.80 | 23.27    0.40
5.100    2.39 |11.167    5.18 |17.233    0.80 | 23.30    0.40
5.133    2.39 |11.200    5.18 |17.267    0.80 | 23.33    0.40
5.167    2.39 |11.233    5.18 |17.300    0.80 | 23.37    0.40
5.200    2.39 |11.267    5.18 |17.333    0.80 | 23.40    0.40
5.233    2.39 |11.300    5.18 |17.367    0.80 | 23.43    0.40
5.267    2.39 |11.333    5.18 |17.400    0.80 | 23.47    0.40
5.300    2.39 |11.367    5.18 |17.433    0.80 | 23.50    0.40
5.333    2.39 |11.400    5.18 |17.467    0.80 | 23.53    0.40
5.367    2.39 |11.433    5.18 |17.500    0.80 | 23.57    0.40
5.400    2.39 |11.467    5.18 |17.533    0.80 | 23.60    0.40
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5.433    2.39 |11.500    5.18 |17.567    0.80 | 23.63    0.40
5.467    2.39 |11.533    5.18 |17.600    0.80 | 23.67    0.40
5.500    2.39 |11.567    5.18 |17.633    0.80 | 23.70    0.40
5.533    2.39 |11.600    5.18 |17.667    0.80 | 23.73    0.40
5.567    2.39 |11.633    5.18 |17.700    0.80 | 23.77    0.40
5.600    2.39 |11.667    5.18 |17.733    0.80 | 23.80    0.40
5.633    2.39 |11.700    5.18 |17.767    0.80 | 23.83    0.40
5.667    2.39 |11.733    5.18 |17.800    0.80 | 23.87    0.40
5.700    2.39 |11.767    5.18 |17.833    0.80 | 23.90    0.40
5.733    2.39 |11.800    5.18 |17.867    0.80 | 23.93    0.40
5.767    2.39 |11.833    5.18 |17.900    0.80 | 23.97    0.40
5.800    2.39 |11.867    5.18 |17.933    0.80 | 24.00    0.40
5.833    2.39 |11.900    5.18 |17.967    0.80 | 24.03    0.40
5.867    2.39 |11.933    5.18 |18.000    0.80 | 24.07    0.40
5.900    2.39 |11.967    5.18 |18.033    0.80 | 24.10    0.40
5.933    2.39 |12.000    5.18 |18.067    0.80 | 24.13    0.40
5.967    2.39 |12.033    5.18 |18.100    0.80 | 24.17    0.40
6.000    2.39 |12.067    5.18 |18.133    0.80 | 24.20    0.40
6.033    2.39 |12.100    5.18 |18.167    0.80 | 24.23    0.40
6.067    2.39 |12.133    5.18 |18.200    0.80 | 24.27    0.20

     Max.Eff.Inten.(mm/hr)=      18.33          8.47
               over (min)         5.00          6.00
     Storage Coeff.  (min)=      4.60 (ii)     5.10 (ii)
     Unit Hyd. Tpeak (min)=      4.00          6.00
     Unit Hyd. peak  (cms)=      0.25          0.21
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.10          0.01          0.104 (iii)
     TIME TO PEAK    (hrs)=      9.53         10.23          10.23
     RUNOFF VOLUME    (mm)=     77.70         26.39          70.00
     TOTAL RAINFALL   (mm)=     79.70         79.70          79.70
     RUNOFF COEFFICIENT   =      0.97          0.33           0.88


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  65.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| RESERVOIR(  2000)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  2.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   0.0362     0.0870
                           0.0158     0.0525   |   0.0413     0.0960
                           0.0235     0.0658   |   0.0470     0.1045
                           0.0284     0.0760   |   0.0000     0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  1000)       2.220     0.104     10.23      70.00
   OUTFLOW: ID= 1 (  2000)       2.220     0.036     10.47      69.62

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 34.95
                  TIME SHIFT OF PEAK FLOW         (min)= 14.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0872

--------------------------------------------------------------------------------
================================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****
```

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\f2deb064-d38b-4796-b299-871c0e0badle\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\f2deb064-d38b-4796-b299-871c0e0badle\scena

DATE: 10/20/2021 TIME: 09:23:45

USER:

COMMENTS: _____

****
** SIMULATION : 050yr-24hr **
****

| READ STORM | Filename: C:\Users\wburke\AppData\Local\Temp\436f8689-d7f8-4833-9a4f-3c530aef3e9e\8f675be6
| Ptotal= 87.80 mm | Comments: 50 Year 24 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	6.50	7.46	12.75	3.07	19.00	0.44
0.50	0.44	6.75	7.46	13.00	3.07	19.25	0.44
0.75	0.44	7.00	7.46	13.25	3.07	19.50	0.44
1.00	0.44	7.25	7.46	13.50	3.07	19.75	0.44
1.25	0.44	7.50	7.46	13.75	3.07	20.00	0.44
1.50	0.44	7.75	7.46	14.00	3.07	20.25	0.44
1.75	0.44	8.00	7.46	14.25	3.07	20.50	0.44
2.00	0.44	8.25	7.46	14.50	1.76	20.75	0.44
2.25	0.44	8.50	20.19	14.75	1.76	21.00	0.44
2.50	0.44	8.75	20.19	15.00	1.76	21.25	0.44
2.75	0.44	9.00	20.19	15.25	1.76	21.50	0.44
3.00	0.44	9.25	20.19	15.50	1.76	21.75	0.44
3.25	0.44	9.50	20.19	15.75	1.76	22.00	0.44
3.50	0.44	9.75	20.19	16.00	1.76	22.25	0.44
3.75	0.44	10.00	20.19	16.25	1.76	22.50	0.44
4.00	0.44	10.25	20.19	16.50	0.88	22.75	0.44
4.25	0.44	10.50	5.71	16.75	0.88	23.00	0.44
4.50	2.63	10.75	5.71	17.00	0.88	23.25	0.44
4.75	2.63	11.00	5.71	17.25	0.88	23.50	0.44
5.00	2.63	11.25	5.71	17.50	0.88	23.75	0.44
5.25	2.63	11.50	5.71	17.75	0.88	24.00	0.44
5.50	2.63	11.75	5.71	18.00	0.88	24.25	0.44
5.75	2.63	12.00	5.71	18.25	0.88		
6.00	2.63	12.25	5.71	18.50	0.44		
6.25	2.63	12.50	3.07	18.75	0.44		

| CALIB | STANDHYD (1000) | ID= 1 DT= 2.0 min | Area (ha)= 2.22 | Total Imp(%)= 85.00 | Dir. Conn.(%)= 85.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	2.63	12.167	5.71	18.23	0.88
0.067	0.00	6.133	2.63	12.200	5.71	18.27	0.66
0.100	0.00	6.167	2.63	12.233	5.71	18.30	0.44
0.133	0.00	6.200	2.63	12.267	4.39	18.33	0.44
0.167	0.00	6.233	2.63	12.300	3.07	18.37	0.44

0.200	0.00	6.267	5.04	12.333	3.07	18.40	0.44
0.233	0.00	6.300	7.46	12.367	3.07	18.43	0.44
0.267	0.22	6.333	7.46	12.400	3.07	18.47	0.44
0.300	0.44	6.367	7.46	12.433	3.07	18.50	0.44
0.333	0.44	6.400	7.46	12.467	3.07	18.53	0.44
0.367	0.44	6.433	7.46	12.500	3.07	18.57	0.44
0.400	0.44	6.467	7.46	12.533	3.07	18.60	0.44
0.433	0.44	6.500	7.46	12.567	3.07	18.63	0.44
0.467	0.44	6.533	7.46	12.600	3.07	18.67	0.44
0.500	0.44	6.567	7.46	12.633	3.07	18.70	0.44
0.533	0.44	6.600	7.46	12.667	3.07	18.73	0.44
0.567	0.44	6.633	7.46	12.700	3.07	18.77	0.44
0.600	0.44	6.667	7.46	12.733	3.07	18.80	0.44
0.633	0.44	6.700	7.46	12.767	3.07	18.83	0.44
0.667	0.44	6.733	7.46	12.800	3.07	18.87	0.44
0.700	0.44	6.767	7.46	12.833	3.07	18.90	0.44
0.733	0.44	6.800	7.46	12.867	3.07	18.93	0.44
0.767	0.44	6.833	7.46	12.900	3.07	18.97	0.44
0.800	0.44	6.867	7.46	12.933	3.07	19.00	0.44
0.833	0.44	6.900	7.46	12.967	3.07	19.03	0.44
0.867	0.44	6.933	7.46	13.000	3.07	19.07	0.44
0.900	0.44	6.967	7.46	13.033	3.07	19.10	0.44
0.933	0.44	7.000	7.46	13.067	3.07	19.13	0.44
0.967	0.44	7.033	7.46	13.100	3.07	19.17	0.44
1.000	0.44	7.067	7.46	13.133	3.07	19.20	0.44
1.033	0.44	7.100	7.46	13.167	3.07	19.23	0.44
1.067	0.44	7.133	7.46	13.200	3.07	19.27	0.44
1.100	0.44	7.167	7.46	13.233	3.07	19.30	0.44
1.133	0.44	7.200	7.46	13.267	3.07	19.33	0.44
1.167	0.44	7.233	7.46	13.300	3.07	19.37	0.44
1.200	0.44	7.267	7.46	13.333	3.07	19.40	0.44
1.233	0.44	7.300	7.46	13.367	3.07	19.43	0.44
1.267	0.44	7.333	7.46	13.400	3.07	19.47	0.44
1.300	0.44	7.367	7.46	13.433	3.07	19.50	0.44
1.333	0.44	7.400	7.46	13.467	3.07	19.53	0.44
1.367	0.44	7.433	7.46	13.500	3.07	19.57	0.44
1.400	0.44	7.467	7.46	13.533	3.07	19.60	0.44
1.433	0.44	7.500	7.46	13.567	3.07	19.63	0.44
1.467	0.44	7.533	7.46	13.600	3.07	19.67	0.44
1.500	0.44	7.567	7.46	13.633	3.07	19.70	0.44
1.533	0.44	7.600	7.46	13.667	3.07	19.73	0.44
1.567	0.44	7.633	7.46	13.700	3.07	19.77	0.44
1.600	0.44	7.667	7.46	13.733	3.07	19.80	0.44
1.633	0.44	7.700	7.46	13.767	3.07	19.83	0.44
1.667	0.44	7.733	7.46	13.800	3.07	19.87	0.44
1.700	0.44	7.767	7.46	13.833	3.07	19.90	0.44
1.733	0.44	7.800	7.46	13.867	3.07	19.93	0.44
1.767	0.44	7.833	7.46	13.900	3.07	19.97	0.44
1.800	0.44	7.867	7.46	13.933	3.07	20.00	0.44
1.833	0.44	7.900	7.46	13.967	3.07	20.03	0.44
1.867	0.44	7.933	7.46	14.000	3.07	20.07	0.44
1.900	0.44	7.967	7.46	14.033	3.07	20.10	0.44
1.933	0.44	8.000	7.46	14.067	3.07	20.13	0.44
1.967	0.44	8.033	7.46	14.100	3.07	20.17	0.44
2.000	0.44	8.067	7.46	14.133	3.07	20.20	0.44
2.033	0.44	8.100	7.46	14.167	3.07	20.23	0.44
2.067	0.44	8.133	7.46	14.200	3.07	20.27	0.44
2.100	0.44	8.167	7.46	14.233	3.07	20.30	0.44
2.133	0.44	8.200	7.46	14.267	2.41	20.33	0.44
2.167	0.44	8.233	7.46	14.300	1.76	20.37	0.44
2.200	0.44	8.267	13.82	14.333	1.76	20.40	0.44
2.233	0.44	8.300	20.19	14.367	1.76	20.43	0.44
2.267	0.44	8.333	20.19	14.400	1.76	20.47	0.44
2.300	0.44	8.367	20.19	14.433	1.76	20.50	0.44
2.333	0.44	8.400	20.19	14.467	1.76	20.53	0.44
2.367	0.44	8.433	20.19	14.500	1.76	20.57	0.44
2.400	0.44	8.467	20.19	14.533	1.76	20.60	0.44
2.433	0.44	8.500	20.19	14.567	1.76	20.63	0.44
2.467	0.44	8.533	20.19	14.600	1.76	20.67	0.44
2.500	0.44	8.567	20.19	14.633	1.76	20.70	0.44
2.533	0.44	8.600	20.19	14.667	1.76	20.73	0.44
2.567	0.44	8.633	20.19	14.700	1.76	20.77	0.44
2.600	0.44	8.667	20.19	14.733	1.76	20.80	0.44
2.633	0.44	8.700	20.19	14.767	1.76	20.83	0.44
2.667	0.44	8.733	20.19	14.800	1.76	20.87	0.44
2.700	0.44	8.767	20.19	14.833	1.76	20.90	0.44
2.733	0.44	8.800	20.19	14.867	1.76	20.93	0.44
2.767	0.44	8.833	20.19	14.900	1.76	20.97	0.44
2.800	0.44	8.867	20.19	14.933	1.76	21.00	0.44
2.833	0.44	8.900	20.19	14.967	1.76	21.03	0.44
2.867	0.44	8.933	20.19	15.000	1.76	21.07	0.44

2.900	0.44	8.967	20.19	15.033	1.76	21.10	0.44
2.933	0.44	9.000	20.19	15.067	1.76	21.13	0.44
2.967	0.44	9.033	20.19	15.100	1.76	21.17	0.44
3.000	0.44	9.067	20.19	15.133	1.76	21.20	0.44
3.033	0.44	9.100	20.19	15.167	1.76	21.23	0.44
3.067	0.44	9.133	20.19	15.200	1.76	21.27	0.44
3.100	0.44	9.167	20.19	15.233	1.76	21.30	0.44
3.133	0.44	9.200	20.19	15.267	1.76	21.33	0.44
3.167	0.44	9.233	20.19	15.300	1.76	21.37	0.44
3.200	0.44	9.267	20.19	15.333	1.76	21.40	0.44
3.233	0.44	9.300	20.19	15.367	1.76	21.43	0.44
3.267	0.44	9.333	20.19	15.400	1.76	21.47	0.44
3.300	0.44	9.367	20.19	15.433	1.76	21.50	0.44
3.333	0.44	9.400	20.19	15.467	1.76	21.53	0.44
3.367	0.44	9.433	20.19	15.500	1.76	21.57	0.44
3.400	0.44	9.467	20.19	15.533	1.76	21.60	0.44
3.433	0.44	9.500	20.19	15.567	1.76	21.63	0.44
3.467	0.44	9.533	20.19	15.600	1.76	21.67	0.44
3.500	0.44	9.567	20.19	15.633	1.76	21.70	0.44
3.533	0.44	9.600	20.19	15.667	1.76	21.73	0.44
3.567	0.44	9.633	20.19	15.700	1.76	21.77	0.44
3.600	0.44	9.667	20.19	15.733	1.76	21.80	0.44
3.633	0.44	9.700	20.19	15.767	1.76	21.83	0.44
3.667	0.44	9.733	20.19	15.800	1.76	21.87	0.44
3.700	0.44	9.767	20.19	15.833	1.76	21.90	0.44
3.733	0.44	9.800	20.19	15.867	1.76	21.93	0.44
3.767	0.44	9.833	20.19	15.900	1.76	21.97	0.44
3.800	0.44	9.867	20.19	15.933	1.76	22.00	0.44
3.833	0.44	9.900	20.19	15.967	1.76	22.03	0.44
3.867	0.44	9.933	20.19	16.000	1.76	22.07	0.44
3.900	0.44	9.967	20.19	16.033	1.76	22.10	0.44
3.933	0.44	10.000	20.19	16.067	1.76	22.13	0.44
3.967	0.44	10.033	20.19	16.100	1.76	22.17	0.44
4.000	0.44	10.067	20.19	16.133	1.76	22.20	0.44
4.033	0.44	10.100	20.19	16.167	1.76	22.23	0.44
4.067	0.44	10.133	20.19	16.200	1.76	22.27	0.44
4.100	0.44	10.167	20.19	16.233	1.76	22.30	0.44
4.133	0.44	10.200	20.19	16.267	1.32	22.33	0.44
4.167	0.44	10.233	20.19	16.300	0.88	22.37	0.44
4.200	0.44	10.267	12.94	16.333	0.88	22.40	0.44
4.233	0.44	10.300	5.71	16.367	0.88	22.43	0.44
4.267	1.53	10.333	5.71	16.400	0.88	22.47	0.44
4.300	2.63	10.367	5.71	16.433	0.88	22.50	0.44
4.333	2.63	10.400	5.71	16.467	0.88	22.53	0.44
4.367	2.63	10.433	5.71	16.500	0.88	22.57	0.44
4.400	2.63	10.467	5.71	16.533	0.88	22.60	0.44
4.433	2.63	10.500	5.71	16.567	0.88	22.63	0.44
4.467	2.63	10.533	5.71	16.600	0.88	22.67	0.44
4.500	2.63	10.567	5.71	16.633	0.88	22.70	0.44
4.533	2.63	10.600	5.71	16.667	0.88	22.73	0.44
4.567	2.63	10.633	5.71	16.700	0.88	22.77	0.44
4.600	2.63	10.667	5.71	16.733	0.88	22.80	0.44
4.633	2.63	10.700	5.71	16.767	0.88	22.83	0.44
4.667	2.63	10.733	5.71	16.800	0.88	22.87	0.44
4.700	2.63	10.767	5.71	16.833	0.88	22.90	0.44
4.733	2.63	10.800	5.71	16.867	0.88	22.93	0.44
4.767	2.63	10.833	5.71	16.900	0.88	22.97	0.44
4.800	2.63	10.867	5.71	16.933	0.88	23.00	0.44
4.833	2.63	10.900	5.71	16.967	0.88	23.03	0.44
4.867	2.63	10.933	5.71	17.000	0.88	23.07	0.44
4.900	2.63	10.967	5.71	17.033	0.88	23.10	0.44
4.933	2.63	11.000	5.71	17.067	0.88	23.13	0.44
4.967	2.63	11.033	5.71	17.100	0.88	23.17	0.44
5.000	2.63	11.067	5.71	17.133	0.88	23.20	0.44
5.033	2.63	11.100	5.71	17.167	0.88	23.23	0.44
5.067	2.63	11.133	5.71	17.200	0.88	23.27	0.44
5.100	2.63	11.167	5.71	17.233	0.88	23.30	0.44
5.133	2.63	11.200	5.71	17.267	0.88	23.33	0.44
5.167	2.63	11.233	5.71	17.300	0.88	23.37	0.44
5.200	2.63	11.267	5.71	17.333	0.88	23.40	0.44
5.233	2.63	11.300	5.71	17.367	0.88	23.43	0.44
5.267	2.63	11.333	5.71	17.400	0.88	23.47	0.44
5.300	2.63	11.367	5.71	17.433	0.88	23.50	0.44
5.333	2.63	11.400	5.71	17.467	0.88	23.53	0.44
5.367	2.63	11.433	5.71	17.500	0.88	23.57	0.44
5.400	2.63	11.467	5.71	17.533	0.88	23.60	0.44
5.433	2.63	11.500	5.71	17.567	0.88	23.63	0.44
5.467	2.63	11.533	5.71	17.600	0.88	23.67	0.44
5.500	2.63	11.567	5.71	17.633	0.88	23.70	0.44
5.533	2.63	11.600	5.71	17.667	0.88	23.73	0.44
5.567	2.63	11.633	5.71	17.700	0.88	23.77	0.44

5.600	2.63	11.667	5.71	17.733	0.88	23.80	0.44
5.633	2.63	11.700	5.71	17.767	0.88	23.83	0.44
5.667	2.63	11.733	5.71	17.800	0.88	23.87	0.44
5.700	2.63	11.767	5.71	17.833	0.88	23.90	0.44
5.733	2.63	11.800	5.71	17.867	0.88	23.93	0.44
5.767	2.63	11.833	5.71	17.900	0.88	23.97	0.44
5.800	2.63	11.867	5.71	17.933	0.88	24.00	0.44
5.833	2.63	11.900	5.71	17.967	0.88	24.03	0.44
5.867	2.63	11.933	5.71	18.000	0.88	24.07	0.44
5.900	2.63	11.967	5.71	18.033	0.88	24.10	0.44
5.933	2.63	12.000	5.71	18.067	0.88	24.13	0.44
5.967	2.63	12.033	5.71	18.100	0.88	24.17	0.44
6.000	2.63	12.067	5.71	18.133	0.88	24.20	0.44
6.033	2.63	12.100	5.71	18.167	0.88	24.23	0.44
6.067	2.63	12.133	5.71	18.200	0.88	24.27	0.22

Max.Eff.Inten.(mm/hr)=	20.19	9.95	
over (min)	5.00	6.00	
Storage Coeff. (min)=	4.43 (ii)	4.91 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.26	0.21	
			TOTALS
PEAK FLOW (cms)=	0.11	0.01	0.115 (iii)
TIME TO PEAK (hrs)=	9.53	10.23	10.23
RUNOFF VOLUME (mm)=	85.80	31.22	77.61
TOTAL RAINFALL (mm)=	87.80	87.80	87.80
RUNOFF COEFFICIENT =	0.98	0.36	0.88

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0870
	0.0158	0.0525	0.0413	0.0960
	0.0235	0.0658	0.0470	0.1045
	0.0284	0.0760	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.115	10.23	77.61
OUTFLOW: ID= 1 (2000)	2.220	0.041	10.43	77.23

PEAK FLOW REDUCTION [Qout/Qin](%)= 35.84
TIME SHIFT OF PEAK FLOW (min)= 12.00
MAXIMUM STORAGE USED (ha.m.)= 0.0958

FINISH

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      V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\e3cecd7a-af2b-4cdd-b466-706d5c410726\scena
Summary filename: C:\Users\wburke\AppData\Local\Civica\VH5\40fcb7f5-f544-4d5a-b245-a4eb17eaad57\e3cecd7a-af2b-4cdd-b466-706d5c410726\scena

DATE: 10/20/2021 TIME: 09:23:45

USER:

COMMENTS: _____

****
** SIMULATION : 100yr-24hr **
****

| READ STORM | Filename: C:\Users\wburke\AppData\Local\Temp\436f8689-d7f8-4833-9a4f-3c530aef3e9e\f8dedf73
| Ptotal= 95.92 mm | Comments: 100 Year 24 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	6.50	8.15	12.75	3.36	19.00	0.48
0.50	0.48	6.75	8.15	13.00	3.36	19.25	0.48
0.75	0.48	7.00	8.15	13.25	3.36	19.50	0.48
1.00	0.48	7.25	8.15	13.50	3.36	19.75	0.48
1.25	0.48	7.50	8.15	13.75	3.36	20.00	0.48
1.50	0.48	7.75	8.15	14.00	3.36	20.25	0.48
1.75	0.48	8.00	8.15	14.25	3.36	20.50	0.48
2.00	0.48	8.25	8.15	14.50	1.92	20.75	0.48
2.25	0.48	8.50	22.06	14.75	1.92	21.00	0.48
2.50	0.48	8.75	22.06	15.00	1.92	21.25	0.48
2.75	0.48	9.00	22.06	15.25	1.92	21.50	0.48
3.00	0.48	9.25	22.06	15.50	1.92	21.75	0.48
3.25	0.48	9.50	22.06	15.75	1.92	22.00	0.48
3.50	0.48	9.75	22.06	16.00	1.92	22.25	0.48
3.75	0.48	10.00	22.06	16.25	1.92	22.50	0.48
4.00	0.48	10.25	22.06	16.50	0.96	22.75	0.48
4.25	0.48	10.50	6.23	16.75	0.96	23.00	0.48
4.50	2.88	10.75	6.23	17.00	0.96	23.25	0.48
4.75	2.88	11.00	6.23	17.25	0.96	23.50	0.48
5.00	2.88	11.25	6.23	17.50	0.96	23.75	0.48
5.25	2.88	11.50	6.23	17.75	0.96	24.00	0.48
5.50	2.88	11.75	6.23	18.00	0.96	24.25	0.48
5.75	2.88	12.00	6.23	18.25	0.96		
6.00	2.88	12.25	6.23	18.50	0.48		
6.25	2.88	12.50	3.36	18.75	0.48		

| CALIB |
| STANDHYD (1000) | Area (ha)= 2.22
|ID= 1 DT= 2.0 min | Total Imp(%)= 85.00 Dir. Conn.(%)= 85.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.89	0.33
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	121.66	0.50
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	0.00	6.100	2.88	12.167	6.23	18.23	0.96
0.067	0.00	6.133	2.88	12.200	6.23	18.27	0.72
0.100	0.00	6.167	2.88	12.233	6.23	18.30	0.48
0.133	0.00	6.200	2.88	12.267	4.79	18.33	0.48
0.167	0.00	6.233	2.88	12.300	3.36	18.37	0.48
0.200	0.00	6.267	5.51	12.333	3.36	18.40	0.48

0.233	0.00	6.300	8.15	12.367	3.36	18.43	0.48
0.267	0.24	6.333	8.15	12.400	3.36	18.47	0.48
0.300	0.48	6.367	8.15	12.433	3.36	18.50	0.48
0.333	0.48	6.400	8.15	12.467	3.36	18.53	0.48
0.367	0.48	6.433	8.15	12.500	3.36	18.57	0.48
0.400	0.48	6.467	8.15	12.533	3.36	18.60	0.48
0.433	0.48	6.500	8.15	12.567	3.36	18.63	0.48
0.467	0.48	6.533	8.15	12.600	3.36	18.67	0.48
0.500	0.48	6.567	8.15	12.633	3.36	18.70	0.48
0.533	0.48	6.600	8.15	12.667	3.36	18.73	0.48
0.567	0.48	6.633	8.15	12.700	3.36	18.77	0.48
0.600	0.48	6.667	8.15	12.733	3.36	18.80	0.48
0.633	0.48	6.700	8.15	12.767	3.36	18.83	0.48
0.667	0.48	6.733	8.15	12.800	3.36	18.87	0.48
0.700	0.48	6.767	8.15	12.833	3.36	18.90	0.48
0.733	0.48	6.800	8.15	12.867	3.36	18.93	0.48
0.767	0.48	6.833	8.15	12.900	3.36	18.97	0.48
0.800	0.48	6.867	8.15	12.933	3.36	19.00	0.48
0.833	0.48	6.900	8.15	12.967	3.36	19.03	0.48
0.867	0.48	6.933	8.15	13.000	3.36	19.07	0.48
0.900	0.48	6.967	8.15	13.033	3.36	19.10	0.48
0.933	0.48	7.000	8.15	13.067	3.36	19.13	0.48
0.967	0.48	7.033	8.15	13.100	3.36	19.17	0.48
1.000	0.48	7.067	8.15	13.133	3.36	19.20	0.48
1.033	0.48	7.100	8.15	13.167	3.36	19.23	0.48
1.067	0.48	7.133	8.15	13.200	3.36	19.27	0.48
1.100	0.48	7.167	8.15	13.233	3.36	19.30	0.48
1.133	0.48	7.200	8.15	13.267	3.36	19.33	0.48
1.167	0.48	7.233	8.15	13.300	3.36	19.37	0.48
1.200	0.48	7.267	8.15	13.333	3.36	19.40	0.48
1.233	0.48	7.300	8.15	13.367	3.36	19.43	0.48
1.267	0.48	7.333	8.15	13.400	3.36	19.47	0.48
1.300	0.48	7.367	8.15	13.433	3.36	19.50	0.48
1.333	0.48	7.400	8.15	13.467	3.36	19.53	0.48
1.367	0.48	7.433	8.15	13.500	3.36	19.57	0.48
1.400	0.48	7.467	8.15	13.533	3.36	19.60	0.48
1.433	0.48	7.500	8.15	13.567	3.36	19.63	0.48
1.467	0.48	7.533	8.15	13.600	3.36	19.67	0.48
1.500	0.48	7.567	8.15	13.633	3.36	19.70	0.48
1.533	0.48	7.600	8.15	13.667	3.36	19.73	0.48
1.567	0.48	7.633	8.15	13.700	3.36	19.77	0.48
1.600	0.48	7.667	8.15	13.733	3.36	19.80	0.48
1.633	0.48	7.700	8.15	13.767	3.36	19.83	0.48
1.667	0.48	7.733	8.15	13.800	3.36	19.87	0.48
1.700	0.48	7.767	8.15	13.833	3.36	19.90	0.48
1.733	0.48	7.800	8.15	13.867	3.36	19.93	0.48
1.767	0.48	7.833	8.15	13.900	3.36	19.97	0.48
1.800	0.48	7.867	8.15	13.933	3.36	20.00	0.48
1.833	0.48	7.900	8.15	13.967	3.36	20.03	0.48
1.867	0.48	7.933	8.15	14.000	3.36	20.07	0.48
1.900	0.48	7.967	8.15	14.033	3.36	20.10	0.48
1.933	0.48	8.000	8.15	14.067	3.36	20.13	0.48
1.967	0.48	8.033	8.15	14.100	3.36	20.17	0.48
2.000	0.48	8.067	8.15	14.133	3.36	20.20	0.48
2.033	0.48	8.100	8.15	14.167	3.36	20.23	0.48
2.067	0.48	8.133	8.15	14.200	3.36	20.27	0.48
2.100	0.48	8.167	8.15	14.233	3.36	20.30	0.48
2.133	0.48	8.200	8.15	14.267	2.64	20.33	0.48
2.167	0.48	8.233	8.15	14.300	1.92	20.37	0.48
2.200	0.48	8.267	15.10	14.333	1.92	20.40	0.48
2.233	0.48	8.300	22.06	14.367	1.92	20.43	0.48
2.267	0.48	8.333	22.06	14.400	1.92	20.47	0.48
2.300	0.48	8.367	22.06	14.433	1.92	20.50	0.48
2.333	0.48	8.400	22.06	14.467	1.92	20.53	0.48
2.367	0.48	8.433	22.06	14.500	1.92	20.57	0.48
2.400	0.48	8.467	22.06	14.533	1.92	20.60	0.48
2.433	0.48	8.500	22.06	14.567	1.92	20.63	0.48
2.467	0.48	8.533	22.06	14.600	1.92	20.67	0.48
2.500	0.48	8.567	22.06	14.633	1.92	20.70	0.48
2.533	0.48	8.600	22.06	14.667	1.92	20.73	0.48
2.567	0.48	8.633	22.06	14.700	1.92	20.77	0.48
2.600	0.48	8.667	22.06	14.733	1.92	20.80	0.48
2.633	0.48	8.700	22.06	14.767	1.92	20.83	0.48
2.667	0.48	8.733	22.06	14.800	1.92	20.87	0.48
2.700	0.48	8.767	22.06	14.833	1.92	20.90	0.48
2.733	0.48	8.800	22.06	14.867	1.92	20.93	0.48
2.767	0.48	8.833	22.06	14.900	1.92	20.97	0.48
2.800	0.48	8.867	22.06	14.933	1.92	21.00	0.48
2.833	0.48	8.900	22.06	14.967	1.92	21.03	0.48
2.867	0.48	8.933	22.06	15.000	1.92	21.07	0.48
2.900	0.48	8.967	22.06	15.033	1.92	21.10	0.48

2.933	0.48	9.000	22.06	15.067	1.92	21.13	0.48
2.967	0.48	9.033	22.06	15.100	1.92	21.17	0.48
3.000	0.48	9.067	22.06	15.133	1.92	21.20	0.48
3.033	0.48	9.100	22.06	15.167	1.92	21.23	0.48
3.067	0.48	9.133	22.06	15.200	1.92	21.27	0.48
3.100	0.48	9.167	22.06	15.233	1.92	21.30	0.48
3.133	0.48	9.200	22.06	15.267	1.92	21.33	0.48
3.167	0.48	9.233	22.06	15.300	1.92	21.37	0.48
3.200	0.48	9.267	22.06	15.333	1.92	21.40	0.48
3.233	0.48	9.300	22.06	15.367	1.92	21.43	0.48
3.267	0.48	9.333	22.06	15.400	1.92	21.47	0.48
3.300	0.48	9.367	22.06	15.433	1.92	21.50	0.48
3.333	0.48	9.400	22.06	15.467	1.92	21.53	0.48
3.367	0.48	9.433	22.06	15.500	1.92	21.57	0.48
3.400	0.48	9.467	22.06	15.533	1.92	21.60	0.48
3.433	0.48	9.500	22.06	15.567	1.92	21.63	0.48
3.467	0.48	9.533	22.06	15.600	1.92	21.67	0.48
3.500	0.48	9.567	22.06	15.633	1.92	21.70	0.48
3.533	0.48	9.600	22.06	15.667	1.92	21.73	0.48
3.567	0.48	9.633	22.06	15.700	1.92	21.77	0.48
3.600	0.48	9.667	22.06	15.733	1.92	21.80	0.48
3.633	0.48	9.700	22.06	15.767	1.92	21.83	0.48
3.667	0.48	9.733	22.06	15.800	1.92	21.87	0.48
3.700	0.48	9.767	22.06	15.833	1.92	21.90	0.48
3.733	0.48	9.800	22.06	15.867	1.92	21.93	0.48
3.767	0.48	9.833	22.06	15.900	1.92	21.97	0.48
3.800	0.48	9.867	22.06	15.933	1.92	22.00	0.48
3.833	0.48	9.900	22.06	15.967	1.92	22.03	0.48
3.867	0.48	9.933	22.06	16.000	1.92	22.07	0.48
3.900	0.48	9.967	22.06	16.033	1.92	22.10	0.48
3.933	0.48	10.000	22.06	16.067	1.92	22.13	0.48
3.967	0.48	10.033	22.06	16.100	1.92	22.17	0.48
4.000	0.48	10.067	22.06	16.133	1.92	22.20	0.48
4.033	0.48	10.100	22.06	16.167	1.92	22.23	0.48
4.067	0.48	10.133	22.06	16.200	1.92	22.27	0.48
4.100	0.48	10.167	22.06	16.233	1.92	22.30	0.48
4.133	0.48	10.200	22.06	16.267	1.44	22.33	0.48
4.167	0.48	10.233	22.06	16.300	0.96	22.37	0.48
4.200	0.48	10.267	14.13	16.333	0.96	22.40	0.48
4.233	0.48	10.300	6.23	16.367	0.96	22.43	0.48
4.267	1.68	10.333	6.23	16.400	0.96	22.47	0.48
4.300	2.88	10.367	6.23	16.433	0.96	22.50	0.48
4.333	2.88	10.400	6.23	16.467	0.96	22.53	0.48
4.367	2.88	10.433	6.23	16.500	0.96	22.57	0.48
4.400	2.88	10.467	6.23	16.533	0.96	22.60	0.48
4.433	2.88	10.500	6.23	16.567	0.96	22.63	0.48
4.467	2.88	10.533	6.23	16.600	0.96	22.67	0.48
4.500	2.88	10.567	6.23	16.633	0.96	22.70	0.48
4.533	2.88	10.600	6.23	16.667	0.96	22.73	0.48
4.567	2.88	10.633	6.23	16.700	0.96	22.77	0.48
4.600	2.88	10.667	6.23	16.733	0.96	22.80	0.48
4.633	2.88	10.700	6.23	16.767	0.96	22.83	0.48
4.667	2.88	10.733	6.23	16.800	0.96	22.87	0.48
4.700	2.88	10.767	6.23	16.833	0.96	22.90	0.48
4.733	2.88	10.800	6.23	16.867	0.96	22.93	0.48
4.767	2.88	10.833	6.23	16.900	0.96	22.97	0.48
4.800	2.88	10.867	6.23	16.933	0.96	23.00	0.48
4.833	2.88	10.900	6.23	16.967	0.96	23.03	0.48
4.867	2.88	10.933	6.23	17.000	0.96	23.07	0.48
4.900	2.88	10.967	6.23	17.033	0.96	23.10	0.48
4.933	2.88	11.000	6.23	17.067	0.96	23.13	0.48
4.967	2.88	11.033	6.23	17.100	0.96	23.17	0.48
5.000	2.88	11.067	6.23	17.133	0.96	23.20	0.48
5.033	2.88	11.100	6.23	17.167	0.96	23.23	0.48
5.067	2.88	11.133	6.23	17.200	0.96	23.27	0.48
5.100	2.88	11.167	6.23	17.233	0.96	23.30	0.48
5.133	2.88	11.200	6.23	17.267	0.96	23.33	0.48
5.167	2.88	11.233	6.23	17.300	0.96	23.37	0.48
5.200	2.88	11.267	6.23	17.333	0.96	23.40	0.48
5.233	2.88	11.300	6.23	17.367	0.96	23.43	0.48
5.267	2.88	11.333	6.23	17.400	0.96	23.47	0.48
5.300	2.88	11.367	6.23	17.433	0.96	23.50	0.48
5.333	2.88	11.400	6.23	17.467	0.96	23.53	0.48
5.367	2.88	11.433	6.23	17.500	0.96	23.57	0.48
5.400	2.88	11.467	6.23	17.533	0.96	23.60	0.48
5.433	2.88	11.500	6.23	17.567	0.96	23.63	0.48
5.467	2.88	11.533	6.23	17.600	0.96	23.67	0.48
5.500	2.88	11.567	6.23	17.633	0.96	23.70	0.48
5.533	2.88	11.600	6.23	17.667	0.96	23.73	0.48
5.567	2.88	11.633	6.23	17.700	0.96	23.77	0.48
5.600	2.88	11.667	6.23	17.733	0.96	23.80	0.48

5.633	2.88	11.700	6.23	17.767	0.96	23.83	0.48
5.667	2.88	11.733	6.23	17.800	0.96	23.87	0.48
5.700	2.88	11.767	6.23	17.833	0.96	23.90	0.48
5.733	2.88	11.800	6.23	17.867	0.96	23.93	0.48
5.767	2.88	11.833	6.23	17.900	0.96	23.97	0.48
5.800	2.88	11.867	6.23	17.933	0.96	24.00	0.48
5.833	2.88	11.900	6.23	17.967	0.96	24.03	0.48
5.867	2.88	11.933	6.23	18.000	0.96	24.07	0.48
5.900	2.88	11.967	6.23	18.033	0.96	24.10	0.48
5.933	2.88	12.000	6.23	18.067	0.96	24.13	0.48
5.967	2.88	12.033	6.23	18.100	0.96	24.17	0.48
6.000	2.88	12.067	6.23	18.133	0.96	24.20	0.48
6.033	2.88	12.100	6.23	18.167	0.96	24.23	0.48
6.067	2.88	12.133	6.23	18.200	0.96	24.27	0.24

Max.Eff.Inten.(mm/hr)=	22.06	11.50	
over (min)	5.00	6.00	
Storage Coeff. (min)=	4.27 (ii)	4.74 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.27	0.22	
			TOTALS
PEAK FLOW (cms)=	0.12	0.01	0.126 (iii)
TIME TO PEAK (hrs)=	9.53	10.23	10.23
RUNOFF VOLUME (mm)=	93.92	36.30	85.28
TOTAL RAINFALL (mm)=	95.92	95.92	95.92
RUNOFF COEFFICIENT =	0.98	0.38	0.89

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0362	0.0870
	0.0158	0.0525	0.0413	0.0960
	0.0235	0.0658	0.0470	0.1045
	0.0284	0.0760	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1000)	2.220	0.126	10.23	85.28
OUTFLOW: ID= 1 (2000)	2.220	0.047	10.43	84.90

PEAK FLOW REDUCTION [Qout/Qin](%)= 37.24
TIME SHIFT OF PEAK FLOW (min)= 12.00
MAXIMUM STORAGE USED (ha.m.)= 0.1045

D.5 HEC-RAS OUTPUT

HEC-RAS Plan: Prop River: Black Creek Reach: 2

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	9061	Fut_Regional	25.810	210.28	212.10	211.92	212.18	0.001226	1.39	22.65	43.02	0.34
2	9061	Fut_350 yr	22.980	210.28	212.07	211.87	212.14	0.001153	1.33	21.01	42.58	0.33
2	9061	Ex_100 yr	1.980	210.28	211.35	210.72	211.37	0.000206	0.38	5.03	7.44	0.13
2	9061	Ex_50 yr	1.740	210.28	211.34	210.69	211.35	0.000171	0.34	4.91	7.38	0.12
2	9061	Ex_25 yr	1.510	210.28	211.32	210.67	211.33	0.000139	0.31	4.80	7.32	0.10
2	9061	Ex_10 yr	1.220	210.28	211.30	210.64	211.31	0.000101	0.26	4.64	7.23	0.09
2	9061	Ex_5 yr	0.800	210.28	211.26	210.57	211.27	0.000052	0.18	4.39	7.09	0.06
2	9061	Ex_2 yr	0.560	210.28	211.24	210.53	211.24	0.000029	0.13	4.21	6.99	0.05
2	9037	Fut_Regional	25.810	210.20	211.93	211.92	212.12	0.003840	2.44	18.76	42.80	0.61
2	9037	Fut_350 yr	22.980	210.20	211.89	211.88	212.08	0.003690	2.36	17.21	42.37	0.59
2	9037	Ex_100 yr	1.980	210.20	211.35	210.58	211.36	0.000232	0.45	5.60	7.20	0.14
2	9037	Ex_50 yr	1.740	210.20	211.34	210.55	211.34	0.000188	0.40	5.49	7.10	0.12
2	9037	Ex_25 yr	1.510	210.20	211.32	210.53	211.33	0.000149	0.35	5.39	6.99	0.11
2	9037	Ex_10 yr	1.220	210.20	211.30	210.49	211.30	0.000105	0.29	5.24	6.92	0.09
2	9037	Ex_5 yr	0.800	210.20	211.26	210.44	211.27	0.000051	0.20	4.99	6.81	0.06
2	9037	Ex_2 yr	0.560	210.20	211.24	210.40	211.24	0.000027	0.14	4.83	6.73	0.05
2	9010	Fut_Regional	25.810	210.13	211.89	211.81	212.01	0.002738	2.11	21.95	42.19	0.52
2	9010	Fut_350 yr	22.980	210.13	211.84	211.77	211.97	0.002704	2.06	20.19	41.40	0.51
2	9010	Ex_100 yr	1.980	210.13	211.34	210.53	211.35	0.000212	0.45	6.15	8.03	0.13
2	9010	Ex_50 yr	1.740	210.13	211.33	210.50	211.34	0.000171	0.40	6.04	7.94	0.12
2	9010	Ex_25 yr	1.510	210.13	211.32	210.48	211.32	0.000135	0.35	5.93	7.84	0.11
2	9010	Ex_10 yr	1.220	210.13	211.30	210.44	211.30	0.000094	0.29	5.78	7.71	0.09
2	9010	Ex_5 yr	0.800	210.13	211.26	210.39	211.26	0.000045	0.20	5.52	7.50	0.06
2	9010	Ex_2 yr	0.560	210.13	211.24	210.34	211.24	0.000024	0.14	5.34	7.36	0.04
2	8985	Fut_Regional	25.810	210.09	211.81	211.73	211.93	0.003125	2.22	21.58	40.14	0.55
2	8985	Fut_350 yr	22.980	210.09	211.77	211.71	211.89	0.002976	2.14	20.23	39.69	0.54
2	8985	Ex_100 yr	1.980	210.09	211.34	210.54	211.35	0.000264	0.52	6.05	7.88	0.15
2	8985	Ex_50 yr	1.740	210.09	211.32	210.50	211.33	0.000212	0.46	5.96	7.80	0.14
2	8985	Ex_25 yr	1.510	210.09	211.31	210.47	211.32	0.000166	0.40	5.86	7.74	0.12
2	8985	Ex_10 yr	1.220	210.09	211.29	210.43	211.30	0.000115	0.33	5.71	7.64	0.10
2	8985	Ex_5 yr	0.800	210.09	211.26	210.36	211.26	0.000055	0.23	5.47	7.48	0.07
2	8985	Ex_2 yr	0.560	210.09	211.24	210.31	211.24	0.000029	0.16	5.30	7.36	0.05
2	8958	Fut_Regional	25.810	210.01	211.79	211.62	211.86	0.001562	1.56	29.23	55.27	0.39
2	8958	Fut_350 yr	22.980	210.01	211.76	211.57	211.82	0.001461	1.49	27.45	54.35	0.37
2	8958	Ex_100 yr	1.980	210.01	211.33	210.46	211.34	0.000182	0.43	6.42	9.64	0.12
2	8958	Ex_50 yr	1.740	210.01	211.32	210.43	211.33	0.000146	0.38	6.31	9.36	0.11
2	8958	Ex_25 yr	1.510	210.01	211.31	210.40	211.31	0.000114	0.34	6.20	8.72	0.10
2	8958	Ex_10 yr	1.220	210.01	211.29	210.37	211.29	0.000079	0.28	6.05	8.55	0.08
2	8958	Ex_5 yr	0.800	210.01	211.26	210.30	211.26	0.000038	0.19	5.79	8.23	0.06
2	8958	Ex_2 yr	0.560	210.01	211.24	210.26	211.24	0.000020	0.13	5.60	8.00	0.04
2	8952	Fut_Regional	25.810	211.07	211.66	211.66	211.83	0.008190	1.79	14.45	45.95	1.02

HEC-RAS Plan: Prop River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8952	Fut_350 yr	22.980	211.07	211.64	211.64	211.79	0.008013	1.74	13.23	44.67	1.02
2	8952	Ex_100 yr	1.980	211.07	211.28	211.28	211.33	0.013139	0.98	2.02	20.42	0.99
2	8952	Ex_50 yr	1.740	211.07	211.27	211.27	211.32	0.013515	0.96	1.82	19.48	1.00
2	8952	Ex_25 yr	1.510	211.07	211.26	211.26	211.31	0.013943	0.95	1.59	17.61	1.01
2	8952	Ex_10 yr	1.220	211.07	211.25	211.25	211.29	0.014186	0.91	1.34	16.07	1.00
2	8952	Ex_5 yr	0.800	211.07	211.23	211.23	211.26	0.011631	0.75	1.06	14.56	0.89
2	8952	Ex_2 yr	0.560	211.07	211.21	211.21	211.23	0.012300	0.70	0.80	12.86	0.89
2	8930	Fut_Regional	25.810	209.91	211.06	211.06	211.21	0.007411	2.49	22.07	59.61	0.78
2	8930	Fut_350 yr	22.980	209.91	211.03	211.03	211.17	0.006988	2.38	20.66	57.71	0.76
2	8930	Ex_100 yr	1.980	209.91	210.61	210.32	210.64	0.001616	0.80	3.19	8.74	0.33
2	8930	Ex_50 yr	1.740	209.91	210.58	210.30	210.61	0.001554	0.75	2.90	8.28	0.32
2	8930	Ex_25 yr	1.510	209.91	210.55	210.27	210.57	0.001429	0.70	2.66	7.97	0.31
2	8930	Ex_10 yr	1.220	209.91	210.53	210.25	210.55	0.001075	0.59	2.51	7.68	0.26
2	8930	Ex_5 yr	0.800	209.91	210.50	210.19	210.51	0.000582	0.41	2.28	7.21	0.19
2	8930	Ex_2 yr	0.560	209.91	210.47	210.15	210.48	0.000348	0.31	2.09	6.51	0.15
2	8906	Fut_Regional	25.810	209.78	210.87	210.87	210.97	0.007167	2.24	31.57	162.06	0.75
2	8906	Fut_350 yr	22.980	209.78	210.87	210.87	210.95	0.005341	1.94	32.39	164.39	0.65
2	8906	Ex_100 yr	1.980	209.78	210.58	210.22	210.61	0.001147	0.70	3.16	6.89	0.28
2	8906	Ex_50 yr	1.740	209.78	210.55	210.19	210.57	0.001058	0.65	2.94	6.49	0.27
2	8906	Ex_25 yr	1.510	209.78	210.53	210.17	210.54	0.000927	0.59	2.78	6.24	0.25
2	8906	Ex_10 yr	1.220	209.78	210.51	210.13	210.53	0.000656	0.49	2.70	6.15	0.21
2	8906	Ex_5 yr	0.800	209.78	210.49	210.06	210.50	0.000325	0.34	2.56	6.00	0.15
2	8906	Ex_2 yr	0.560	209.78	210.47	210.01	210.47	0.000185	0.25	2.42	5.85	0.11
2	8901	Fut_Regional	25.810	210.32	210.87	210.81	210.90	0.008237	0.69	37.14	228.61	0.55
2	8901	Fut_350 yr	22.980	210.32	210.85	210.78	210.87	0.010404	0.73	31.44	213.70	0.61
2	8901	Ex_100 yr	1.980	210.32	210.58	210.51	210.59	0.006411	0.45	4.40	35.66	0.41
2	8901	Ex_50 yr	1.740	210.32	210.55	210.50	210.56	0.010907	0.55	3.18	27.78	0.52
2	8901	Ex_25 yr	1.510	210.32	210.50	210.49	210.53	0.028679	0.72	2.10	25.25	0.79
2	8901	Ex_10 yr	1.220	210.32	210.48	210.48	210.51	0.049886	0.81	1.51	23.04	1.01
2	8901	Ex_5 yr	0.800	210.32	210.44	210.44	210.49	0.068755	0.95	0.84	12.77	1.18
2	8901	Ex_2 yr	0.560	210.32	210.42	210.42	210.46	0.077555	0.89	0.63	11.52	1.22
2	8890	Fut_Regional	25.810	209.73	210.86	210.76	210.87	0.000742	0.77	81.87	233.65	0.24
2	8890	Fut_350 yr	22.980	209.73	210.84	210.76	210.85	0.000739	0.75	76.05	230.71	0.24
2	8890	Ex_100 yr	1.980	209.73	210.52	210.20	210.56	0.001797	0.90	2.62	7.50	0.35
2	8890	Ex_50 yr	1.740	209.73	210.49	210.16	210.52	0.001633	0.83	2.44	5.43	0.33
2	8890	Ex_25 yr	1.510	209.73	210.46	210.14	210.49	0.001443	0.76	2.29	5.22	0.31
2	8890	Ex_10 yr	1.220	209.73	210.41	210.10	210.43	0.001256	0.67	2.05	4.86	0.29
2	8890	Ex_5 yr	0.800	209.73	210.33	210.03	210.34	0.000914	0.52	1.68	4.46	0.24
2	8890	Ex_2 yr	0.560	209.73	210.26	209.98	210.27	0.000746	0.42	1.40	4.13	0.21
2	8848	Fut_Regional	28.650	209.63	210.74	210.65	210.80	0.004228	1.80	38.10	113.32	0.58
2	8848	Fut_350 yr	25.650	209.63	210.72	210.61	210.78	0.003934	1.72	35.93	110.50	0.56

HEC-RAS Plan: Prop River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8848	Ex_100 yr	4.260	209.63	210.27	210.27	210.37	0.007941	1.58	4.65	29.59	0.72
2	8848	Ex_50 yr	3.790	209.63	210.25	210.25	210.35	0.007351	1.49	4.25	28.81	0.69
2	8848	Ex_25 yr	3.330	209.63	210.42	210.23	210.44	0.000949	0.66	11.16	53.79	0.26
2	8848	Ex_10 yr	2.660	209.63	210.37	210.13	210.38	0.001021	0.64	8.46	44.32	0.26
2	8848	Ex_5 yr	1.810	209.63	210.28	210.03	210.30	0.001178	0.62	5.18	31.40	0.28
2	8848	Ex_2 yr	1.250	209.63	210.22	209.97	210.23	0.001217	0.58	3.23	24.59	0.28
2	8773	Fut_Regional	28.650	209.63	210.23	210.19	210.30	0.011731	1.99	27.86	120.03	0.88
2	8773	Fut_350 yr	25.650	209.63	210.19	210.17	210.27	0.013724	2.06	24.09	110.67	0.94
2	8773	Ex_100 yr	4.260	209.63	210.11	210.11	210.12	0.001077	0.51	16.18	88.28	0.26
2	8773	Ex_50 yr	3.790	209.63	210.11	210.11	210.12	0.000852	0.46	16.18	88.28	0.23
2	8773	Ex_25 yr	3.330	209.63	210.07	210.07	210.24	0.015833	1.82	1.93	6.34	0.96
2	8773	Ex_10 yr	2.660	209.63	210.01	210.01	210.16	0.017515	1.72	1.59	5.90	0.99
2	8773	Ex_5 yr	1.810	209.63	209.95	209.95	210.06	0.018669	1.50	1.21	5.34	0.98
2	8773	Ex_2 yr	1.250	209.63	209.89	209.89	209.98	0.020463	1.34	0.93	4.90	0.98
2	8694	Fut_Regional	33.230	209.39	210.12	209.68	210.13	0.000832	0.64	112.11	318.07	0.25
2	8694	Fut_350 yr	29.830	209.39	210.08	209.68	210.09	0.000872	0.63	103.53	304.60	0.25
2	8694	Ex_100 yr	8.700	209.39	209.85	209.68	209.85	0.000427	0.33	57.16	187.35	0.16
2	8694	Ex_50 yr	7.640	209.39	209.84	209.68	209.84	0.000381	0.30	54.58	180.74	0.15
2	8694	Ex_25 yr	6.580	209.39	209.82	209.68	209.82	0.000326	0.27	52.04	176.48	0.14
2	8694	Ex_10 yr	5.040	209.39	209.92	209.68	209.92	0.000081	0.16	69.27	227.58	0.07
2	8694	Ex_5 yr	3.000	209.39	209.82	209.68	209.82	0.000069	0.13	51.54	175.65	0.06
2	8694	Ex_2 yr	2.010	209.39	209.70	209.68	209.70	0.000124	0.13	32.71	144.97	0.08
2	8617	Fut_Regional	33.230	209.03	210.01	209.80	210.03	0.001886	1.12	66.20	257.78	0.38
2	8617	Fut_350 yr	29.830	209.03	209.96	209.80	209.98	0.002284	1.18	57.86	241.87	0.42
2	8617	Ex_100 yr	8.700	209.03	209.76	209.76	209.78	0.002784	1.09	22.83	105.22	0.44
2	8617	Ex_50 yr	7.640	209.03	209.76	209.76	209.78	0.002147	0.96	22.83	105.22	0.39
2	8617	Ex_25 yr	6.580	209.03	209.76	209.76	209.77	0.001593	0.83	22.83	105.22	0.33
2	8617	Ex_10 yr	5.040	209.03	209.68	209.68	209.88	0.011755	2.05	3.22	9.77	0.89
2	8617	Ex_5 yr	3.000	209.03	209.75	209.53	209.80	0.002720	1.06	3.88	11.09	0.43
2	8617	Ex_2 yr	2.010	209.03	209.63	209.44	209.67	0.002799	0.93	2.71	8.61	0.43
2	8574	Fut_Regional	33.230	208.90	209.98	209.65	209.99	0.000509	0.62	110.15	321.52	0.20
2	8574	Fut_350 yr	29.830	208.90	209.93	209.65	209.93	0.000583	0.64	98.64	304.18	0.21
2	8574	Ex_100 yr	8.700	208.90	209.71	209.65	209.72	0.000237	0.34	58.47	205.85	0.13
2	8574	Ex_50 yr	7.640	208.90	209.71	209.65	209.72	0.000183	0.30	58.37	205.48	0.11
2	8574	Ex_25 yr	6.580	208.90	209.71	209.65	209.71	0.000137	0.26	58.28	205.13	0.10
2	8574	Ex_10 yr	5.040	208.90	209.75	209.55	209.75	0.000058	0.17	65.32	228.45	0.06
2	8574	Ex_5 yr	3.000	208.90	209.59	209.38	209.66	0.003782	1.20	2.76	7.14	0.50
2	8574	Ex_2 yr	2.010	208.90	209.50	209.29	209.54	0.003069	0.96	2.20	5.44	0.44
2	8569	Fut_Regional	33.230	209.08	209.98	209.48	209.98	0.000638	0.30	110.37	318.25	0.13
2	8569	Fut_350 yr	29.830	209.08	209.92	209.45	209.93	0.000743	0.30	98.71	303.89	0.14
2	8569	Ex_100 yr	8.700	209.08	209.71	209.32	209.71	0.000345	0.15	58.15	203.66	0.08

HEC-RAS Plan: Prop River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8569	Ex_50 yr	7.640	209.08	209.71	209.30	209.71	0.000267	0.13	58.09	203.56	0.07
2	8569	Ex_25 yr	6.580	209.08	209.71	209.29	209.71	0.000199	0.11	58.04	203.48	0.06
2	8569	Ex_10 yr	5.040	209.08	209.75	209.27	209.75	0.000081	0.08	65.22	216.45	0.04
2	8569	Ex_5 yr	3.000	209.08	209.64	209.24	209.64	0.000083	0.07	44.88	167.96	0.04
2	8569	Ex_2 yr	2.010	209.08	209.53	209.21	209.53	0.000131	0.07	29.52	129.14	0.05
2	8563	Fut_Regional	33.230	208.87	209.98	209.71	209.98	0.000518	0.61	117.55	322.10	0.20
2	8563	Fut_350 yr	29.830	208.87	209.92	209.71	209.92	0.000561	0.61	105.78	296.68	0.21
2	8563	Ex_100 yr	8.700	208.87	209.71	209.71	209.71	0.000198	0.30	66.47	203.42	0.12
2	8563	Ex_50 yr	7.640	208.87	209.71	209.71	209.71	0.000153	0.27	66.47	203.42	0.10
2	8563	Ex_25 yr	6.580	208.87	209.71	209.71	209.71	0.000113	0.23	66.47	203.42	0.09
2	8563	Ex_10 yr	5.040	208.87	209.70	209.64	209.75	0.002649	1.10	6.94	38.62	0.43
2	8563	Ex_5 yr	3.000	208.87	209.56	209.41	209.63	0.004196	1.19	3.05	15.43	0.52
2	8563	Ex_2 yr	2.010	208.87	209.46	209.31	209.52	0.004987	1.12	1.87	7.72	0.54
2	8514	Fut_Regional	33.230	208.68	209.96	209.34	209.96	0.000454	0.67	127.13	298.74	0.20
2	8514	Fut_350 yr	29.830	208.68	209.90	209.34	209.91	0.000461	0.65	116.18	279.31	0.20
2	8514	Ex_100 yr	8.700	208.68	209.47	209.34	209.47	0.000386	0.43	52.08	124.30	0.17
2	8514	Ex_50 yr	7.640	208.68	209.43	209.34	209.43	0.000371	0.40	47.69	119.79	0.16
2	8514	Ex_25 yr	6.580	208.68	209.39	209.34	209.39	0.000371	0.39	42.98	115.64	0.16
2	8514	Ex_10 yr	5.040	208.68	209.31	209.31	209.50	0.011999	1.99	3.43	11.46	0.89
2	8514	Ex_5 yr	3.000	208.68	209.22	209.17	209.33	0.009073	1.52	2.44	9.76	0.75
2	8514	Ex_2 yr	2.010	208.68	209.17	209.08	209.24	0.006364	1.17	2.00	8.38	0.61
2	8456	Fut_Regional	33.230	208.60	209.93	209.41	209.94	0.000712	0.90	104.86	354.23	0.25
2	8456	Fut_350 yr	29.830	208.60	209.87	209.39	209.88	0.000772	0.91	94.41	322.15	0.26
2	8456	Ex_100 yr	8.700	208.60	209.44	209.19	209.45	0.000758	0.68	34.78	92.76	0.24
2	8456	Ex_50 yr	7.640	208.60	209.40	209.14	209.41	0.000756	0.66	31.59	88.86	0.24
2	8456	Ex_25 yr	6.580	208.60	209.36	209.10	209.37	0.000752	0.63	28.16	84.06	0.24
2	8456	Ex_10 yr	5.040	208.60	209.30	209.06	209.31	0.000797	0.61	22.64	82.39	0.24
2	8456	Ex_5 yr	3.000	208.60	209.18	208.96	209.19	0.000884	0.57	14.01	70.30	0.25
2	8456	Ex_2 yr	2.010	208.60	209.12	208.89	209.13	0.000784	0.49	10.00	57.96	0.23
2	8395	Fut_Regional	33.230	208.50	209.89	209.15	209.90	0.000487	0.76	108.22	234.36	0.21
2	8395	Fut_350 yr	29.830	208.50	209.83	209.11	209.84	0.000486	0.74	100.13	199.65	0.21
2	8395	Ex_100 yr	8.700	208.50	209.42	208.85	209.42	0.000242	0.40	53.01	99.18	0.14
2	8395	Ex_50 yr	7.640	208.50	209.38	208.84	209.39	0.000226	0.38	49.64	97.87	0.13
2	8395	Ex_25 yr	6.580	208.50	209.35	208.82	209.35	0.000212	0.35	45.85	96.55	0.13
2	8395	Ex_10 yr	5.040	208.50	209.28	208.77	209.28	0.000191	0.31	39.64	94.80	0.12
2	8395	Ex_5 yr	3.000	208.50	209.17	208.75	209.17	0.000155	0.25	29.51	87.54	0.10
2	8395	Ex_2 yr	2.010	208.50	209.11	208.71	209.11	0.000095	0.19	24.75	80.77	0.08
2	8337	Fut_Regional	33.230	208.43	209.77	209.21	209.83	0.003223	1.92	36.78	56.91	0.54
2	8337	Fut_350 yr	29.830	208.43	209.72	209.17	209.78	0.003000	1.81	35.20	56.60	0.52
2	8337	Ex_100 yr	8.700	208.43	209.39	208.87	209.40	0.000807	0.76	24.77	54.54	0.25
2	8337	Ex_50 yr	7.640	208.43	209.35	208.86	209.36	0.000710	0.70	23.79	54.34	0.24

HEC-RAS Plan: Prop River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8337	Ex_25 yr	6.580	208.43	209.32	208.83	209.33	0.000616	0.63	22.68	54.12	0.22
2	8337	Ex_10 yr	5.040	208.43	209.26	208.80	209.26	0.000479	0.53	20.79	53.71	0.19
2	8337	Ex_5 yr	3.000	208.43	209.16	208.75	209.16	0.000296	0.38	17.53	52.98	0.15
2	8337	Ex_2 yr	2.010	208.43	209.10	208.72	209.11	0.000181	0.28	15.93	52.56	0.11
2	8313		Culvert									
2	8290	Fut_Regional	33.230	208.40	209.63	209.11	209.70	0.001736	1.34	27.95	70.20	0.39
2	8290	Fut_350 yr	29.830	208.40	209.60	209.08	209.66	0.001533	1.24	27.15	61.82	0.37
2	8290	Ex_100 yr	8.700	208.40	209.36	208.76	209.37	0.000304	0.47	20.70	29.37	0.16
2	8290	Ex_50 yr	7.640	208.40	209.33	208.75	209.34	0.000264	0.43	19.91	29.05	0.15
2	8290	Ex_25 yr	6.580	208.40	209.30	208.72	209.31	0.000223	0.39	19.08	28.72	0.13
2	8290	Ex_10 yr	5.040	208.40	209.24	208.69	209.25	0.000167	0.32	17.66	27.86	0.11
2	8290	Ex_5 yr	3.000	208.40	209.15	208.64	209.15	0.000095	0.22	15.11	25.91	0.08
2	8290	Ex_2 yr	2.010	208.40	209.10	208.61	209.10	0.000055	0.16	13.91	24.83	0.06
2	8271	Fut_Regional	33.230	208.34	209.65	209.31	209.66	0.000353	0.63	76.89	167.46	0.18
2	8271	Fut_350 yr	29.830	208.34	209.61	209.29	209.62	0.000361	0.62	71.13	165.50	0.18
2	8271	Ex_100 yr	8.700	208.34	209.36	209.09	209.36	0.000300	0.48	32.20	135.21	0.16
2	8271	Ex_50 yr	7.640	208.34	209.33	209.07	209.33	0.000296	0.47	28.35	119.40	0.16
2	8271	Ex_25 yr	6.580	208.34	209.29	209.05	209.30	0.000318	0.48	24.81	104.76	0.16
2	8271	Ex_10 yr	5.040	208.34	209.24	208.88	209.24	0.000324	0.46	19.40	89.24	0.16
2	8271	Ex_5 yr	3.000	208.34	209.14	208.73	209.15	0.000322	0.42	12.24	58.12	0.16
2	8271	Ex_2 yr	2.010	208.34	209.09	208.65	209.10	0.000246	0.35	9.72	50.64	0.13
2	8264	Fut_Regional	33.230	208.90	209.65	209.33	209.66	0.000402	0.47	70.94	158.91	0.22
2	8264	Fut_350 yr	29.830	208.90	209.61	209.30	209.62	0.000414	0.46	65.52	156.42	0.22
2	8264	Ex_100 yr	8.700	208.90	209.35	209.17	209.36	0.000480	0.31	28.15	134.47	0.22
2	8264	Ex_50 yr	7.640	208.90	209.32	209.15	209.33	0.000605	0.32	24.07	131.33	0.24
2	8264	Ex_25 yr	6.580	208.90	209.29	209.14	209.30	0.000718	0.33	20.02	117.92	0.25
2	8264	Ex_10 yr	5.040	208.90	209.23	209.11	209.24	0.001141	0.36	13.94	100.66	0.31
2	8264	Ex_5 yr	3.000	208.90	209.12	209.08	209.14	0.003670	0.54	5.54	52.52	0.53
2	8264	Ex_2 yr	2.010	208.90	209.06	209.06	209.09	0.012262	0.74	2.73	40.43	0.90
2	8257	Fut_Regional	33.230	208.38	209.63	209.37	209.65	0.001083	1.06	57.03	119.93	0.31
2	8257	Fut_350 yr	29.830	208.38	209.59	209.35	209.62	0.000974	0.99	53.40	109.77	0.29
2	8257	Ex_100 yr	8.700	208.38	209.35	209.14	209.35	0.000540	0.63	27.84	96.24	0.21
2	8257	Ex_50 yr	7.640	208.38	209.31	209.10	209.32	0.000562	0.62	24.85	94.44	0.21
2	8257	Ex_25 yr	6.580	208.38	209.28	208.93	209.29	0.000582	0.62	21.81	91.50	0.21
2	8257	Ex_10 yr	5.040	208.38	209.22	208.85	209.23	0.000618	0.61	16.89	80.36	0.22
2	8257	Ex_5 yr	3.000	208.38	209.11	208.73	209.13	0.000707	0.59	9.26	58.36	0.23
2	8257	Ex_2 yr	2.010	208.38	209.05	208.66	209.06	0.000597	0.50	5.91	38.38	0.20
2	8224	Fut_Regional	35.790	208.28	209.59	209.34	209.61	0.001243	1.16	60.14	123.48	0.33
2	8224	Fut_350 yr	32.170	208.28	209.55	209.31	209.58	0.001233	1.13	56.24	122.98	0.33
2	8224	Ex_100 yr	12.440	208.28	209.30	209.16	209.33	0.001230	0.97	27.43	90.74	0.32

HEC-RAS Plan: Prop River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8224	Ex_50 yr	10.840	208.28	209.27	209.13	209.29	0.001213	0.94	24.74	84.39	0.31
2	8224	Ex_25 yr	9.260	208.28	209.24	209.11	209.26	0.001176	0.91	22.14	79.28	0.31
2	8224	Ex_10 yr	6.940	208.28	209.18	209.04	209.20	0.001159	0.86	17.82	73.12	0.30
2	8224	Ex_5 yr	3.870	208.28	209.08	208.77	209.10	0.001096	0.77	10.53	60.81	0.29
2	8224	Ex_2 yr	2.550	208.28	209.02	208.67	209.03	0.000844	0.63	7.46	40.91	0.25
2	8191	Fut_Regional	35.790	208.11	209.52	209.35	209.56	0.001866	1.46	51.39	122.99	0.41
2	8191	Fut_350 yr	32.170	208.11	209.48	209.32	209.53	0.001907	1.45	47.30	121.43	0.41
2	8191	Ex_100 yr	12.440	208.11	209.24	209.11	209.28	0.001670	1.17	22.37	71.71	0.37
2	8191	Ex_50 yr	10.840	208.11	209.21	209.04	209.25	0.001571	1.12	20.46	68.95	0.36
2	8191	Ex_25 yr	9.260	208.11	209.18	209.02	209.22	0.001439	1.05	18.61	68.61	0.34
2	8191	Ex_10 yr	6.940	208.11	209.14	208.79	209.16	0.001206	0.93	15.37	63.69	0.31
2	8191	Ex_5 yr	3.870	208.11	209.05	208.61	209.07	0.000683	0.66	10.71	45.73	0.23
2	8191	Ex_2 yr	2.550	208.11	209.00	208.51	209.01	0.000446	0.51	8.49	37.68	0.18
2	8158	Fut_Regional	35.790	208.06	209.46	209.30	209.50	0.001839	1.44	52.41	126.71	0.40
2	8158	Fut_350 yr	32.170	208.06	209.42	209.28	209.46	0.001913	1.44	47.90	125.25	0.41
2	8158	Ex_100 yr	12.440	208.06	209.18	209.01	209.22	0.001747	1.19	22.60	79.57	0.38
2	8158	Ex_50 yr	10.840	208.06	209.16	208.97	209.19	0.001581	1.12	20.92	75.02	0.36
2	8158	Ex_25 yr	9.260	208.06	209.14	208.93	209.17	0.001371	1.03	19.43	73.93	0.33
2	8158	Ex_10 yr	6.940	208.06	209.10	208.85	209.13	0.001071	0.88	16.67	68.72	0.29
2	8158	Ex_5 yr	3.870	208.06	209.04	208.57	209.05	0.000481	0.57	12.98	43.91	0.19
2	8158	Ex_2 yr	2.550	208.06	208.99	208.47	209.00	0.000295	0.43	11.02	40.61	0.15
2	8149	Fut_Regional	35.790	208.77	209.46	209.25	209.48	0.001588	0.62	57.46	167.52	0.34
2	8149	Fut_350 yr	32.170	208.77	209.42	209.23	209.44	0.001877	0.63	51.29	166.51	0.36
2	8149	Ex_100 yr	12.440	208.77	209.11	209.11	209.18	0.016880	1.20	10.35	74.12	1.03
2	8149	Ex_50 yr	10.840	208.77	209.09	209.09	209.16	0.012399	1.16	9.31	63.08	0.97
2	8149	Ex_25 yr	9.260	208.77	209.07	209.07	209.14	0.012803	1.18	7.82	59.37	1.04
2	8149	Ex_10 yr	6.940	208.77	209.04	209.04	209.10	0.010517	1.07	6.51	53.34	0.98
2	8149	Ex_5 yr	3.870	208.77	208.98	208.98	209.03	0.011576	1.05	3.67	29.56	0.95
2	8149	Ex_2 yr	2.550	208.77	208.94	208.94	208.99	0.013590	0.99	2.56	25.15	0.99
2	8143	Fut_Regional	35.790	207.99	209.46	209.13	209.47	0.000330	0.65	105.45	204.48	0.18
2	8143	Fut_350 yr	32.170	207.99	209.42	209.11	209.43	0.000335	0.64	97.93	202.24	0.18
2	8143	Ex_100 yr	12.440	207.99	209.01	208.64	209.05	0.001462	1.05	22.47	88.37	0.35
2	8143	Ex_50 yr	10.840	207.99	208.96	208.60	209.00	0.001462	1.02	19.01	56.51	0.34
2	8143	Ex_25 yr	9.260	207.99	208.91	208.55	208.94	0.001430	0.96	16.41	42.46	0.34
2	8143	Ex_10 yr	6.940	207.99	208.82	208.48	208.85	0.001275	0.85	13.25	29.90	0.31
2	8143	Ex_5 yr	3.870	207.99	208.68	208.35	208.70	0.000859	0.61	9.59	24.68	0.25
2	8143	Ex_2 yr	2.550	207.99	208.62	208.27	208.63	0.000555	0.46	8.16	23.56	0.20
2	8115	Fut_Regional	35.790	207.91	209.26	209.26	209.43	0.004398	2.23	30.96	97.10	0.63
2	8115	Fut_350 yr	32.170	207.91	209.22	209.22	209.39	0.004336	2.17	28.22	92.44	0.62
2	8115	Ex_100 yr	12.440	207.91	208.83	208.59	208.97	0.004413	1.70	8.31	12.69	0.59
2	8115	Ex_50 yr	10.840	207.91	208.82	208.53	208.93	0.003465	1.50	8.21	12.57	0.52

HEC-RAS Plan: Prop River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8115	Ex_25 yr	9.260	207.91	208.80	208.48	208.88	0.002784	1.32	7.92	12.22	0.46
2	8115	Ex_10 yr	6.940	207.91	208.75	208.39	208.80	0.001953	1.06	7.30	11.77	0.38
2	8115	Ex_5 yr	3.870	207.91	208.65	208.26	208.67	0.000957	0.68	6.22	10.90	0.26
2	8115	Ex_2 yr	2.550	207.91	208.61	208.19	208.62	0.000522	0.48	5.75	10.59	0.19
2	8082	Fut_Regional	35.790	207.90	209.19	208.68	209.19	0.000287	0.55	117.32	243.82	0.16
2	8082	Fut_350 yr	32.170	207.90	209.15	208.67	209.16	0.000276	0.53	109.51	242.44	0.15
2	8082	Ex_100 yr	12.440	207.90	208.91	208.54	208.91	0.000181	0.37	59.06	164.35	0.12
2	8082	Ex_50 yr	10.840	207.90	208.88	208.53	208.88	0.000168	0.34	54.52	152.78	0.12
2	8082	Ex_25 yr	9.260	207.90	208.84	208.51	208.84	0.000167	0.33	48.60	144.84	0.11
2	8082	Ex_10 yr	6.940	207.90	208.77	208.47	208.77	0.000169	0.32	38.66	135.94	0.11
2	8082	Ex_5 yr	3.870	207.90	208.65	208.40	208.66	0.000170	0.29	23.76	121.73	0.11
2	8082	Ex_2 yr	2.550	207.90	208.61	208.35	208.61	0.000132	0.24	18.25	108.85	0.10
2	8062	Fut_Regional	35.790	207.82	209.18	208.79	209.19	0.000328	0.60	130.42	253.31	0.17
2	8062	Fut_350 yr	32.170	207.82	209.15	208.77	209.15	0.000319	0.58	122.33	252.64	0.17
2	8062	Ex_100 yr	12.440	207.82	208.90	208.66	208.91	0.000278	0.47	64.79	221.36	0.15
2	8062	Ex_50 yr	10.840	207.82	208.88	208.66	208.88	0.000277	0.46	58.51	214.41	0.15
2	8062	Ex_25 yr	9.260	207.82	208.84	208.64	208.84	0.000307	0.47	50.12	199.38	0.16
2	8062	Ex_10 yr	6.940	207.82	208.76	208.60	208.77	0.000411	0.52	36.24	182.31	0.18
2	8062	Ex_5 yr	3.870	207.82	208.64	208.36	208.65	0.000764	0.63	16.39	127.45	0.24
2	8062	Ex_2 yr	2.550	207.82	208.59	208.24	208.60	0.000663	0.57	10.80	107.61	0.22
2	8056	Fut_Regional	35.790	208.44	209.18	208.73	209.18	0.000104	0.26	135.37	258.67	0.12
2	8056	Fut_350 yr	32.170	208.44	209.15	208.73	209.15	0.000101	0.25	127.18	254.92	0.11
2	8056	Ex_100 yr	12.440	208.44	208.90	208.64	208.91	0.000107	0.18	67.85	230.07	0.11
2	8056	Ex_50 yr	10.840	208.44	208.88	208.64	208.88	0.000112	0.18	61.28	227.30	0.11
2	8056	Ex_25 yr	9.260	208.44	208.84	208.63	208.84	0.000138	0.18	52.11	223.56	0.12
2	8056	Ex_10 yr	6.940	208.44	208.76	208.60	208.76	0.000250	0.19	36.06	214.99	0.15
2	8056	Ex_5 yr	3.870	208.44	208.63	208.59	208.64	0.001918	0.32	11.92	149.29	0.37
2	8056	Ex_2 yr	2.550	208.44	208.57	208.56	208.59	0.012612	0.58	4.38	93.60	0.86
2	8049	Fut_Regional	35.790	207.86	209.18	208.72	209.18	0.000344	0.60	159.91	275.34	0.17
2	8049	Fut_350 yr	32.170	207.86	209.15	208.72	209.15	0.000328	0.58	151.13	272.36	0.17
2	8049	Ex_100 yr	12.440	207.86	208.90	208.63	208.91	0.000273	0.45	86.42	257.93	0.15
2	8049	Ex_50 yr	10.840	207.86	208.87	208.61	208.88	0.000267	0.44	79.07	252.41	0.15
2	8049	Ex_25 yr	9.260	207.86	208.83	208.60	208.84	0.000294	0.45	68.80	247.91	0.15
2	8049	Ex_10 yr	6.940	207.86	208.76	208.56	208.76	0.000383	0.48	50.87	234.48	0.17
2	8049	Ex_5 yr	3.870	207.86	208.63	208.49	208.63	0.000645	0.56	24.00	170.50	0.22
2	8049	Ex_2 yr	2.550	207.86	208.57	208.29	208.58	0.000627	0.52	15.13	127.96	0.21
2	8009	Fut_Regional	35.790	207.72	209.17	208.23	209.18	0.000096	0.35	278.51	342.26	0.09
2	8009	Fut_350 yr	32.170	207.72	209.14	208.22	209.14	0.000088	0.33	267.70	340.14	0.09
2	8009	Ex_100 yr	12.440	207.72	208.90	208.06	208.90	0.000038	0.19	189.67	303.44	0.06
2	8009	Ex_50 yr	10.840	207.72	208.87	208.05	208.87	0.000033	0.17	181.07	297.30	0.05
2	8009	Ex_25 yr	9.260	207.72	208.83	208.02	208.83	0.000029	0.16	169.13	289.07	0.05

HEC-RAS Plan: Prop River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	8009	Ex_10 yr	6.940	207.72	208.76	208.00	208.76	0.000024	0.14	148.86	266.47	0.04
2	8009	Ex_5 yr	3.870	207.72	208.63	207.94	208.63	0.000014	0.10	115.10	254.67	0.03
2	8009	Ex_2 yr	2.550	207.72	208.57	207.91	208.57	0.000009	0.07	100.90	246.88	0.03
2	7982	Fut_Regional	35.790	207.74	209.09	208.97	209.16	0.002958	1.79	46.48	116.57	0.51
2	7982	Fut_350 yr	32.170	207.74	209.07	208.97	209.13	0.002796	1.72	43.34	113.24	0.50
2	7982	Ex_100 yr	12.440	207.74	208.83	208.77	208.89	0.002330	1.36	20.15	88.48	0.44
2	7982	Ex_50 yr	10.840	207.74	208.81	208.74	208.86	0.002214	1.30	17.91	83.04	0.42
2	7982	Ex_25 yr	9.260	207.74	208.76	208.50	208.82	0.002478	1.33	13.89	72.75	0.44
2	7982	Ex_10 yr	6.940	207.74	208.66	208.38	208.75	0.003049	1.37	7.61	54.57	0.48
2	7982	Ex_5 yr	3.870	207.74	208.58	208.21	208.62	0.001475	0.89	4.91	12.17	0.33
2	7982	Ex_2 yr	2.550	207.74	208.55	208.12	208.57	0.000754	0.62	4.60	8.37	0.23
2	7956	Fut_Regional	35.790	207.76	208.91	208.91	209.05	0.006990	2.54	33.24	106.20	0.77
2	7956	Fut_350 yr	32.170	207.76	208.87	208.87	209.02	0.007175	2.52	29.79	90.96	0.78
2	7956	Ex_100 yr	12.440	207.76	208.68	208.68	208.80	0.005291	1.90	14.06	69.93	0.65
2	7956	Ex_50 yr	10.840	207.76	208.62	208.62	208.77	0.006404	1.99	10.13	51.61	0.70
2	7956	Ex_25 yr	9.260	207.76	208.60	208.60	208.73	0.005511	1.81	9.15	42.30	0.65
2	7956	Ex_10 yr	6.940	207.76	208.58	208.36	208.66	0.003470	1.42	8.53	38.75	0.51
2	7956	Ex_5 yr	3.870	207.76	208.55	208.19	208.59	0.001321	0.86	7.53	37.98	0.31
2	7956	Ex_2 yr	2.550	207.76	208.54	208.10	208.55	0.000664	0.60	6.79	37.20	0.22
2	7949	Fut_Regional	35.790	208.40	208.80	208.76	208.89	0.005994	1.32	27.12	97.43	0.80
2	7949	Fut_350 yr	32.170	208.40	208.74	208.74	208.86	0.010249	1.53	21.07	91.01	1.01
2	7949	Ex_100 yr	12.440	208.40	208.61	208.61	208.68	0.011582	1.18	10.50	72.71	1.00
2	7949	Ex_50 yr	10.840	208.40	208.60	208.60	208.66	0.011909	1.14	9.53	71.57	1.00
2	7949	Ex_25 yr	9.260	208.40	208.59	208.59	208.64	0.009049	0.98	9.40	71.43	0.87
2	7949	Ex_10 yr	6.940	208.40	208.56	208.56	208.61	0.013099	1.00	6.97	68.63	1.00
2	7949	Ex_5 yr	3.870	208.40	208.51	208.51	208.56	0.020863	0.96	4.02	59.17	1.18
2	7949	Ex_2 yr	2.550	208.40	208.49	208.49	208.53	0.026003	0.89	2.87	55.90	1.26
2	7937	Fut_Regional	35.790	207.67	208.83	208.39	208.84	0.001106	1.02	90.63	126.76	0.31
2	7937	Fut_350 yr	32.170	207.67	208.77	208.36	208.78	0.001176	1.01	83.03	124.48	0.32
2	7937	Ex_100 yr	12.440	207.67	208.40	208.22	208.42	0.001694	0.91	39.48	112.71	0.35
2	7937	Ex_50 yr	10.840	207.67	208.37	208.21	208.39	0.001636	0.87	36.21	112.07	0.34
2	7937	Ex_25 yr	9.260	207.67	208.34	208.18	208.36	0.001567	0.82	32.80	110.45	0.33
2	7937	Ex_10 yr	6.940	207.67	208.27	208.16	208.28	0.001835	0.82	24.95	106.59	0.35
2	7937	Ex_5 yr	3.870	207.67	208.17	208.05	208.19	0.002081	0.76	14.49	99.97	0.36
2	7937	Ex_2 yr	2.550	207.67	208.11	207.98	208.13	0.002262	0.73	9.00	83.68	0.37
2	7883	Fut_Regional	35.790	207.35	208.65	208.35	208.72	0.003766	1.97	44.83	54.35	0.57
2	7883	Fut_350 yr	32.170	207.35	208.59	208.32	208.66	0.003913	1.94	41.28	54.02	0.58
2	7883	Ex_100 yr	12.440	207.35	208.02	208.02	208.17	0.014613	2.37	11.98	44.15	1.00
2	7883	Ex_50 yr	10.840	207.35	207.97	207.97	208.13	0.016580	2.38	9.89	38.09	1.05
2	7883	Ex_25 yr	9.260	207.35	207.89	207.89	208.08	0.024305	2.56	7.05	28.50	1.23
2	7883	Ex_10 yr	6.940	207.35	207.85	207.85	207.99	0.019720	2.16	5.98	24.58	1.09

HEC-RAS Plan: Prop River: Black Creek Reach: 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
2	7883	Ex_5 yr	3.870	207.35	207.68	207.68	207.81	0.036707	2.03	2.78	13.94	1.36
2	7883	Ex_2 yr	2.550	207.35	207.57	207.57	207.70	0.065575	1.88	1.65	7.70	1.66
2	7854	Fut_Regional	35.790	205.90	208.29	208.29	208.61	0.004477	3.20	31.34	46.99	0.68
2	7854	Fut_350 yr	32.170	205.90	208.22	208.22	208.54	0.004387	3.11	28.35	46.43	0.67
2	7854	Ex_100 yr	12.440	205.90	207.20	207.20	207.68	0.010861	3.22	5.12	6.31	0.95
2	7854	Ex_50 yr	10.840	205.90	207.11	207.11	207.55	0.011256	3.09	4.53	6.03	0.95
2	7854	Ex_25 yr	9.260	205.90	207.01	207.00	207.42	0.011499	2.94	3.97	5.74	0.95
2	7854	Ex_10 yr	6.940	205.90	206.93	206.84	207.21	0.008652	2.41	3.54	5.45	0.81
2	7854	Ex_5 yr	3.870	205.90	206.71	206.59	206.87	0.007450	1.84	2.41	4.61	0.72
2	7854	Ex_2 yr	2.550	205.90	206.59	206.46	206.70	0.006379	1.50	1.88	4.20	0.64
2	7807	Fut_Regional	35.790	205.65	208.13	207.15	208.16	0.000705	1.27	81.44	77.31	0.26
2	7807	Fut_350 yr	32.170	205.65	208.12	207.07	208.14	0.000591	1.16	80.38	77.26	0.24
2	7807	Ex_100 yr	12.440	205.65	206.53	206.53	206.83	0.015538	2.82	7.13	13.31	1.03
2	7807	Ex_50 yr	10.840	205.65	206.47	206.47	206.75	0.015875	2.70	6.37	12.67	1.03
2	7807	Ex_25 yr	9.260	205.65	206.41	206.41	206.67	0.016215	2.57	5.61	12.05	1.02
2	7807	Ex_10 yr	6.940	205.65	206.25	206.25	206.52	0.023508	2.58	3.90	9.64	1.18
2	7807	Ex_5 yr	3.870	205.65	206.13	206.13	206.29	0.019251	2.00	2.73	8.50	1.03
2	7807	Ex_2 yr	2.550	205.65	206.03	206.03	206.17	0.020532	1.80	1.96	7.62	1.04
2	7771	Fut_Regional	35.790	205.11	208.15	205.78	208.15	0.000038	0.37	190.52	74.23	0.07
2	7771	Fut_350 yr	32.170	205.11	208.13	205.75	208.13	0.000032	0.33	189.31	74.21	0.06
2	7771	Ex_100 yr	12.440	205.11	206.23	205.56	206.24	0.000237	0.46	54.85	63.38	0.14
2	7771	Ex_50 yr	10.840	205.11	205.78	205.54	205.80	0.001573	0.83	27.09	60.00	0.33
2	7771	Ex_25 yr	9.260	205.11	205.67	205.52	205.69	0.002723	0.95	20.22	59.06	0.42
2	7771	Ex_10 yr	6.940	205.11	205.53	205.50	205.58	0.006195	1.17	12.27	58.07	0.61
2	7771	Ex_5 yr	3.870	205.11	205.42	205.42	205.48	0.010321	1.20	6.03	56.92	0.74
2	7771	Ex_2 yr	2.550	205.11	205.38	205.38	205.44	0.010642	1.09	3.63	56.27	0.73