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## Kizell Lands – Fernbank 5618 Hazeldean Road

### Concept Servicing Report Assessment of Adequacy of Public Services and Stormwater Site Management

**CONCEPT SERVICING REPORT  
ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES  
AND STORMWATER SITE MANAGEMENT**

**KIZELL LANDS - FERNBANK  
5618 HAZELDEAN ROAD**

Prepared By:

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February 23, 2018  
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Ref: R-2016-159

December 13, 2019

City of Ottawa  
Planning and Growth Management Department  
110 Laurier Avenue West, 4<sup>th</sup> Floor  
Ottawa, ON K1P 1J1

**Attention: Ms. Kathy Rygus**

Dear Ms. Rygus:

**Reference: Concept Servicing Report  
Kizell Lands - Fernbank  
Our File No.: 108195**

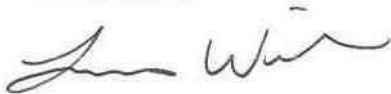
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Enclosed are three (3) copies of the Concept Servicing Report for the Kizell Lands within the Fernbank Community. The report addresses development servicing for the subject property.

If you have any questions or comments, please do not hesitate to contact us.

Sincerely,

**NOVATECH**



Lucas Wilson, P.Eng.  
Project Coordinator

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## **Appendices**

Appendix A: Sewer Design Sheets and Water Modelling

Appendix B: Stormwater Documentation

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## 1.0 INTRODUCTION

### 1.1 Background

The Kizell Lands are located within the Fernbank Community between the Abbott Street extension and Hazeldean Road, east of Iber Road. **Figure 1-1** shows the location of the Fernbank Community and the Kizell Lands. The lands will be developed with a mix of residential products (low, medium and high-density), accompanied by commercial, institutional and recreational land uses.



**Figure 1-1: Key Plan**

The proposed subdivision is approximately 87.0ha and will be bordered by existing industrial lands to the west (Iber Road), the Trans-Canada Trail to the south, Bradley Commons Subdivision to the east (Richcraft), and commercial lands to the north (Hazeldean Road).

The subdivision will be comprised of low, medium, and high-density residential dwellings with a planned total of 288 singles and 475 townhouses. Approximately 1,038 units are proposed within the medium-density blocks (15.99ha), that will be located adjacent the proposed extension to Robert Grant Avenue. An additional 360 apartment units (648 population) within the high-density blocks (4.40ha) will be located in proximity to the Hazeldean Road. Mixed-Use blocks (4.09ha) are proposed along the existing Hazeldean Road and proposed Robert Grant

Avenue. A school (3.23ha) will front onto the proposed minor collector along the east boundary of the site. A Park n' Ride facility (2.27ha) is proposed at the corner of the proposed Robert Grant Avenue and Hazeldean Road. The remainder of the site is comprised of Parkland (3.28ha), Open Space (1.19ha), Hydro Corridor (2.69ha), and a SWM Facility (4.41ha). The proposed Land Use Plan is shown in **Figure 2**.

This Concept Servicing Report provides information on the considerations and approach by which Novatech has analyzed the existing site information for the Kizell Lands, and details how the development lands can be adequately serviced while meeting the City requirements and all other pertinent regulations. This study builds upon works completed for the Fernbank Community Design Plan [1] prepared by Walker, Nott, Dragicevic Associates Limited, the Fernbank Master Servicing Study [2] prepared by Novatech, and the Fernbank Environmental Management Plan also prepared by Novatech [3].

There is ongoing coordination with the landowners to the east (Richcraft, Metric and Mattamy). Kizell will cost share local infrastructure with Richcraft and Mattamy as part of a private agreement; this may include sewer oversizing, stormwater ponds, roadways, etc.

Major landowners within the Fernbank Community have executed a cost sharing agreement that deals with construction of Robert Grant Avenue, Abbott Street extension, the Fernbank Trunk, and Parkland development; and Kizell is a party to this agreement.

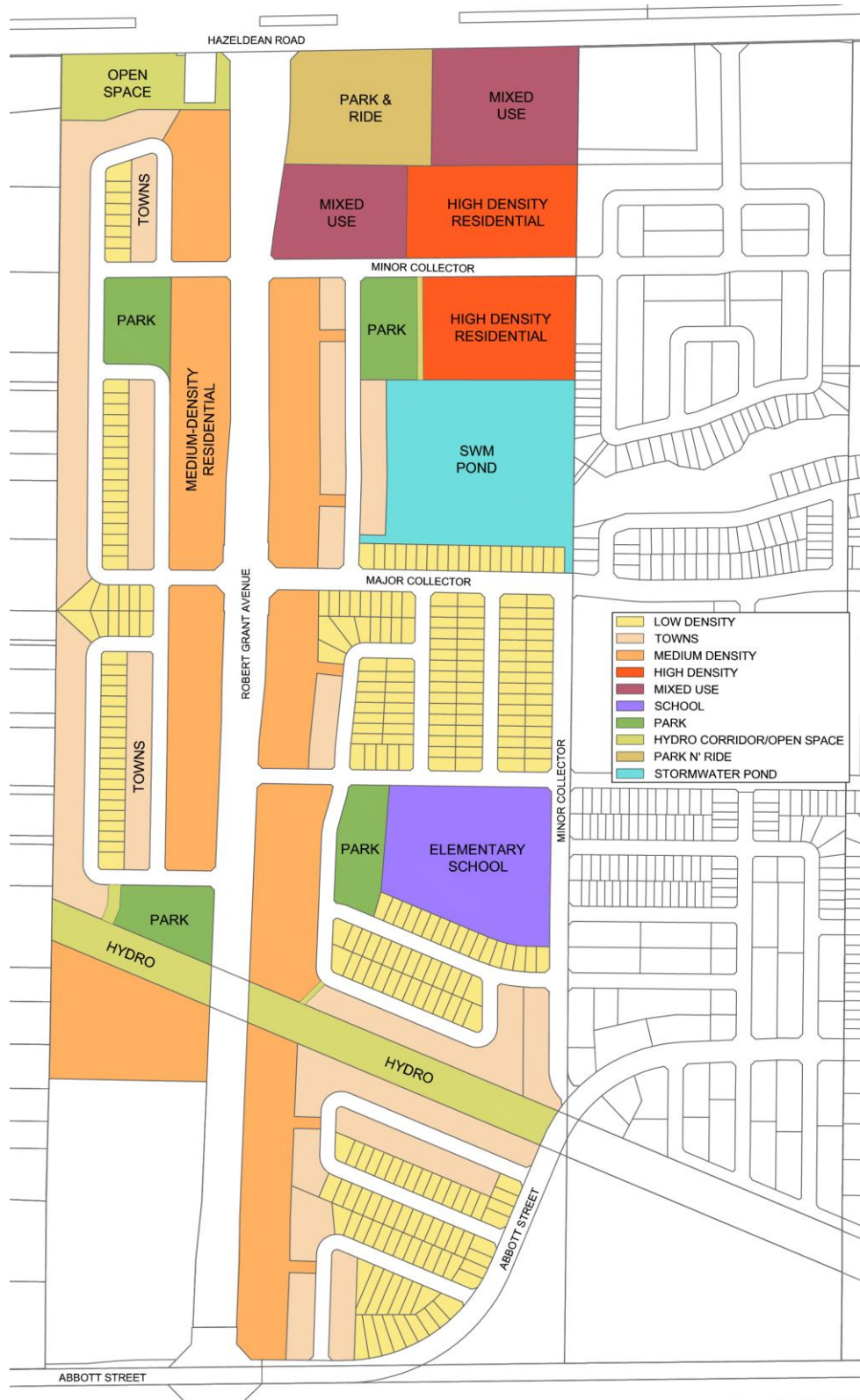


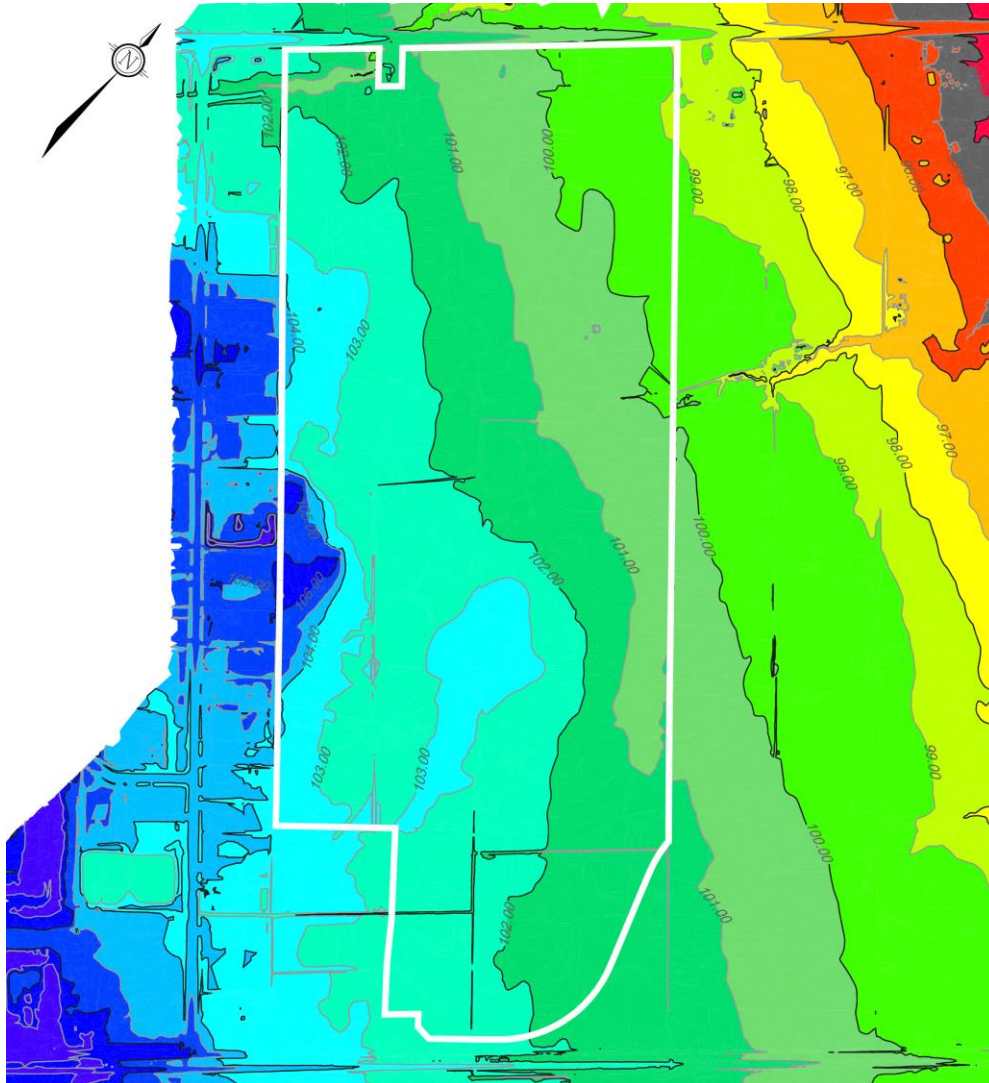
Figure 1-2: Land Use Plan



## 2.0 TOPOGRAPHY AND GRADING

### 2.1 Existing Conditions

Based on the topographical survey shown below in **Figure 2-1**, the site generally slopes to the northeast at approximately 0.6%. Steeper grades of up to 15% are locally found near the high-point along the west property boundary. The maximum grade of approximately 107.0 metres on the west property boundary, and a minimum elevation of approximately 99.0 metres in the northeast corner give a total elevation differential of approximately 8.0 metres across the entire site.

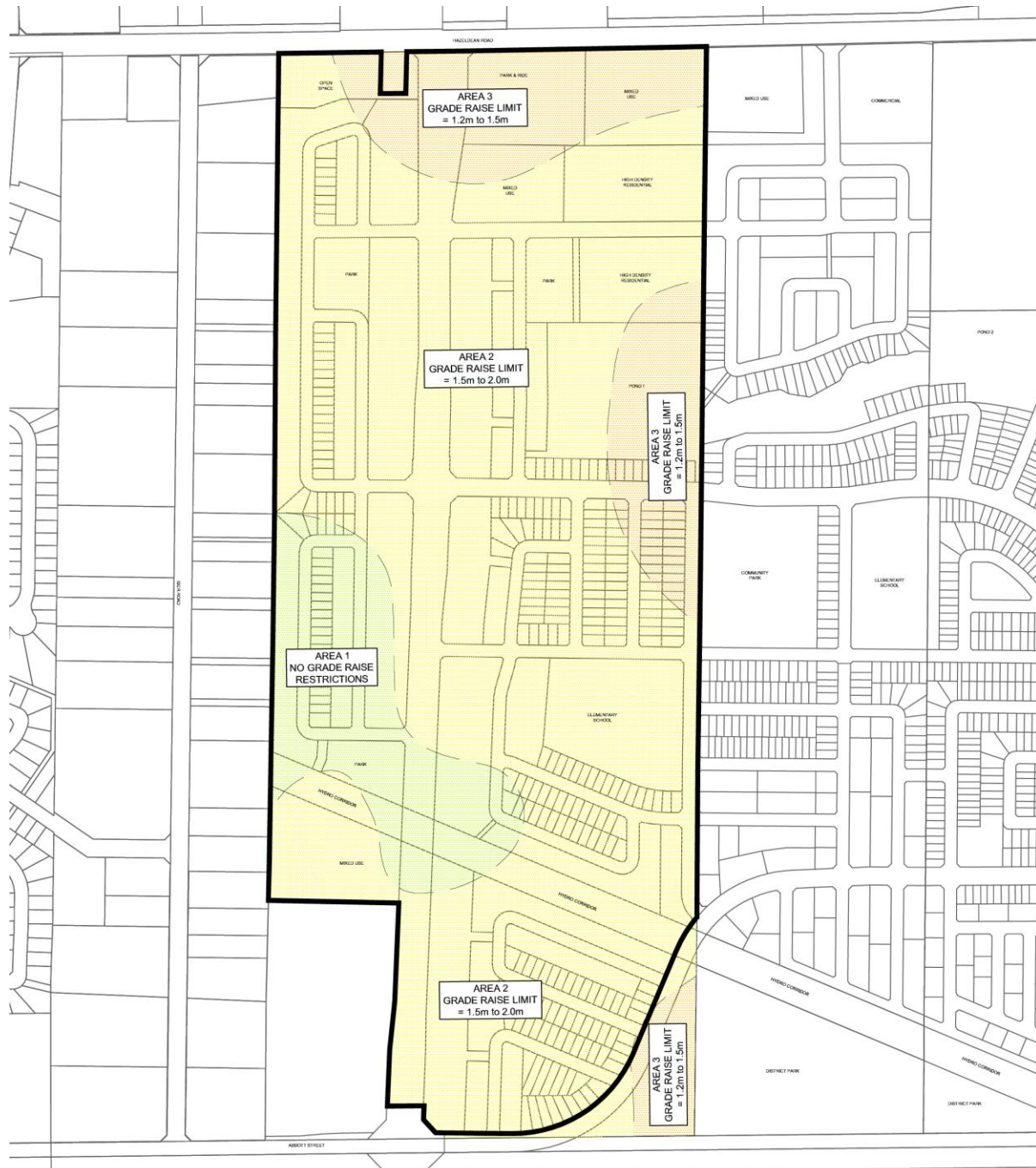


**Figure 2-1: Existing Topography**

Geotechnical investigations were carried out by Houle Chevrier Engineering [4], and bedrock was encountered in a localized area along the west part of the site, characterized by exposed bedrock and/or bedrock at shallow depth.

## 2.2 Proposed Conditions

The proposed grading for the Kizell Lands will closely follow the Grading Plan contained in the Fernbank Master Servicing Study [1]. Grade raise constraints are shown in **Figure 2-2** and are described as Area 1, 2, and 3. There is no grade raise restrictions within Area 1. The depth of fill material near structures and in garages should be limited to within 1.5 to 2.0 metres for Area 2, and 1.2 to 1.5 metres for Area 3. Additional geotechnical investigations may refine the grade raise limits and boundaries.



**Figure 2-2: Grade Raise Constraints**

Existing elevations will be met along Hazeldean Road, the west property boundary (Iber Road), and Abbott Street. Grading will be coordinated with the proposed development to the east (Richcraft). A high-level grading plan is shown in **Appendix B**.

### 2.3 Offsite Requirements

Grading will be coordinated with adjacent land owners (Richcraft) to ensure compliance with grade raise restrictions and proper functioning of the major system flow paths.



## **2.4 Changes from Fernbank Community Design Plan**

No significant changes are anticipated to the Grading Plan, as outlined in the approved Fernbank Master Servicing Study.

## **3.0 ROADWAYS**

### **3.1 Existing Conditions**

Currently there is roadway access to the Kizell Lands via Robert Grant Avenue and Hazeldean Road. The 2013 City of Ottawa Transportation Master Plan [6] classifies Robert Grant Avenue as a 2-lane Arterial Road, while Hazeldean Road is classified therein as a 4-lane Arterial Road.

### **3.2 Proposed Conditions**

The Fernbank Transportation Master Plan [6] prepared by Delcan, specifies that a North-South Arterial Road is required to serve the Fernbank Community. The existing Arterial Road (Robert Grant Avenue) is to be extended through the development from Abbott Street to Hazeldean Road.

Robert Grant Avenue has been constructed as a 2-lane arterial road between Fernbank Road and Abbott Street, and will continue with the same configuration to Hazeldean Road. It is planned that Robert Grant Avenue will be upgraded to include two vehicle-lanes in both directions with transit lanes in the centre median.

Two east-west major collectors (26m ROW), one planned and one existing, that will connect to Robert Grant Avenue; these include the Abbott Street Extension (existing) and Cranesbill Road (planned). The major collectors generally follow the approved alignment from the Fernbank Transportation Master Plan.

There are two minor collectors (22m ROW) planned. The first connects the two major collectors along a north-south axis near the east property line, while the second connects Robert Grant Avenue and Hazeldean Road through the Richcraft property.

All other roads to be constructed are either local roads (18m ROW) or private. Typical cross-sections are contained within the Fernbank Community Design Plan [1] and the City of Ottawa Standard Detail Drawings.

Refer to the Transportation Study [7], prepared by Novatech for more detailed analysis of the proposed road network.

### **3.3 Offsite Requirements**

Offsite roadwork may be required at the intersection of Robert Grant and Hazeldean Road.

### **3.4 Changes from Fernbank Community Design Plan**

The roadway network generally follows the Fernbank Transportation Master Plan [6], except for a portion of the north-south minor collector that was omitted east of Pond 1.

## 4.0 SANITARY SEWERS

### 4.1 Existing Conditions

Currently, there is no sanitary infrastructure within the Kizell Lands.

The Stittsville Trunk runs parallel to the Trans Canada Trail south of the Kizell Lands, and is a 750mm diameter trunk sewer that flows easterly to the Hazeldean Pump Station.

The Fernbank Trunk is located south of the Kizell Lands within the Hydro One easement corridor and flows easterly to the Hazeldean Pump Station.

The City of Ottawa recently completed an upgrade to the Hazeldean Pump Station to improve system capacity, reliability, and emergency overflow conditions. The Fernbank Trunk is now connected to the Hazeldean Pump Station.

### 4.2 Proposed Conditions

Unit and population densities are taken from the Fernbank Community Design Plan [1] and the 5618 Hazeldean Road Planning Rationale & Integrated Environmental Review Statement [12]. All other design parameters are specified in the City of Ottawa Sewer Design Guidelines [8]. The peak design flow parameters in **Table 4.1** have been used in the sewer capacity analysis.

Most of the sanitary flow from the Kizell Lands will connect into the proposed Stittsville Diversion Trunk, located within Robert Grant Avenue, and will ultimately outlet to the Kanata West Pump Station. The remainder of the sanitary flow is proposed to connect into downstream sewer systems at three different nodes through the adjacent Richcraft Lands. Flow from these three nodes is routed to the Hazeldean Pump Station via the existing Fernbank Trunk. The trunk sewer layout is shown on the Sanitary Drainage Area Plan located in **Appendix B**.

The Stittsville Diversion Trunk is expected to convey approximately 557.1L/s at node SA114 near Hazeldean Road. This is comprised of 493.4L/s diverted from the Stittsville Trunk, and 63.7L/s generated from within the Kizell Lands (approx. 65.3ha).

Three localized areas will drain easterly through the Richcraft Lands to the Hazeldean Pump Station. These are identified as Outlets 2-4 on the Sanitary Drainage Area Plan and have peak design flows of 15.9L/s, 1.5L/s and 15.6L/s respectively. The sanitary sewer design is being coordinated with the adjacent landowners.

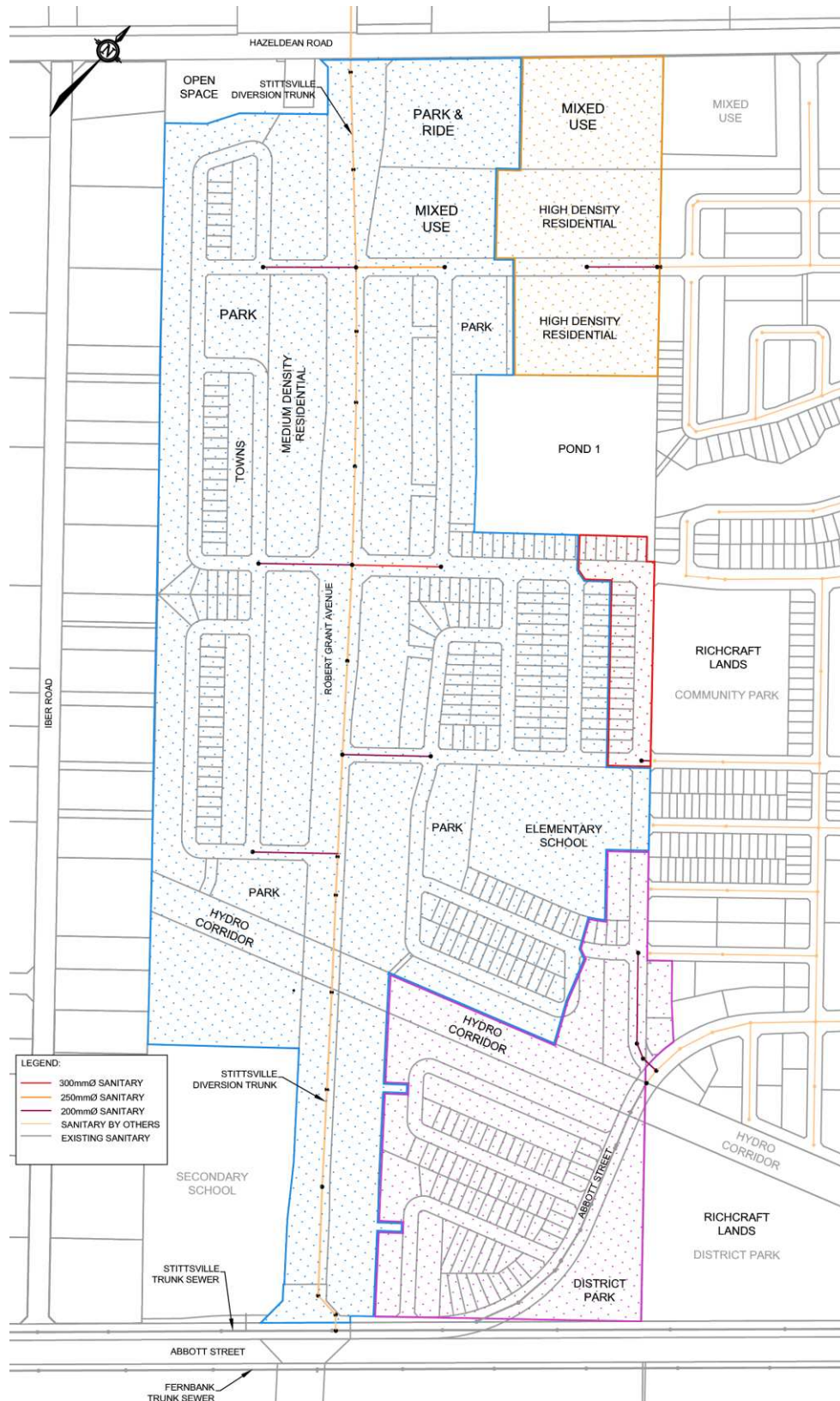


Figure 4-1: Sanitary Sewer Network

**Table 4.1: Sanitary Sewer Design Parameters**

Parameter	Design Parameter
Single Unit Population	3.4 people/unit
Townhome Unit Population	2.7 people/unit
Medium Density/High Density/Mixed Use Unit Population	1.8 people/unit
Medium Density Residential Unit Density	65 Units/net ha
High Density Residential Unit Density	180 Units (Block 318), 180 Units (Block 319)
Mixed-Use Residential Unit Density	160 Units (Block 316), 300 Units (Block 317)
Park and Ride Unit Density	300 Units
Residential Flow Rate, Average Daily	280 L/cap/day
Residential Peaking Factor	Harmon Equation (min=2.0, max=4.0)
Commercial & Institutional Flow Rate	28,000 L/day/ha
ICI Peaking Factor	1.5
Infiltration Rate	0.33 L/s/ha
Minimum Pipe Size	250 mm (ICI), 200mm (Res)
Minimum Velocity	0.6 m/s
Maximum Velocity	3.0 m/s

### 4.3 Offsite Requirements

The Stittsville Diversion Trunk is a city-initiated wastewater project that will route flow from the Stittsville Trunk to the Kanata West Pump Station. The planned sewer alignment runs through the Kizell Lands within the Robert Grant Avenue ROW to Hazeldean Road, then continues through the Kanata West Lands to the Kanata West Pump Station. The Stittsville Diversion Trunk and KWPS must be operational before tributary lands owned by Kizell can be developed.

### 4.4 Changes from Fernbank Community Design Plan

The Stittsville Diversion Trunk is new infrastructure that was not contemplated at the time of the Fernbank CDP.

## 5.0 WATER DISTRIBUTION

### 5.1 Existing Conditions

Figure 5.1 from the Fernbank Environmental Management Plan [3] identifies potential well locations within the Fernbank Community. All water wells shall be properly abandoned in accordance with the Ontario Water Resources Act, R.R.O. 1990, Regulation 903, as amended.

A 400mm watermain is located south of the Kizell Lands in an unopened road allowance. To the north, 600mm and 900mm watermains are located in Hazeldean Road, that connect to the Glen Cairn Water Reservoir and Pump Station. A 300mm watermain is located in Iber Road,

and connects the above infrastructure. The existing plant is shown on the Water Distribution Plan included in **Appendix B**.

## 5.2 Proposed Conditions

A planning-level assessment of the water distribution system was completed in Section 8 of the Fernbank Master Servicing Study [2].

The Kizell Lands will be connected to the existing watermain network by way of separate feed points. Two connections are proposed to the existing 400mm diameter main south of the site; one within the intersection of Robert Grant Avenue and Abbott Street, and the other approximately 230m east within the planned extension of Abbott Street. A third watermain connection is proposed to the 900mm diameter watermain within Hazeldean Road at the Robert Grant Avenue intersection. Additional connections will be made through the neighboring lands to the east (Richcraft) that in turn connect to the existing 900mm main in Hazeldean Road, the existing 400mm main in Terry Fox Drive and the existing 400mm main adjacent the Trans Canada Trail. These watermain connections are being coordinated with the adjacent landowners.

In accordance with the Fernbank Master Servicing Study [2], a 300mm watermain is proposed to link the existing off-site distribution system from Hazeldean Road to Abbott Street, and connect with the planned development infrastructure to the east. These larger 300mm pipes serve as the primary conduit to supply the subdivision and ensure adequate conveyance of domestic water and fire protection. A layout for the 300mm piping system is presented on the Water Distribution Plan, and is attached in **Appendix C**.

We have not shown the network of smaller 150mm and 200mm watermain that is required to supply individual lots and/or blocks. This system of local water infrastructure will be established at detail design of the subdivision and serves to reinforce the overall supply (network looping).

The watermain boundary conditions below were obtained from the City of Ottawa and has been included in **Appendix A**:

### Boundary Condition Hazeldean Connection (900mm feedermain):

Max Day + FF of 167 L/s = 155.6m  
Max Day + FF of 217 L/s = 155.6m  
Minimum Pressure during Peak Hour = 155.5m  
Max Pressure Check = 162.4m

### Boundary Condition Abbott Connection (400mm watermain):

Max Day + FF of 167 L/s = 154.5m  
Max Day + FF of 217 L/s = 153.6m  
Minimum Pressure during Peak Hour = 154.5m  
Max Pressure Check = 162.1m

City of Ottawa watermain design criteria, Fernbank Community Design Parameters and Planning Rationale parameters are outlined in **Table 5.1**.



Figure 5-1: Watermain Layout

**Table 5.1: Watermain Design Criteria**

Design Parameter	Design Criteria
Single Family Home Population	3.4 people/unit
Townhouse Population	2.7 people/unit
Medium Density/High Density/Mixed Use Population	1.8 people/unit
Medium Residential Density	65 units/ha
High Density Residential Unit Density	180 Units (Block 318), 180 Units (Block 319)
Mixed-Use Residential Unit Density	160 Units (Block 316), 300 Units (Block 317)
Park and Ride Unit Density	300 Units
Residential Demand	280 L/c/d
Institutional/Commercial Demand	28,000 L/gross ha/day
Maximum Day Demand	2.5 x Average Day
Peak Hour Demand	2.2 x Maximum Day
Institutional/Commercial Max Day	1.5 x Average Day
Institutional/Commercial Peak Hour	1.8 x Maximum Day
Fire Demand (Residential Areas)	167 L/s
Fire Demand (Institutional and Commercial Areas)	217 L/s
Maximum Pressure	690 kPa (100psi) unoccupied areas
Maximum Pressure	552 kPa (80psi) occupied areas outside of ROW
Minimum Pressure	275 kPa (40 psi) except during fire flow
Minimum Pressure (Fire)	140 kPa (20 psi)

In accordance with the City of Ottawa's Technical Bulletin, a fire flow of 167L/s was used for all residential dwelling types, while a fire flow of 217L/s was used for the industrial, commercial, and institutional areas as referenced in the Fernbank Master Servicing Study [2].

The proposed watermain was modeled using EPANET 2. The EPANET model layout is shown in drawing 108195-WTR.

A summary of the model results is shown below in **Table 5.2**, **Table 5.3** and **Table 5.4**. Full model results are included in **Appendix A**.

**Table 5.2: Summary of Hydraulic Model Results - Maximum Day + Fire Flow**

Operating Condition	Minimum Pressure
223.35 L/s at N6	427.62 kPa (N6)

**Table 5.3: Summary of Hydraulic Model Results - Peak Hour Demand**

Operating Condition	Maximum Pressure	Minimum Pressure
121.13 L/s through system	577.02 (N9)	496.78 kPa (N1)

**Table 5.4: Summary of Hydraulic Model Results – Maximum Pressure Check**

Operating Condition	Maximum Pressure	Minimum Pressure
24.203 L/s through system	644.71 kPa (N9)	572.32 kPa (N1)

Water modelling shows the planned network will meet minimum system pressure requirements during both the fire flow and peak hour design conditions. The maximum pressure check shows modelled system pressures are above 552 kPa (80 psi) throughout the subdivision, therefore pressure reducing valves will be required on all dwellings.

### 5.3 Offsite Requirements

As specified in the Fernbank Master Servicing Study [2], additional firm pumping capacity at the Glen Cairn Pumping Station and one of the Zone 2W pumping stations might be required to meet additional demands associated with the Fernbank Community. The timing of these upgrades is related to the overall rate of growth in the entire Zone 3W (Kanata and Stittsville area). Growth within the Abbott-Fernbank Lands plays only a small part in determining when these upgrades are required; the City of Ottawa will determine when these water supply upgrades occur. No direct costs associated with the offsite upgrades are attributable to the developer.

To provide watermain looping to the site, it will be necessary for the adjacent Richcraft Lands to the east to be constructed ahead of the Kizell development. The Richcraft development is proceeding in advance of the Kizell Lands and will provide valve closures on the watermains at the property line for future connection and extension of the distribution system.

### 5.4 Changes from Fernbank Community Design Plan

Changes in the proposed water system are defined as *minor* on page 83 of the Fernbank Master Servicing Study [1] and do not require an amendment to the Environmental Assessment since the results do not appreciably change the expected net impacts associated with the project. These changes include:

- Two connections to the existing 400mm diameter watermain running east/west on the south side of the Kizell Lands will be made at the intersection of Robert Grant Avenue and Abbott Street and the other connection 230 metres east. The water distribution links are required for reasons of supply and redundancy; however, there is flexibility in the precise location of the link.



- The 300mm diameter trunk system has been slightly realigned to follow the proposed road network.

## 6.0 STORMWATER MANAGEMENT

### 6.1 Existing Drainage Conditions

The Kizell Lands are located at the headwaters of the Carp River West Tributary (part of the Carp River Watershed). There is currently no storm sewer infrastructure servicing the Kizell Lands. Site drainage primarily occurs via overland flow to agricultural ditches. **Figure 6-1** shows the location of the Kizell Lands and the existing watershed boundaries.

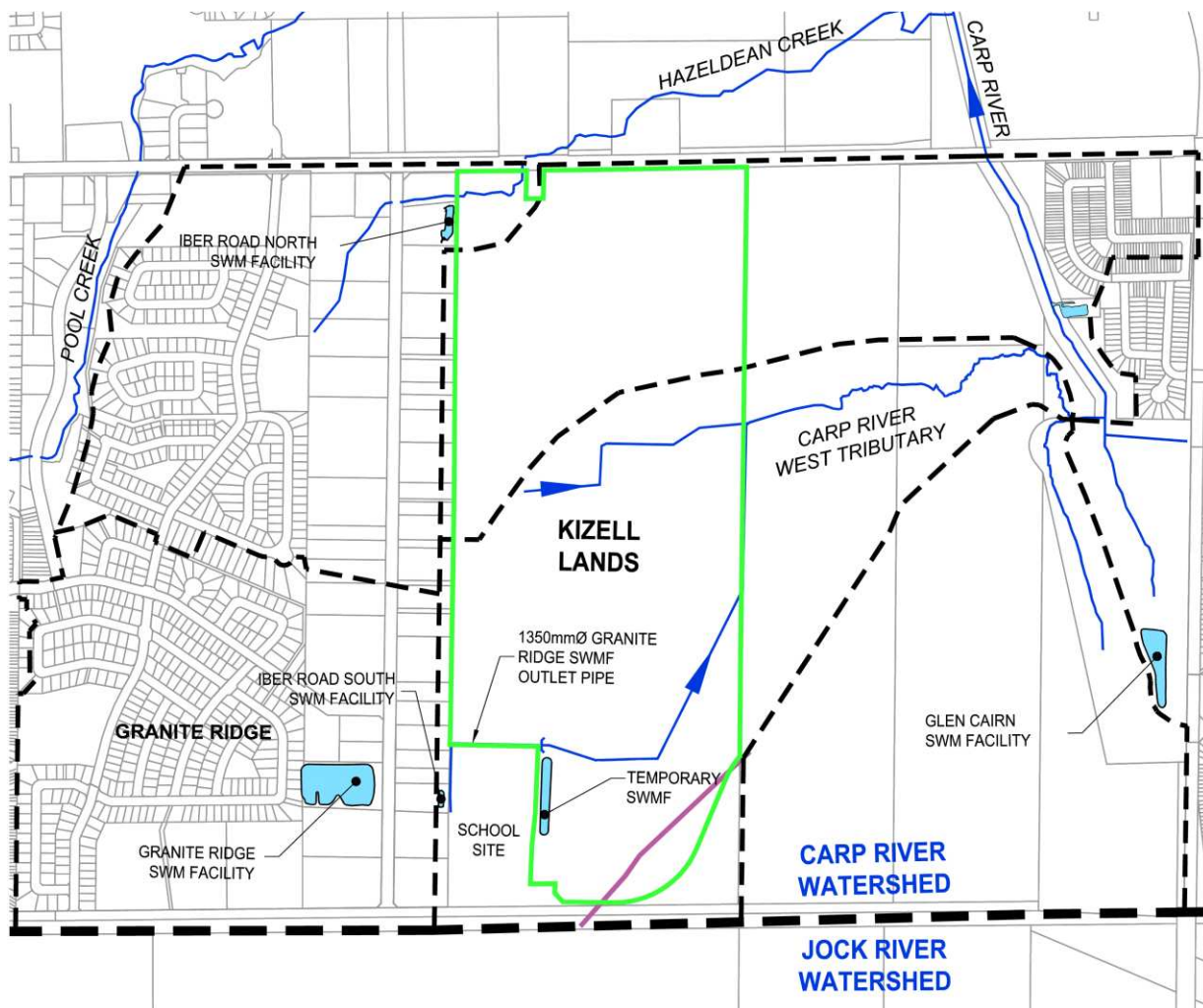


Figure 6-1: Existing Watershed Boundaries

#### 6.1.1 Kizell Lands

Under existing conditions, storm runoff from the southern portion of the Kizell Lands is conveyed by overland flow and open channels to the Carp River West Tributary, which flows east to a confluence with the Carp River just north of the Glen Cairn SWM Facility. As specified in the

Fernbank Environmental Management Plan, the Carp River West Tributary has been classified as a tolerant warm water fish community that provides permanent fish habitat.

The Kizell Lands north of the Carp River West Tributary generally slope to the east, towards the Carp River with no defined watercourse.

The Northwest corner of the site is tributary to Hazeldean Creek, which flows east to a confluence with the Carp River approximately 250m north of Hazeldean Road.

Additional information on the existing conditions can be found in the Fernbank Environmental Management Plan [3].

### **6.1.2 Granite Ridge SWM Facility**

The Granite Ridge SWM Facility is located on the west side of Iber Road in Stittsville. This facility provides water quality and quantity control for the Granite Ridge Subdivision, which is south west of the proposed Kizell Lands development.

Under existing conditions, outflows from the Granite Ridge SWM facility are directed through a culvert under Iber Road into an open channel, and into a 1350mm storm sewer running along the north side of the high school site on Abbott Street. This storm sewer discharges into a temporary outlet ditch at the northeast corner of the high school site, which flows northeast to a confluence with the Carp River West Tributary at the eastern limit of the Kizell Lands.

### **6.1.3 Iber Road**

Properties within the Iber Road Business Park are expected to provide on-site water quantity control, matching peak flows to pre-development levels (Simmering & Associates, February 2000). A summary of the required quantity controls outlined in the MOECC Environmental Compliance Approvals for several of the properties on Iber Road have been provided as a part of the Technical Memo included in **Appendix B**. Runoff from the Iber Road Business park is directed to a drainage ditch along the northern boundary of the Business Park and connects to the Granite Ridge SWM facility outlet ditch just east of Iber Road.

### **6.1.4 High School Site**

Drainage works were completed in support of a new high school development that involved redirecting outflow from the Granite Ridge SWM Facility around the school site. A temporary SWM facility was constructed to provide water quality and quantity control. Updates to the school site, including the construction of a permanent sports dome have recently been completed, along with updates to the on-site stormwater management. Once the Kizell Lands are developed, the temporary pond will be decommissioned and storm runoff from the high school site will be directed to the proposed storm sewers servicing the Kizell lands, with water quality treatment provided by the proposed SWM Facility (Fernbank Pond 1). Quantity control is to be provided on-site for peak flows greater than the 1:5-year post-development peak flows.

## **6.2 Stormwater Management Criteria**

The Kizell Lands are located within the Carp River Subwatershed, and are tributary to the Carp River, which falls under the jurisdiction of the Mississippi Valley Conservation Authority (MVCA). The following stormwater management criteria have been developed based on the criteria in the

Fernbank EMP, and requirements of the MVCA and the City of Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletin PIEDTB-2016-01 (September 2016).

### **6.2.1 Minor System (Storm Sewers)**

- Storm sewers are to be designed using the Rational Method as follows:
  - 1:2 year return period for local streets;
  - 1:5 year return period for collector roads;
  - 1:10 year return period for arterial roads;
- Inlet control devices (ICDs) are to be installed in road and rearyard catchbasins to control inflows to the storm sewers;
- Ensure that the 100-year hydraulic grade line in the storm sewer is at least 0.3 m below the underside of footing (USF) elevations for the proposed development.

### **6.2.2 Major System (Overland Flow)**

- Overland flows are to be confined within the right-of-way and/or defined drainage easements for all storms up to and including the 1:100 year event;
- Maximum depth of flow (static + dynamic) on local and collector streets shall not exceed 0.35 m during the 100-year event. The depth of flow may extend adjacent to the right-of-way provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event;
- Maximum depth of flow on arterial roads shall not overtop the barrier curb and shall leave one lane free of water in each direction.
- Runoff that exceeds the available storage in the right-of-way will be conveyed overland along defined major system flow routes towards the proposed major system outlet to the SWM Facility. There must be at least 15cm of vertical clearance between the spill elevation on the street and the ground elevation at the building envelope that is in the proximity of the flow route or ponding area;
- Although rear yard storage cannot be accounted for in computer modelling, the effect of flow attenuation can be accounted for by assuming a constant slope ditch/swale draining to the street with the following geometry:
  - A minimum slope of 1.5%;
  - A depth ranging between 150mm (min) and 600mm (max); and
  - Maximum side slopes of 3H:1V.
- The product of the 100-year flow depth (m) on street and flow velocity (m/s) shall not exceed 0.60;

### **6.2.3 Water Quality & Quantity Control**

- Provide a *Normal* (70% TSS removal) level of quality control;
- Implement lot level and conveyance Best Management Practices to promote infiltration and treatment of storm runoff;

- Post-development peak flows are not to exceed pre-development peak flows for all storms up to and including the 100-year event.

### **6.3 Storm Servicing Design**

Storm servicing for the subject development will be provided using a dual drainage system: Runoff from frequent events will be conveyed by storm sewers (minor system), while flows from large storm events which exceed the capacity of the minor system will be conveyed overland along defined overland flow routes (major system).

The minor system servicing the Kizell lands is divided into two main trunks with a north and a south inlet to the stormwater management facility. The proposed SWM facility (Pond 1) will serve as the outlet for both the major and minor systems.

#### **6.3.1 Minor System Design**

The storm sewers comprising the minor system have been designed in accordance with Technical Bulletin PIEDTB-2016-01 (September 2016). The criteria used to design the storm sewers are summarized in

**Design** Sheets are in **Appendix A**. The Storm Drainage Area Plan is in **Appendix C**.

Table 6.1 and **Table 6.2**.

Design Sheets are in **Appendix A**. The Storm Drainage Area Plan is in **Appendix C**.

**Table 6.1: Storm Sewer Design Parameters**

Parameter	Design Criteria
Local Roads	2 Year Return Period
Collector Roads	5 Year Return Period
Arterial Road	10 Year Return Period
Storm Sewer Design	Rational Method / PCSWMM
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration ( $T_c$ )	15 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	300 mm

**Table 6.2: Runoff Coefficients**

Land Use	Runoff Coefficient
Mixed Use	0.80
Park N' Ride	0.80
Arterial Roads	0.90
Schools	0.60
Medium Density / High Density Residential	0.80
Low Density Residential	0.65
Parks	0.40
Hydro Corridor	0.20

### Initial Time of Concentration

For conceptual design purposes, the subcatchment areas have been discretized as semi-lumped areas and do not represent each individual sewer section. A 15-minute initial time of concentration has been used to represent the additional travel time through the sewers in the uppermost reaches of the catchments.

At the detailed design stage, the catchment areas will be refined to reflect the areas tributary to each inlet of the sewer system, and the storm sewer design sheets will use an initial time of concentration of 10 minutes.

### Inlet Control Devices

Inlet control devices (ICDs) are to be installed in all catchbasins to limit inflows to the minor system capacity (1:2yr local / 1:5yr collector / 1:10yr arterial). ICDs sizes and catchbasin locations will be determined during the detailed design stage.



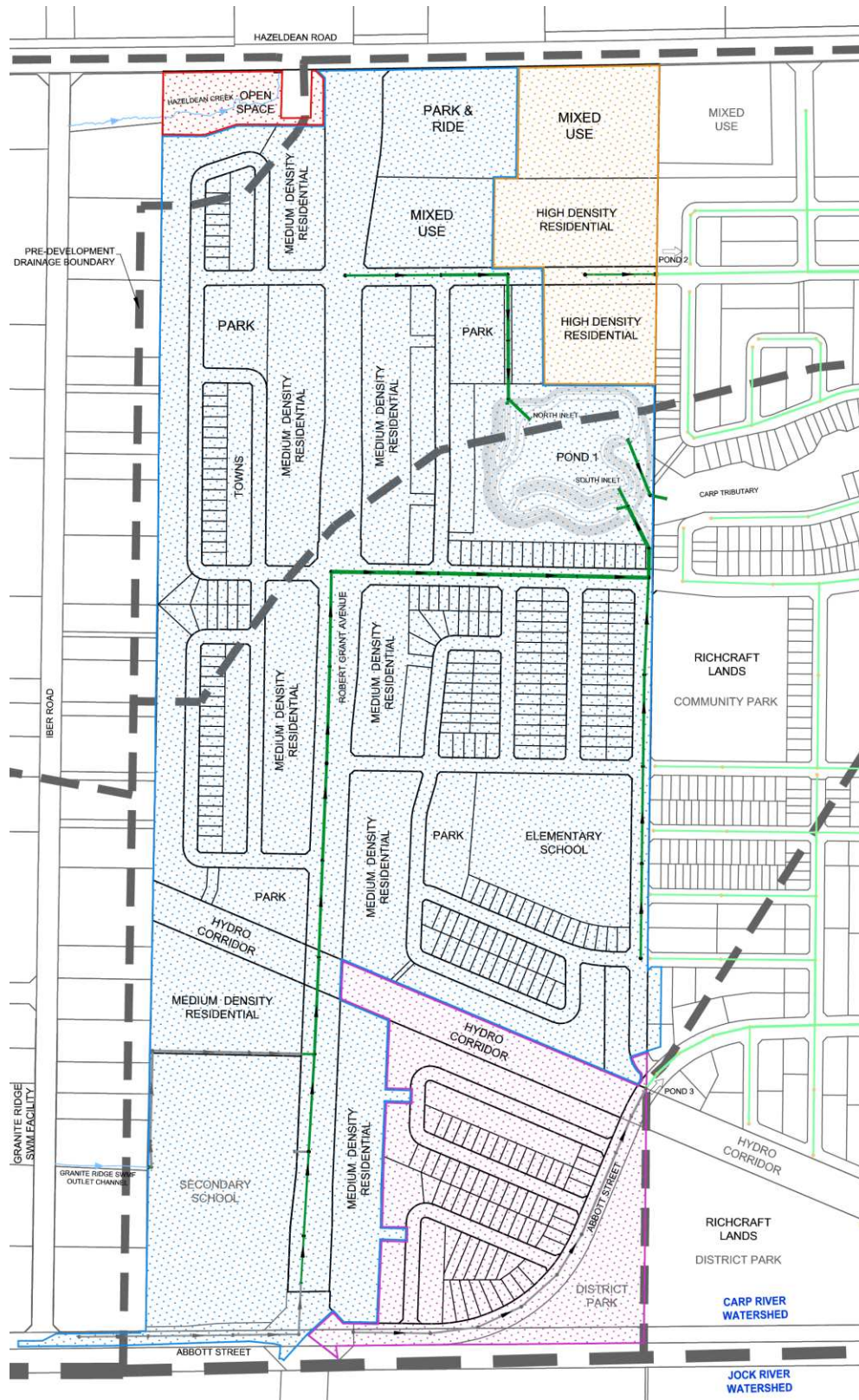


Figure 6-2: Storm Sewer Network

### 6.3.2 Major System Design

The major system design will conform to the design standards outlined in the Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletin PIEDTB-2016-01 (September 2016). During detailed design, the right-of-way will be graded to provide sufficient storage to contain the major system runoff from storm events exceeding the minor system capacity for all storms up to and including the 100-year design event. The site will be graded to provide an engineered overland flow route for large, infrequent storms, or in the event that the storm sewer system becomes obstructed, with the majority of major system flows routed to Pond 1. There is one drainage area in the north-eastern corner of the site (P2-20) where major and minor system flows are tributary to the storm sewers within the adjacent development, which outlet to Pond 2, and another area (P3-21) where major and minor system flows are tributary to the storm sewers within the adjacent development, which outlet to Pond 3 .

#### Cross-Street Flow

No cross-street flow is permitted for the minor (2-year) storm event, and there is to be only minimal ponding within the roadways. Major system flow from local streets can be conveyed to other local or collector roads, or to a Stormwater Management Facility or watercourse.

#### Major System Flow Depths

For events exceeding the minor system design storm and up to the 100-year design storm, flow depths in the right of way are to be limited to the maximum water depths outlined in **Table 6.3**.

**Table 6.3: Major System Flow Depths**

Road Classification	Maximum Water Depth
Local	350mm at edge of pavement
Collector	350mm at edge of pavement
Arterial	No barrier curb overtopping/Flow spread must leave at least one lane free of water in each direction.

### 6.3.3 Groundwater Infiltration and Water Balance

As discussed in the Fernbank Environmental Management Plan [3], the hydrogeologic conditions of the Kizell Lands will be altered by the increase in hard surfaces and the increased efficiency of stormwater conveyance. The net result will be a reduction in groundwater infiltration, which can potentially result in a reduction in the groundwater table, reduction of baseflow in watercourses, reduced well capacities and consolidation of the overburden, among other impacts.

The recommended infiltration target is to match pre-development infiltration rates. The water balance analysis in the Fernbank Environmental Management Plan [3] indicates that maintaining annual pre-development infiltration should be achievable using infiltration best management practices; the types, locations, and suitability of infiltration BMPs will be dependent on site specific details and land use.

### Infiltration Best Management Practices

Infiltration of surface runoff will be accomplished using lot level and conveyance controls. The most suitable practices for groundwater infiltration include:

- Infiltration of runoff captured by rear yard catchbasins;
- Direct roof leaders to rear yard areas;
- Infiltration trenches underlying drainage swales in park areas;
- The use of fine sandy loam topsoil in parks and on residential lawns.

By implementing infiltration Best Management Practices as part of the storm drainage design for the Kizell lands, the impacts of development on the hydrologic cycle can be considerably reduced. Infiltration of clean runoff will also have additional benefits for stormwater management; by reducing the volume of “clean” water conveyed to Pond 1, the performance of Pond 1 will be increased.

#### **6.3.4 SWM Facility – Pond 1**

Water quantity control and water quality treatment will be provided by an end-of pipe stormwater management pond, ‘Pond 1’. Pond 1 has been sized to control and treat runoff from the Kizell Lands development, including flows from the Granite Ridge SWM facility, and a portion of Iber Road.

### **6.4 Hydrologic & Hydraulic Modeling**

The *City of Ottawa Sewer Design Guidelines* (October 2012) require hydrologic modeling for all dual drainage systems. The performance of the proposed storm drainage system for the Kizell Lands was evaluated using the PCSWMM hydrologic/hydraulic model.

A semi-lumped model of the proposed subdivision storm sewers and Pond 1 was developed using PCSWMM and has been imported into the Carp River PCSWMM model to evaluate the impact of the proposed development on water levels in the Carp River.

The PCSWMM model is a semi-lumped model that represents both the minor and major system flows from the development. The results of the analysis were used to:

- Simulate major and minor system runoff from the site;
- Determine the storm sewer hydraulic grade line for the 100-year storm event;
- Ensure the stormwater management facility is sufficiently sized to control runoff from the proposed development and the upstream drainage areas.

Additional details on the Carp River PCSWMM model are provided in **Section 6.4.5**. Modeling files are provided on the enclosed CD.



### 6.4.1 Design Storms

The hydrologic analysis was completed using the following synthetic design storms and historical storms. The IDF parameters used to generate the Chicago design storms were taken from the *Ottawa Design Guidelines - Sewer* (November 2004). The 12-Hour SCS MTO design storms were copied from the provided Carp River PCSWMM model, to ensure consistent results.

3 Hour Chicago Distribution:

- 25mm Event (Water Quality)
- 2-year Event
- 5-year Event
- 10-year Event
- 100-year Event

12 Hour MTO SCS Distribution:

- 2-year Event
- 5-year Event
- 10-year Event
- 100-year Event

The 3-hour Chicago distribution generated the highest peak flows on a per-subcatchment basis, however the 12-hour SCS storm (MTO distribution) generated higher HGL elevations. Thus, both storm distributions were used for the design and analysis of the storm drainage system.

### 6.4.2 Storm Drainage Areas

The site has been divided into subcatchments based on the proposed land use and roadway design. The catchment areas shown on the Storm Drainage Area Plan **108195-STM** (**Appendix C**) correspond to the areas used in the Storm Sewer Design Sheet (**Appendix A**).

### 6.4.3 Model Parameters

The hydrologic parameters for each subcatchment were developed based on the Land Use Plan (**Figure 2**) and the Storm Drainage Area Plan (**108195-STM**). An overview of the modeling parameters is provided in **Table 6.4**.

**Table 6.4: PCSWMM Model Parameters**

Area ID	Area (ha)	Runoff Coeff. (C)	Percent Impervious (%)	Zero Impervious (%)	Curve Number (CN)	Equivalent Width (m)	Average Slope (%)
<b>DEL Lands Catchment Areas</b>							
P1-01	1.25	0.82	89%	0%	80.5	280	0.50
P1-02	0.48	0.90	100%	0%	80.5	110	0.50
P1-03a	6.01	0.60	57%	10%	80.5	180	0.50
P1-03b	1.28	0.80	86%	50%	80.5	290	0.50
P1-03c	0.60	0.90	100%	0%	80.5	135	0.50
P1-04a	2.38	0.80	86%	50%	80.5	540	0.50
P1-04b	1.11	0.80	86%	50%	80.5	250	0.50
P1-04c	0.37	0.90	100%	0%	80.5	85	0.50
P1-05	1.61	0.50	43%	0%	80.5	365	0.50
P1-06	3.49	0.62	60%	50%	80.5	785	0.50
P1-07	1.66	0.90	100%	0%	80.5	374	0.50
P1-08	9.70	0.70	71%	50%	80.5	2185	0.50

Area ID	Area (ha)	Runoff Coeff. (C)	Percent Impervious (%)	Zero Impervious (%)	Curve Number (CN)	Equivalent Width (m)	Average Slope (%)
P1-09	1.66	0.84	91%	0%	80.5	375	0.50
P1-10	1.94	0.70	71%	50%	80.5	440	0.50
P1-11	4.70	0.69	70%	50%	80.5	1060	0.50
P1-12	2.28	0.65	64%	50%	80.5	515	0.50
P1-13	8.21	0.66	66%	50%	80.5	1850	0.50
P1-14	3.50	0.60	57%	50%	80.5	790	0.50
P1-15	2.10	0.65	64%	50%	80.5	475	0.50
P1-16	6.12	0.67	67%	50%	80.5	1380	0.50
P1-17	2.42	0.88	97%	0%	80.5	545	0.50
P1-18	4.01	0.80	86%	10%	80.5	905	0.50
P1-19	4.78	0.67	67%	50%	80.5	1080	0.50
P1-22_Pond1	4.35	0.65	64%	0%	80.5	980	0.50
<b>TOTAL:</b>	<b>76.01</b>						
<b>Off-Site Catchment Areas</b>							
CS254_1	47.20	0.51	44%	25%	85.0	500	0.70
CS254_2	18.12	0.45	36%	25%	87.0	500	1.20
CS252	10.45	0.59	56%	25%	87.0	210	1.20

### Major System Storage

Since the major system has not yet been designed, the subcatchment areas are not based on a detailed grading plan. Major system storage is represented in the PCSWMM model using storage nodes. The required storage volumes are based on containing the runoff from the 100-year event within road sags (max depth of 0.35m) with no cascading overland flow. The release rates from the storage nodes have been established as follows:

- Local Roads, up to the 2-year peak flow from the subcatchment flow uncontrolled to the storm sewers, storage is provided for larger storm events;
- Collector Roads, up to the 5-year peak flow from the subcatchment flow uncontrolled to the storm sewers, storage is provided for larger storm events;
- Arterial Roads, up to the 10-year peak flow from the subcatchment flow uncontrolled to the storm sewers, storage is provided for larger storm events;

As the project is only at the Draft Plan stage, detailed lot-level grading information is not yet available. The PCSWMM model is set up with the main trunk sewers, as outlined in the storm sewer design sheet.

The required major system storage volumes are provided in **Section 6.4.4 “Model Results”** - refer to **Table 6.7**.

### Runoff Coefficient/ Impervious Values

Impervious (%IMP) values for each subcatchment area were calculated based on the Runoff Coefficients (see **Table 6.2**) noted on the Storm Drainage Area Plan (**108195-STM**) using the equation:

$$\%IMP = \frac{(C - 0.2)}{0.7}$$

### Depression Storage

The default values for depression storage in the City of Ottawa were used for all catchments.

- Depression Storage (pervious areas): 4.67 mm
- Depression Storage (impervious areas): 1.57 mm

Residential rooftops are assumed to provide no depression storage and all rainfall is converted to runoff. The percentage of rooftop area to total impervious area is represented by the 'no depression storage' column in **Table 6.4**.

### Curve Number

The Carp River Watershed PCSWMM model uses an SCS Curve Number of 80.5. Thus, all subcatchments within the Kizell Lands have been given a curve number value of 80.5, to remain consistent with the Carp River Watershed model.

### Equivalent Width

'Equivalent Width' refers to the width of the sub-catchment flow path. This parameter is calculated as described in the *Sewer Design Guidelines, October 2012, Section 5.4.5.6*. For areas where detailed roadway information is available, the total length of the street segment, multiplied by 2 (in areas where there is to be development on both sides of the street) has been used. In areas where detailed roadway information is not available, such as in the mixed-use development blocks, a value of 225m per ha has been used. These areas have been indicated in the model parameter table with an asterisk (\*).

### Upstream Areas

The proposed Kizell Lands development must maintain a storm outlet for the Granite Ridge SWM facility. The existing 1350mm storm sewer north of the high school site at Abbott Street will connect to the proposed storm sewer system, and will serve as the outlet for the Granite Ridge SWM facility and a portion of the industrial area on the east side of Iber Road.

The outflows from the upstream SWM facilities will have already been treated, but will be routed through the Kizell storm sewers to Pond 1. For SWM facilities in series, the MOE recommends that the downstream pond (Pond 1) be designed to provide 80 m<sup>3</sup>/ha extended detention storage, double the standard 40 m<sup>3</sup>/ha required for a single facility.

### Fernbank Pond 1

Refer to **Section 7.0** for additional details on the design of Fernbank Pond 1, including the stage-storage-discharge curves used in the PCSWMM model.

Modeling Files / Schematic

The PCSWMM model schematics are provided in **Appendix B**. Digital copies of the modeling files and model output for all storm events are provided on the enclosed CD.

**6.4.4 Model Results**

The results of the PCSWMM model are summarized in the following sections.

Peak Flows

The proposed SWM facility has been designed to control post-development peak flows in the Carp River West Tributary to pre-development levels. The pre-development peak flows for the 12-hour SCS distribution are taken from Table 8-2 of the Fernbank EMP. A comparison of pre- vs. post-development peak flows is provided in **Table 6.5**.

**Table 6.5: Pre vs. Post-Development Peak Flows to Carp River West Tributary (m<sup>3</sup>/s)**

Storm Distribution->	12hr SCS Distribution			
Return Period->	2yr	5yr	10yr	100yr
<b>Pre-Development</b>	1.71	2.67	3.32	5.43
<b>Post-Development</b>	1.14	1.96	2.53	4.60

Hydraulic Grade Line

The PCSWMM model was used to evaluate the 100-year hydraulic grade line (HGL) elevations within the proposed storm sewers. As the design is only at the draft plan stage, underside of footing (USF) elevations have not yet been determined. The HGL analysis will need to be revised at the detailed design stage to reflect the controlled inflows at each inlet to the storm sewers.

The model indicates that there will be surcharging of the sewers during the 100-year event. While the 3-hour Chicago distribution generates higher peak flows, the 12-hour SCS MTO distribution generates larger runoff volumes. Consequently, the 12-hour SCS MTO distribution also generates the highest HGL elevations due to backwater from the 100-year water level in the proposed SWM facility.

The storm sewer sizes and elevations have been adjusted where possible to maintain a 100-year HGL within approximately 0.30 m above the pipe obvert.

**Table 6.6: 100-year HGL Elevations**

Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	Outlet Pipe Obvert (m)	HGL Elevation (MTO SCS) (m)	WL Above Obvert (MTO SCS) (m)	HGL Elevation (Chicago) (m)	WL Above Obvert (Chicago) (m)
101_(STM)	97.65	101.59	99.45	99.49	0.04	99.38	-0.07
101a_(STM)	97.65	101.59	99.45	99.36	-0.09	99.17	-0.28
103_(STM)	97.71	101.69	99.51	99.81	0.30	99.76	0.25
105_(STM)	97.78	101.50	99.58	99.98	0.40	99.91	0.33
107_(STM)	98.20	101.67	99.70	100.11	0.41	100.04	0.34

Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	Outlet Pipe Obvert (m)	HGL Elevation (MTO SCS) (m)	WL Above Obvert (MTO SCS) (m)	HGL Elevation (Chicago) (m)	WL Above Obvert (Chicago) (m)
109_(STM)	98.31	101.82	99.81	100.14	0.33	100.17	0.36
111_(STM)	98.79	102.06	99.99	100.53	0.54	100.46	0.47
113_(STM)	99.17	102.28	100.22	100.83	0.61	100.75	0.53
147_(STM)	97.93	101.82	99.88	100.31	0.43	100.21	0.33
153_(STM)	98.01	102.12	99.96	100.44	0.48	100.33	0.37
165_(STM)	98.10	102.31	100.05	100.55	0.50	100.42	0.37
169_(STM)	98.15	102.42	100.10	100.63	0.53	100.49	0.39
171_(STM)	98.29	102.51	100.24	100.72	0.48	100.57	0.33
173_(STM)	99.46	103.07	100.29	101.11	0.82	100.96	0.67
203_(STM)	98.67	103.15	100.47	101.12	0.65	100.95	0.48
205_(STM)	98.91	103.66	100.71	101.34	0.63	101.17	0.46
207_(STM)	99.16	103.20	100.96	101.51	0.55	101.36	0.40
209_(STM)	100.46	103.50	101.21	101.77	0.56	101.62	0.41
215_(STM)	99.54	102.77	101.19	101.73	0.54	101.60	0.41
215A_(STM)	101.01	103.40	101.55	102.21	0.66	102.03	0.48
217_(STM)	99.89	103.08	101.54	101.99	0.45	101.87	0.33
217A_(STM)	101.17	103.06	101.92	102.03	0.11	101.90	-0.02
219_(STM)	100.64	103.45	101.84	102.19	0.35	102.00	0.16
219A_(STM)	101.19	102.84	101.94	102.22	0.28	102.30	0.36
221_(STM)	100.69	102.42	101.44	101.95	0.51	101.83	0.39
221a_(STM)	99.69	102.90	101.34	101.86	0.52	101.74	0.40
301_(STM)	97.69	101.83	99.04	99.35	0.31	99.17	0.13
301a_(STM)	97.69	101.83	99.04	99.36	0.32	99.17	0.13
305_(STM)	97.77	101.84	99.11	99.37	0.26	99.34	0.23
309_(STM)	98.72	101.75	99.55	100.72	1.18	100.73	1.19
319_(STM)	97.85	101.51	99.19	99.58	0.39	99.56	0.37
321_(STM)	98.03	101.66	99.37	99.99	0.62	100.00	0.63
327_(STM)	98.63	102.51	99.68	100.57	0.89	100.63	0.95
337_(STM)	99.17	102.84	100.00	101.11	1.11	101.16	1.16
349_(STM)	101.62	103.95	102.22	102.78	0.56	102.33	0.11
351_(STM)	101.35	103.76	102.10	102.49	0.39	102.01	-0.09
364_(STM)	100.50	103.08	101.85	102.13	0.28	102.00	0.15
391_(STM)	100.91	103.45	101.89	102.29	0.41	102.10	0.22
EX. 472 (STM)	101.51	103.55	102.86	103.25	0.39	102.87	0.01
EX. 501 (STM)	101.18	104.04	102.53	103.00	0.47	102.61	0.08
EX. 502 (STM)	101.12	103.98	102.47	102.87	0.40	102.50	0.03
EX. 503 (STM)	100.87	103.75	102.22	102.42	0.20	102.25	0.03
EX. 504_(STM)	100.63	102.89	101.98	102.24	0.26	102.10	0.12

Note that there are some manhole locations where the 100-year HGL elevation exceeds 0.30m above the pipe invert. During the detailed design stage, pipe sizes and building elevations will be adjusted accordingly to ensure the 100-year HGL will be at least 0.30m below the design USF elevations.

### Major System Storage

The storage required in the right-of-way has been evaluated on a per-hectare basis for each subcatchment. Refer to **Table 6.7**.

**Table 6.7: Major System Storage**

Drainage Area ID	Area (ha)	Storage Required		
		Area (m <sup>2</sup> )	Total Volume (m <sup>3</sup> )	Per Hectare Volume (m <sup>3</sup> /ha)
P1-01	1.25	320	53	43
P1-02	0.48	128	22	46
P1-03a	6.01	3325	220	37
P1-03b	1.28	965	163	127
P1-03c	0.6	160	27	46
P1-04a	2.38	1765	299	126
P1-04b	1.11	830	137	124
P1-04c	0.37	97	17	46
P1-05	1.61	350	45	28
P1-06	3.49	2120	339	97
P1-07	1.66	415	72	43
P1-08	9.7	6125	1031	106
P1-09	1.66	425	72	43
P1-10	1.94	1250	212	109
P1-11	4.7	2975	503	107
P1-12	2.28	1400	231	101
P1-13	8.21	4945	837	102
P1-14	3.5	2120	326	93
P1-15	2.1	1300	214	102
P1-16	6.12	3735	631	103
P1-17	2.42	605	104	43
P1-18	4.01	1655	261	65
P1-19	4.78	1705	266	56

There is a relatively wide range of major system storage requirements. Some areas, primarily those designated for mixed use development, may require up to approximately 130m<sup>3</sup>/ha in order to fully contain the 100-year event.

The required major system storage volumes are generally larger than the values documented in the Fernbank MSS. However, Technical Bulletin PIEDTB-2016-01 (September 2016) has increased the allowable ponding depths in the right-of-way from 0.30m to 0.35m, which represents a significant increase in the maximum storage volumes that can be provided.

The major system storage volumes will be reassessed at the detailed design stage to ensure the appropriate major system storage is provided.

**6.4.5 Carp River Watershed PCSWMM Model**

The City has developed a PCSWMM model of the Carp River subwatershed and indicated that all new development within the watershed is to be represented in this model to confirm that the cumulative impacts of development are accounted for and that the proposed stormwater management strategies will have no adverse impact on water levels in the Carp River.

To determine what effect the proposed Kizell Lands development will have on the downstream Carp River, the Kizell Lands PCSWMM model was integrated into the Carp River Watershed PCSWMM model provided by the City, following the protocol outlined in the *City of Ottawa Carp River PCSWMM Model Documentation*.

After discussions with City staff, there have been some revisions made to some of the subcatchment area parameters upstream and downstream of the Kizell subdivision. Please refer to the technical memorandum included in **Appendix B**, which outlines these changes.

The results of the analysis indicate that the proposed development will not have an adverse effect on the downstream watercourses, as the outflows from Pond 1 are to be controlled to match existing flows into the Carp River West Tributary.

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**Table 6.9** (Ultimate Conditions) provide a comparison of the 100-year water levels and flows along the main Branch of the Carp River between the updated Carp River Models and the original March 2016 models provided by the City.

**Table 6.8: 100-year Flows and Water Levels in Carp River (Interim Conditions)**

Location on Carp River	PCSWMM Node	Original March 2016		With Fernbank Pond 2	
		Flow (m <sup>3</sup> /s)	Water Level (m)	Flow (m <sup>3</sup> /s)	Water Level (m)
Existing West Tributary	CJ201	12.48	94.51	12.84	94.54
Hazeldean Road	CJ199	11.41	94.49	11.93	94.52
Maple Grove Road	CJ172	11.22	94.44	11.86	94.46
Palladium Drive	CJ150	28.56	94.33	29.03	94.34
Highway 417	CJ120	29.09	94.24	29.69	94.25
Feedmill Creek	CJ106	30.03	94.00	30.31	94.01
Richardson Side Road	CJ050	39.38	93.38	40.02	93.39
Huntmar Drive	CJ032	53.97	93.06	54.37	93.06

**Table 6.9: 100-year Flows and Water Levels in Carp River (Ultimate Conditions)**

Location on Carp River	PCSWMM Node	Original March 2016		With Fernbank Ponds 2 and 3	
		Flow (m <sup>3</sup> /s)	Water Level (m)	Flow (m <sup>3</sup> /s)	Water Level (m)
Existing West Tributary	CJ201	14.63	94.40	8.553	94.34
Hazeldean Road	CJ199	14.22	94.31	14.11	94.31
Maple Grove Road	CJ172	16.63	94.19	16.77	94.19
Palladium Drive	CJ150	55.11	94.15	51.60	94.15
Highway 417	CJ120	32.51	93.98	32.58	93.97
Feedmill Creek	CJ106	44.68	93.69	43.91	93.68
Richardson Side Road	CJ050	43.76	93.47	43.06	93.45
Huntmar Drive	CJ032	58.46	93.11	56.76	93.10

The model results indicate little change in peak flow in the Carp River at most locations throughout the model. The release rates from the Kizell Lands and Pond 1 are consistent with the release rates from the SWMHYMO model prepared as part of the Fernbank EMP.

The model results indicate that there will be only slight changes to the modeled 100-year water levels in the Carp River under interim or future development conditions. As this is only a preliminary design, these results will be further refined during the detailed design stage.

#### **6.4.6 Runoff Volumes and Downstream Impacts**

When the Fernbank EMP was written, it was assumed that the Kizell Lands would have an average imperviousness of 56%. The current plans for the proposed residential development have an average imperviousness of 70%. The Fernbank EMP states the following: *“The recommended areas for SWM blocks have been oversized to allow for flexibility in the configuration of the SWM facilities, as well as to allow provide flexibility for expansion of the SWM facilities to account for any intensification of development from the current land use plan.”* (Page 88 Section 9.0, Fernbank EMP, Novatech, June 2009).

##### Pond 1

The conceptual design for the Pond 1 SWM facility (refer to drawing **108195-SWM**) accounts for the increase in runoff resulting from the increased impervious area, and will control flows to the allowable release rates as outlined in the Fernbank EMP. The pond forebay sizing has also been adjusted from the original concept to account for the increase in imperviousness, to ensure that the 70% TSS water quality requirement is being met.

##### Runoff Volumes

In terms of the runoff volume, the Fernbank EMP outlines the following criteria: *“Increases in runoff volumes resulting from development are not to exceed an additional 40,000m<sup>3</sup> above existing conditions for the 100-year event.”*



To determine the magnitude and impact of additional runoff volume directed to the Carp River West Tributary due to the increased impervious area of the Kizell lands, the SWMHYMO model submitted as a part of the Fernbank EMP was updated with a % impervious (TIMP) value of 0.70, up from the original 0.56. Results are as follows:

**Table 6.10: 100-year Runoff Volume Comparison**

Development Condition	100yr Runoff Volume (m3)				
	Pond 1	Pond 2	Pond 3	Total	Increase
Pre-Development	112,700	17,900	51,300	181,900	-
Post-Development (no BMPs, 56% IMP)	122,100	20,000	68,400	210,500	28,600
Post-Development (with BMPs, 56% IMP)	120,200	19,500	68,500	208,200	26,300
Post-Development (no BMPs, 70% IMP)	126,800	20,000	68,400	215,200	33,300
Post-Development (with BMPs, 70% IMP)	124,100	19,500	68,500	212,100	30,200

The Fernbank EMP states that “Increases in runoff volume resulting from development are not to exceed an additional 40,000m<sup>3</sup> above existing conditions for the 100-year event.” As shown in the above table, the increase in impervious area does result in an increase to the runoff volume directed to the Carp River. However, the increase is well within the allowable overall increase for the Fernbank Community.

Continuous Modeling (Erosion Assessment)

To determine if there would be a negative impact to the downstream channel morphology, the continuous SWMHYMO model submitted as a part of the Fernbank EMP was updated with a % impervious (TIMP) value of 0.70, up from the original 0.56. Results are as follows:

**Table 6.11: Erosion Threshold Exceedance Comparison**

# of Hours Exceeding Critical Flow Threshold for Erosion % of Total Annual Flow above Erosion Threshold						
Location	Year					
	1974	1979	1981	1986	1995	1997
<b>Critical Flow = 1.70 m3/s (C12)</b>						
<b>Carp River West Tributary @ Monitoring Location C12 (Downstream of SWMF P1)</b>						
Pre-Development	0 hrs 0%	7 hrs 0.10%	12 hrs 0.20%	6 hrs 0.10%	16 hrs 0.30%	0 hrs 0%
Post-Development (no BMPs, 56% IMP)	0 hrs 0%	6 hrs 0.10%	10 hrs 0.20%	4 hrs 0.10%	15 hrs 0.30%	0 hrs 0%
Post-Development (no BMPs, 70% IMP)	0 hrs 0%	6 hrs 0.10%	11 hrs 0.20%	5 hrs 0.10%	16 hrs 0.30%	0 hrs 0%

As shown in the above table, there should be little to no increase in impact to the downstream channel morphology due to the increased impervious area.

## 7.0 STORMWATER MANAGEMENT FACILITY

The proposed SWM facility has been sized to provide water quality and quantity control for a total tributary drainage area of 77.9 ha from the Kizell Lands, plus an additional 75.8 ha from the upstream Granite Ridge SWM Facility and Iber Road. The design of the SWM facility is shown on Drawing **108195-SWM**.

### 7.1 Design Criteria

The proposed SWM facility has been designed to meet the following criteria:

- Provide a *Normal* level of water quality control (70% long-term TSS removal);
- Provide quantity control storage to limit post-development flows into the Carp River West Tributary to 4.75 m<sup>3</sup>/s for all storms up to and including the 100-year event;
- The SWM facility will have side slopes of 3:1 (H:V) or shallower;
- The forebays have been sized to provide sufficient storage for 10-years of sediment accumulation;
- A sediment storage area for each forebay (two in total) have been provided within the SWM block to allow for storage and drying of material removed during maintenance/cleanout;
- Guardrails conforming to City standards are to be installed at the inlet and outlet structures of the SWM facility;
- Infiltration tests are to be performed on the native material to determine whether a liner will be required.

### 7.2 Pathways/ SWM Facility Access

Access to the inlet and outlet structures and the sediment storage area will be provided by the proposed service road / pathway that runs around the perimeter of the pond. Three accesses to the pond block will be provided as shown on Drawing **108195-SWM**.

### 7.3 Geotechnical (Pond Liner)

It is recommended that the base and the sidewalls of the SWM facility be inspected by a geotechnical consultant to confirm the requirement for a geotechnical liner. The thickness of the pond liner (if required) would be designed to be outside the limits of the design grades of the SWM facility and would have no impact on the storage volume of the pond.

### 7.4 Inlet Structures

The north and south inlets to the SWM facility have been designed with flow splitters consisting of a low-flow pipe to direct runoff from smaller storm events into the forebays, and a high flow pipe to direct peak flows from larger storm events directly into the main cell of the pond. The low-flow and high-flow pipes are to be separated by a weir structure within the connecting manhole.

The SWM Facility inlet structures will consist of the following:

- North Inlet:
  - 1350 mm pipe outletting to the north forebay, sized for the flows from the 25mm water quality event;
  - 1340 x 2100 mm pipe outletting to the main cell of the pond.
  - Flow splitter weir (crest elevation = 98.60 m)
- South Inlet:
  - 1800 mm pipe outletting to the north forebay, sized for the flows from the 25mm water quality event;
  - 1800 mm pipe outletting to the main cell of the pond.
  - Flow splitter weir (crest elevation = 98.86 m)

A plunge pool will be placed at each inlet to prevent scour and erosion. The plunge pool and the banks of the forebay near the inlet will be lined with riprap as per City of Ottawa standards.

## 7.5 Sediment Forebays/ Permanent Pool

The sediment forebays and permanent pool have been designed in accordance with the *MOE SWM Planning and Design Manual* (March 2003). Supporting calculations are provided in **Appendix B**.

### Forebays

The north forebay will have a length of approximately 75 m, and the south forebay will have a length of approximately 85 m. Submerged riprap berms set 0.10 m below the normal water level will separate the forebays from the main cell of the pond.

Annual sediment loading to the SWM facility from the upstream drainage area has been estimate at approximately 145.3 m<sup>3</sup>/year (see design calculations in **Appendix B**). Each forebay has been designed to allow for a minimum of 10 years of sediment accumulation:

- The north forebay will have an estimated sediment loading rate of approximately 39 m<sup>3</sup>/year. This corresponds to a sediment volume of 390 m<sup>3</sup> over a period of 10 years. The north forebay provides a sediment storage volume of approximately 1,240 m<sup>3</sup> at the top of the submerged berm separating the forebay and the main cell.
- The south forebay will have an estimated sediment loading rate of approximately 106 m<sup>3</sup>/year. This corresponds to a sediment volume of 1,060 m<sup>3</sup> over a period of 10 years. The south forebay provides a sediment storage volume of approximately 3,730 m<sup>3</sup> at the top of the submerged berm separating the forebay and the main cell.

### Permanent Pool

The upstream drainage area from the Kizell Lands to the SWM facility (approximately 76.01 ha) has an average imperviousness of 71%. For a *Normal* level of protection (70% long-term TSS removal), the required permanent pool volume is approximately 6,900 m<sup>3</sup>.

The conceptual design of the SWM pond is governed primarily by the active storage component. The permanent pool volume provided by the conceptual design (approximately 23,700 m<sup>3</sup>) is based on the pond footprint at the normal water level, and grading down to a permanent pool depth of 1.5m. At the detailed design stage, the pond configuration will be revised to ensure the permanent pool is not significantly over-sized.

## **7.6 SWM Facility Outlet Structure**

Outflows from the SWM facility will be routed through an outlet control structure before discharging to a 1950 mm storm sewer which will outlet to the Carp River West Tributary. Refer to **Appendix B** for the supporting outlet sizing calculations and to Drawing **108195-SWM**.

### **7.6.1 Extended Detention**

Extended detention will be provided for the first 7,980 m<sup>3</sup> (6,081m<sup>3</sup> required) of active storage to allow for settling of suspended sediment in the pond. Extended detention outflows will be conveyed to the outlet structure via a 450mm reverse slope pipe with an invert of 96.25m at the bottom of the SWM facility and an invert of 97.65m (normal water level) at the connection to the outlet structure. The extended detention volume will be released over a period of approximately 40 hours through a 220mm slide-in orifice plate installed in the weir within the outlet structure.

### **7.6.2 Quantity Control**

Flows that exceed the extended detention storage volume will outlet through a multi-stage weir within the outlet structure.

### **7.6.3 Overflow Spillway**

The proposed SWM facility has been sized to provide sufficient storage for storms up to and including the 100-year event. An overflow spillway has been provided in case the outlet storm sewer is obstructed or an extreme event (greater than the 100-year event) generates runoff exceeding the maximum available storage in the SWM facility. The overflow spillway will have a crest elevation of 99.80m and will direct overflows into the Carp River West Tributary.

## 7.7 Stage-Storage-Discharge Table

Based on the proposed SWM facility design, the calculated stage-storage-discharge table is as follows:

**Table 7.1: Pond 1 Stage-Storage-Discharge Table**

Service Level	Elevation (m)	Stage (m)	Total Volume (m <sup>3</sup> )	Active Volume (m <sup>3</sup> )	Approximate Discharge (m <sup>3</sup> /s)
Bottom	96.25	-	0		
NWL	97.65	0.00	23763	0	0
	97.75	0.10	25698	1935	0
Ex.Det.	98.05	0.40	31741	7978	55
	98.25	0.60	35975	12213	329
2-year	98.55	0.90	42629	18867	1067
	98.75	1.10	47302	23540	1676
5-year	98.79	1.14	48267	24505	1805
10-year	98.94	1.29	51953	28191	2308
	99.25	1.60	59769	36006	3518
100-year	99.35	1.70	62340	38577	4074
Overflow	99.75	2.10	72867	49104	9785

Note that the discharge rate has been calculated based on the orifice and weir calculations, and is less than the peak flow measured from the outlet in the PCSWMM model.

## 7.8 Carp River West Tributary

The SWM facility will outlet to the existing Carp River West Tributary at the northern end of the site. As per the Fernbank EMP, the upper reach of the tributary is not considered a “naturalized” channel, and will be re-graded to accommodate the proposed SWM facility outlet. There is an existing perched culvert downstream of the planned Pond 1 outlet that was identified in the EMP for removal to facilitate the movement of aquatic species. The Carp River West Tributary is classified as a tolerant warm-water fish community (Type 3 Community), based on the *Carp River Watershed/Subwatershed Study*. Temperature mitigation is required within Pond 1 and along the Tributary, with the goal of ensuring that the temperature of discharged stormwater does not exceed 25°C (22°C preferred). Temperature mitigation is commonly achieved through tree plantings (shade), pond layout and orientation, and bottom-draw techniques. The re-graded section of the Carp River West Tributary will be reinstated with plantings and may incorporate other natural channel features (specifics to be determined at the detailed design stage). Sections of open channel upstream of Pond 1 will be abandoned in conjunction with urbanization, all in accordance with recommendations from the EMP.

## 7.9 Decommissioning/Abandonment of Existing Facilities

The temporary SWM facility for the high school site is located within the Robert Grant Avenue right-of-way. Decommissioning of the facility will occur in conjunction with construction of Robert Grant Avenue northerly to Hazeldean Road. The storage and treatment function of the temporary facility will be replaced by Pond 1, with conveyance by new storm sewers.

The upper reach of the Carp River West Tributary provides agricultural drainage, and an outlet for the Granite Ridge SWM Facility and High School upstream of Pond 1. Construction sequencing of decommissioning commences with the construction of Pond 1 to operational conditions (vegetated) including the outlet to Carp Tributary. The trunk storm sewer system within Robert Grant Avenue must be installed connecting the Granite Ridge Diversion Pipe to Pond 1. The trunk storm sewer system must then be extended, with connections to outlet from both Abbott Street and the High School Site storm sewers (including by-pass pumping). Decommissioning of the temporary SWM Facility and reinstatement of ground surface to be completed once connections are made. The open channels will be progressively abandoned in conjunction with development of the lands, and in accordance with the Fernbank Environmental Management Plan (see **Figure 7-1** for construction sequencing details). The MVCA's regulatory jurisdiction extends into the planned development and any alterations of the tributary and entombment requires written authorization from MVCA pursuant to Ontario Regulation 153/06 ("Development, Interference with Wetlands and Alterations to Shorelines and Watercourses").





Compensation planting and environmental work for the planned channel entombment will be completed in accordance with the EMP, and coordinated with the MVCA.

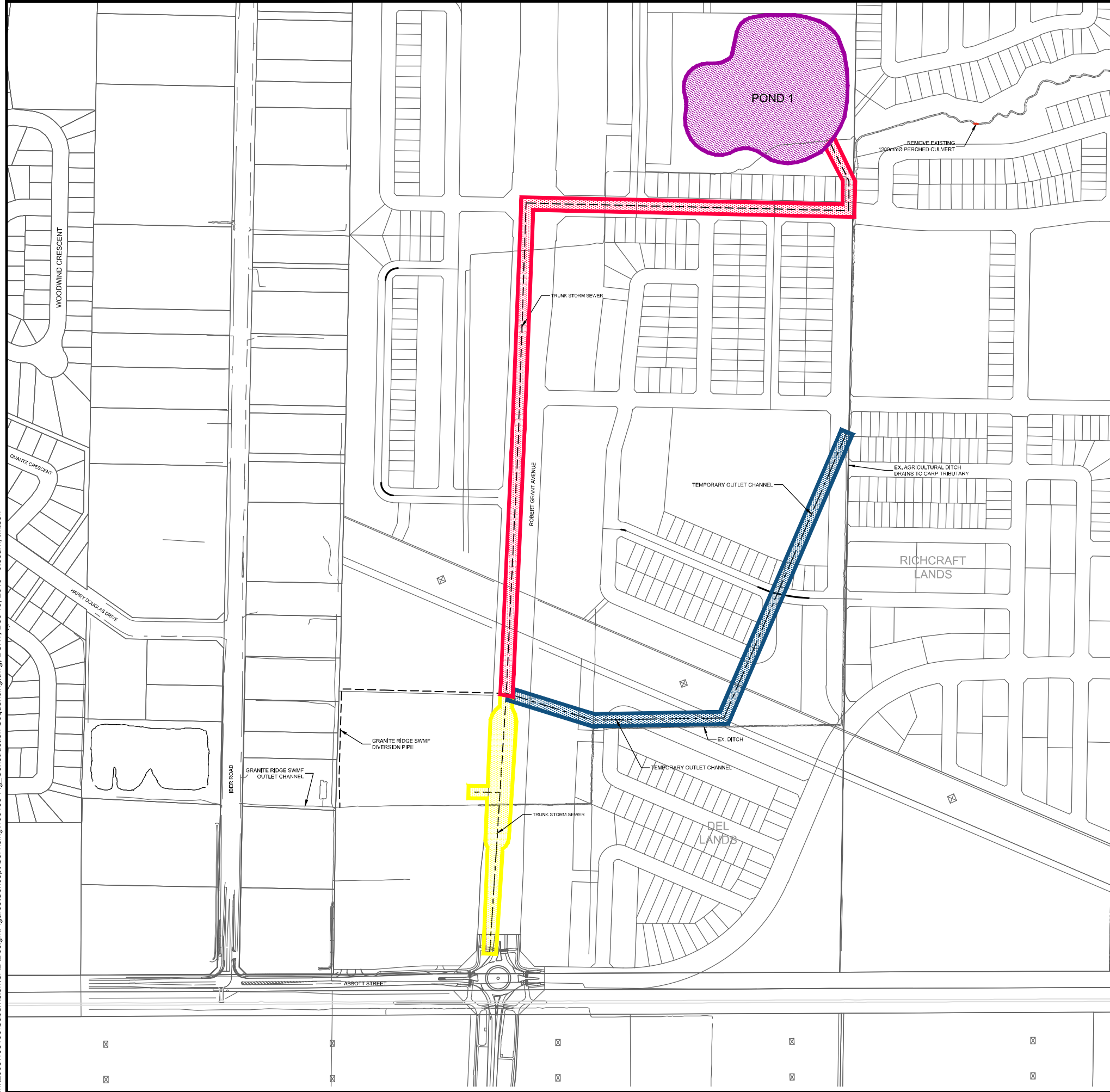
## 7.10 Changes from Fernbank Community Design Plan

To prevent major system drainage from crossing Robert Grant Avenue, the Fernbank CDP proposed two dry ponds on the Kizell Lands. The intent was for major system flow to be conveyed overland to the dry ponds during heavy rainfall events, for temporary storage. Policy changes outlined in Technical Bulletin PIEDTB-2016-01 (September 2016) with respect to stormwater design have increased the permitted ponding depths within ROW's leading to an increase in available surface storage. The consequence of this design change is that the dry ponds are no longer required, as the major and minor system is now locally contained.

The overall percent impervious for the subdivision has increased from the 56% outlined in the EMP to 70%. Refer to **Section 6.4.6** for details of the impact this change will have on the downstream watercourses.

# CONSTRUCTION SEQUENCING

-  1) CONSTRUCT POND 1 TO OPERATIONAL CONDITIONS (VEGETATED) INCLUDING OUTLET TO CARP TRIBUTARY.
-  2) INSTALL TRUNK STORM SEWER SYSTEM IN ROBERT GRANT AVENUE TO POND 1 AND CONNECT TO GRANITE RIDGE DIVERSION PIPE.
-  3) EXTEND ROBERT GRANT AVENUE STORM TRUNK, WITH CONNECTIONS TO OUTLET FROM BOTH ABBOTT STREET AND SCHOOL SITE STORM SEWERS (INCLUDING BY-PASS PUMPING). DECOMMISSION TEMPORARY SWMF AND REINSTATE GROUND SURFACE.
-  4) ABANDONMENT OF TEMPORARY OUTLET CHANNEL IN CONJUNCTION WITH FUTURE LAND DEVELOPMENT.



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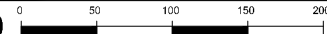


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CITY OF OTTAWA  
FERNBANK COMMUNITY - KIZELL LANDS

DECOMMISSIONING  
CONSTRUCTION SEQUENCING

SCALE 1:5000 

DATE 2019.12.13 JOB 108195 FIGURE 7-1



## 8.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures will be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987). Detailed plans will be provided at the detailed design stage.

Typical erosion and sediment control measures recommended include, but are not limited to, the use of silt fences around perimeter of site (OPSD 219.110), filter fabric or inserts under catch basin/maintenance hole lids, heavy duty silt fence barrier (OPSD 219.130), straw bale check dams (OPSD 219.180), rock check dams (219.210 or OPSD 219.211), turbidity curtain (OPSD 219.260), dewatering trap (OPSD 219.240), temporary water passage system (OPSD 221.030), riprap (OPSS 511), mud mats, silt bags for dewatering operations, topsoil and sod to disturbed areas and natural grassed waterways. Dewatering and sediment control techniques will be developed for the individual situations based on the above guidelines and utilizing typical measures to ensure erosion and sediment control is controlled in an acceptable manner and there is no negative impact to adjacent lands, water bodies or water treatment/conveyance facilities.

It will be the responsibility of the Contractor to submit a detailed construction schedule and appropriate staging, dewatering and erosion and sediment control plans to the Contract Administrator for review and approval prior to the commencement of work.

All erosion and sediment control measures are to be installed to the satisfaction of the engineer, the municipality and the conservation authority prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and remain present during all phases of site preparation and construction.

- A qualified inspector should conduct daily visits during construction to ensure that the contractor is working in accord with the design drawings and that mitigation measures are being implemented as specified.
  - A light duty silt fence barrier is to be installed in the locations shown on the Erosion and Sediment Control Plan.
  - Straw bale barriers are to be installed in drainage ditches
  - Inserts are to be placed under the grates of all proposed and existing catchbasins and structures.
  - After complete build-out, all sewers are to be inspected and cleaned and all sediment and construction fencing is to be removed.
- The contractor shall ensure that proper dust control is provided with the application of water (and if required, calcium chloride) during dry periods.
- The contractor shall immediately report to the engineer or inspector any accidental discharges of sediment material into any ditch or sewer system. Appropriate response measures shall be carried out by the contractor without delay.
- The contractor acknowledges that failure to implement erosion and sediment control measures may result in penalties imposed by any applicable regulatory agency.

A list of Best Management Practices, recommended by the Mississippi Valley Conservation Authority, for the development are provided below:

- Natural areas to be retained are to be isolated by sturdy construction fencing or similar barrier at least 1.0m in height during construction in order to ensure their retention.
- Construction equipment will remain within the areas of active construction and will not cross the sediment control measures.
- Following construction, bare soils will be re-seeded to reduce surface erosion.
- Erosion and sediment control measures will be in place for the duration of construction and until the site is re-vegetated. Erosion and sediment control measures should be maintained in good condition for the duration of construction. These measures should be removed at the completion of construction once the site has stabilized.
- Disturbed areas should be replanted with locally grown native species.
- No woody vegetation should be removed between April 15<sup>th</sup> and August 15<sup>th</sup> unless a breeding bird survey is conducted.
- Should any species at risk be discovered and/or should any species at risk or their habitat be potentially impacted by on site activities, the Ministry of Natural Resources and Forestry (MNRF) should be contacted immediately and activities should be modified to avoid impacts until further direction is provided by MNRF.

## 9.0 NOISE

The City of Ottawa is concerned with noise from aircraft, roads, railways and Transitways as expressed in Section 4.8.8 of the Official Plan. These policies are supported by the Environmental Noise Control Guidelines [10] which is a technical document that outlines the specific sound level criteria.

The proposed Arterial Road, Hazeldean Road, Abbott Street and the Major/Minor Collectors are all classified as potential noise sources that must be analyzed at the detailed design stage. The Plan of Subdivision has been configured to mitigate noise levels to the extent practical using planning-based strategies. Dwellings adjacent the Arterial Road will likely have an architectural and acoustic façade facing the high-traffic roadway, and an outdoor amenity area shielded behind the super-structure of each apartment block.

Despite the preceding land use measures, a detailed noise study will be undertaken in conjunction with the Plan of Subdivision and Site Plan applications. Specific noise mitigation measures will be analyzed and submitted at that time, including such measures as noise attenuation barriers, acoustic residential glazing, etc.

## 10.0 UTILITIES

The development will be serviced by Hydro Ottawa, Bell Canada, Enbridge Gas and Rogers Cablevision (as required); services will be constructed as per the City and Utility standards.

Discussions with the various utility companies have confirmed that there is adequate infrastructure in the vicinity to supply the Fernbank Community as it grows. Ongoing coordination during the development approvals process will be required to ensure that utilities are in place when development proceeds.

As stated in the Fernbank Master Servicing Study, the utility firms have requested they are kept apprised throughout the development process, but no additional investigation or analysis is warranted until detail design is initiated.

## 11.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the preceding, the report conclusions are summarized below:

- 1) The servicing design generally conforms to the conclusions and recommendations outlined in the Fernbank Master Servicing Study and the Fernbank Environmental Management Plan both of which were approved by Council on June 24, 2009.
- 2) There is adequate capacity in the existing and planned infrastructure (sanitary, storm and water) to accommodate servicing from the Kizell Lands.
- 3) The proposed grading design generally follows the existing topographic contours. Grading will be coordinated with neighboring land owners.
- 4) The Stittsville Diversion Trunk and Kanata West Pump Station (sanitary) must be operational to service most of the Kizell Lands.
- 5) The Glen Cairn Pumping Station will be upgraded by the City of Ottawa as-and-when required based on overall growth rates within in the entire Zone 3W Area.
- 6) Pond 1 is required to provide quality and quantity control of stormwater runoff. Ponds 2 & 3 will be constructed by others, and will service a portion of the Kizell Lands.
- 7) A Noise Study is required in conjunction with the detail design of the development.
- 8) Hydro, Gas, Bell and Cablevision have infrastructure nearby to service the proposed development.

This report is respectfully submitted for review and approval. Please contact the undersigned should you have questions or require additional information.

Prepared By:

Prepared By:

**NOVATECH**



Kallie Auld, P.Eng.  
Project Coordinator, Water Resources



Lucas Wilson, P.Eng.  
Project Coordinator

## References

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- 2 “Fernbank Master Servicing Study”, Novatech Engineering Consultants Ltd. [June 24, 2009]
- 3 “Fernbank Environmental Management Plan”, Novatech Engineering Consultants Ltd. [June 24, 2009]
- 4 “Preliminary Geotechnical Assessment Kizell Lands, 5618 Hazeldean Road, Ottawa, Ontario”, Houle Chevrier Engineering [August 25, 2016]
- 5 “Transportation Master Plan”, City of Ottawa [November 2013]
- 6 “Fernbank Transportation Master Plan”, Delcan [June 24, 2009]
- 7 “Kizell Lands - Community Transportation Study / Transportation Impact Study”, Novatech [Report No. 2016-161, November 2016]
- 8 “Sewer Design Guidelines”, Department of Public Works and Services, City of Ottawa [October 2012]
- 9 “Standard Tender Documents, Material Specifications and Standard Detail Drawings” City of Ottawa, Department of Infrastructure Services and Community Sustainability [March, 2014]
- 10 “City of Ottawa Environmental Noise Control Guidelines, Planning and Growth Management Department” City of Ottawa [January, 2016]
- 11 “Granite Ridge Subdivision Stormwater Site Management Plan and Summary of Calculations” Simmering & Associates Ltd. [February, 2000]
- 12 “Planning Rationale & Integrated Environmental Review Statement”, Novatech [Report No. R-2016-162, December 13, 2019]

**Appendix A: Sewer Design Sheets and Water Modelling**

Storm Sewer Design Sheet (Rational Method)  
Sanitary Sewer Design Sheets  
Watermain Boundary Conditions  
Watermain Modelling

Fernbank Community - Kizell Lands: Storm Sewer Design Sheet ( Rational Method )

LOCATION			AREA											FLOW						Total Peak Flow (Q) (L/s)	PROPOSED SEWER									
Location	From Node	To Node	Park N' Ride	Arterial Road ROW	Abbott Street ROW	Mixed Use	High Density / Medium Block	Low Density	Schools	Park	Hydro Corridor	Total Area (ha)	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr)				Peak Flow (L/s)	Pipe Type	Pipe Size (mm)	Grade (%)	Length (m)	Capacity (l/s)	Full Flow Velocity (m/s)	Time of Flow (min.)	Q/Qfull (%)	
																	2yr	5yr	10yr											
<b>POND 1 North Inlet</b>			0.80	0.90	0.76	0.80	0.80	0.65	0.60	0.40	0.20																			
P1-16	337	327					2.10	3.19			0.83	6.12	0.67	11.36	11.36	15.00	61.77			701.5	CONC	825	0.30	105.3	820.2	1.49	1.18	85.5%		
												0.00		0.00	0.00	15.00			0.0											
P1-17	327	321						0.20				0.00	0.65	0.00	11.36	16.18	59.11			671.4	CONC	1050	0.25	118.5	1424.4	1.59	1.24	85.7%		
				2.22								0.20	0.90	0.36	0.36	16.18		79.9	28.9	1220.1										
							2.22	0.90				2.22	0.90	5.55	5.55	16.18			93.6	519.8										
P1-18, P1-19	321	319	2.30			1.71	1.97	2.00			0.82	8.80	0.73	17.83	29.18	17.42	56.59			1651.4	CONC	1650	0.15	161.8	3682.6	1.67	1.62	59.1%		
												0.00		0.00	0.36	17.42		76.47	27.6	2176.3										
												0.00		0.00	5.55	17.42			89.5	497.3										
	319	301										0.00		0.00	29.18	19.04	53.63			1565.2	CONC	1650	0.10	150.7	3006.9	1.36	1.84	68.6%		
												0.00		0.00	0.36	19.04		72.4	26.2	2062.3										
												0.00		0.00	5.55	19.04			84.8	470.9										
<b>TOTAL</b>			<b>2.30</b>	<b>2.22</b>	<b>0.00</b>	<b>1.71</b>	<b>4.07</b>	<b>5.39</b>	<b>0.00</b>	<b>1.65</b>	<b>0.00</b>	<b>17.34</b>	<b>0.73</b>		<b>35.10</b>	<b>20.88</b>				<b>118.9</b>	<b>L/s/ha</b>									

Q = 2.78 AIR      WHERE : Q = PEAK FLOW IN LITRES PER SECOND (L/s)       $Q = (1/n) A R^{(2/3)} S_o^{(1/2)}$       WHERE :      Q = CAPACITY (L/s)      Project: Kizell Lands (108195)  
 A = AREA IN HECTARES (ha)      I = RAINFALL INTENSITY IN MILLIMETERS PER HOUR (mm/hr)      n = MANNING COEFFICIENT OF ROUGHNESS (0.013)      A = FLOW AREA (m<sup>2</sup>)      Designed: LRW  
 R = WEIGHTED RUNOFF COEFFICIENT      Checked: MAB  
 Date: December 13 2019





Fernbank Community - Kizell Lands: Storm Sewer Design Sheet ( Rational Method )

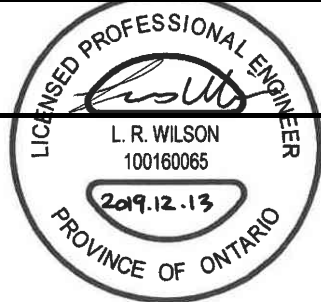
LOCATION			AREA										FLOW						Total Peak Flow (Q) (L/s)	PROPOSED SEWER										
Location	From Node	To Node	Park N' Ride	Arterial Road ROW	Abbott Street ROW	Mixed Use	High Density / Medium Block	Low Density	Schools	Park	Hydro Corridor	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr)			Peak Flow	Pipe Type	Size (mm)	Grade (%)	Length (m)	Capacity (l/s)	Full Flow Velocity (m/s)	Time of Flow (min.)	Q/Qfull (%)		
																	2yr	5yr											10yr	(L/s)
<b>POND 1 South Outlet</b>			0.80	0.90	0.76	0.80	0.80	0.65	0.60	0.40	0.20	(ha)																		
P1-1	Abbott	351			0.70							0.00	0.70	0.76	0.00	0.00	15.00				0.0	258.2	CONC	600	0.20	121.9	286.5	0.98	2.07	90.1%
				0.55								0.55	0.90		1.38	1.38	15.00			97.85	134.7									
P1-2	351	219										0.00	0.00		0.00	0.00	17.07				0.0	348.1	CONC	750	0.25	104.1	580.7	1.27	1.36	59.9%
				0.48								0.48	0.90		1.20	2.58	17.07			90.63	233.6									
P1-3	219	217					1.30		6.01			7.31	0.64		12.92	12.92	18.43	54.70			706.5	1166.3	CONC	1200	0.25	120.0	2033.7	1.74	1.15	57.4%
				0.59								0.59	0.90		1.48	4.05	18.43			86.49	350.6									
<b>Granite Ridge/Industrial Park</b>																						2483.0								
P1-4	217	215					3.49					3.49	0.80		7.76	20.68	19.58	52.72			1090.0	4093.1	CONC	1650	0.25	120.0	4754.3	2.15	0.93	86.1%
				0.37								0.37	0.90		0.93	4.98	19.58			83.3	414.8									
P1-5	215	207										0.93	0.20		0.52	21.19	20.51	51.23			1085.7	4211.6	CONC	1650	0.25	112.9	4754.3	2.15	0.87	88.6%
				0.68								0.68	0.90		1.70	6.68	20.51			80.92	540.6									
P1-6	209	207					0.65	2.04		0.80		3.49	0.62		6.02	6.02	15.00	61.77			371.9	371.9	CONC	750	0.30	83.3	636.1	1.39	1.00	58.5%
												0.00			0.00	0.00	15.00				0.0									
P1-7	207	171										0.00			0.00	27.22	21.38	49.91			1358.3	4794.7	CONC	1800	0.20	246.7	5362.9	2.04	2.01	89.4%
				1.66								1.66	0.90		4.15	10.83	21.38			78.81	853.8									
P1-8	173	171					3.03	6.67				9.70	0.70		18.79	18.79	15.00	61.77			1160.7	1160.7	CONC	1050	0.30	88.7	1560.3	1.75	0.85	74.4%
												0.00			0.00	0.00	15.00				0.0									
P1-9	171	165						0.37				0.00	0.00		0.00	46.01	23.40	47.14			2168.8	5834.1	CONC	2400	0.10	132.9	8166.8	1.75	1.27	71.4%
				1.29								1.29	0.90		3.23	14.06	23.40			74.4	1045.8									
P1-10	165	153					0.70	0.66				1.36	0.73		2.75	48.76	24.66	45.57			2221.7	5912.6	CONC	2400	0.10	88.8	8166.8	1.75	0.85	72.4%
								0.59				0.59	0.65		1.07	3.21	24.66			61.4	197.4									
												0.00			0.00	14.06	24.66			71.86	1010.5									
P1-11	153	147					1.31	2.93				4.24	0.70		8.21	56.96	25.51	44.58			2539.4	6253.7	CONC	2400	0.10	82.0	8166.8	1.75	0.78	76.6%
								0.46				0.46	0.65		0.83	4.04	25.51			60.1	243.1									
												0.00			0.00	14.06	25.51			70.28	988.3									
P1-12	147	105						1.73				1.73	0.65		3.13	60.09	26.29	43.71			2626.4	6375.0	CONC	2400	0.10	87.1	8166.8	1.75	0.83	78.1%
								0.55				0.55	0.65		0.99	5.04	26.29			58.9	296.8									
												0.00			0.00	14.06	26.29			68.89	968.7									
P1-13	113	111					1.98	4.48		0.80		7.26	0.66		13.39	13.39	15.00	61.77			827.0	970.4	CONC	1050	0.20	116.7	1274.0	1.43	1.36	76.2%
								0.95				0.95	0.65		1.72	1.72	15.00			83.56	143.4									
												0.00			0.00	0.00	15.00				0.0									
P1-14	111	109							3.26			3.26	0.60		5.44	18.83	16.36	58.72			1105.5	1276.3	CONC	1200	0.15	120.1	1575.3	1.35	1.48	81.0%
								0.24				0.24	0.65		0.43	2.15	16.36			79.39	170.7									
												0.00			0.00	0.00	16.36				0.0									
P1-15	109	105						0.92				0.92	0.65		1.66	20.49	17.85	55.77			1142.7	1465.4	CONC	1500	0.10	233.3	2332.0	1.28	3.04	62.8%
								1.18				1.18	0.65		2.13	4.28	17.85			75.36	322.7									
												0.00			0.00	0.00	17.85				0.0									
Pond 1	105	101										0.00			0.00	80.58	27.12	42.82			3450.7	7420.5	CONC	1800x3000	0.10	80.8	9301.6	1.81	0.75	79.8%
												0.00			0.00	9.32	27.12			57.7	537.9									
												0.00			0.00	14.06	27.12			67.5	948.9									
<b>TOTAL</b>			0.00	5.62	0.70	0.00	12.46	23.77	9.27	1.60	0.93	54.35	0.69		103.96	27.87						136.5	L/s/ha							

Q = 2.78 AIR WHERE : Q = PEAK FLOW IN LITRES PER SECOND (L/s)  
 A = AREA IN HECTARES (ha)  
 I = RAINFALL INTENSITY IN MILLIMETERS PER HOUR (mm/hr)  
 R = WEIGHTED RUNOFF COEFFICIENT

Q = (1/n) A R^(2/3)So^(1/2) WHERE :

Q = CAPACITY (L/s)  
 n = MANNING COEFFICIENT OF ROUGHNESS (0.013)  
 A = FLOW AREA (m<sup>2</sup>)

Project: Kizell Lands (108195)  
 Designed: LRW  
 Checked: MAB  
 Date: December 13 2019



Fernbank Community - Kizell Lands: Storm Sewer Design Sheet ( Rational Method )

LOCATION			AREA											FLOW						Total Peak Flow (Q) (L/s)	PROPOSED SEWER									
Location	From Node	To Node	Park N' Ride	Arterial Road ROW	Abbott Street ROW	Mixed Use	High Density / Medium Block	Low Density	Schools	Park	Hydro Corridor	Total Area (ha)	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr)				Peak Flow (L/s)	Pipe Type	Pipe Size (mm)	Grade (%)	Length (m)	Capacity (l/s)	Full Flow Velocity (m/s)	Time of Flow (min.)	Q/Qfull (%)	
																	2yr	5yr	10yr											
<b>POND 2</b>			0.80	0.90	0.76	0.80	0.80	0.65	0.60	0.40	0.20																			
P2-20	501	R216A				2.42	3.91	0.30				6.63	0.79	14.62	14.62	15.00	61.77			903.0	CONC	975	0.20	35.2	1045.6	1.36	0.43	86.4%		
												0.00		0.00	0.00	15.00			0.0											
												0.00		0.00	0.00	15.00			0.0											
<b>POND 3</b>																														
P3-24	409	425			1.56			7.05		1.63	1.76	10.44	0.54	15.53	15.53	15.00	61.77			959.3	CONC	1050	0.50	39.3	2014.4	2.25	0.29	65.7%		
								0.59				2.15	0.73	4.36	4.36	15.00			364.5											
								0.00				0.00		0.00	0.00	15.00			0.0											

Q = 2.78 AIR      WHERE : Q = PEAK FLOW IN LITRES PER SECOND (L/s)  
 A = AREA IN HECTARES (ha)  
 I = RAINFALL INTENSITY IN MILLIMETERS PER HOUR (mm/hr)  
 R = WEIGHTED RUNOFF COEFFICIENT

$Q = (1/n) A R^{(2/3)} S_o^{(1/2)}$       WHERE :      Q = CAPACITY (L/s)  
 n = MANNING COEFFICIENT OF ROUGHNESS (0.013)  
 A = FLOW AREA (m<sup>2</sup>)

Project: Kizell Lands (108195)  
 Designed: LRW  
 Checked: MAB  
 Date: December 13 2019



**FERNBANK COMMUNITY - KIZELL LANDS  
SANITARY SEWER DESIGN SHEET**

AREA			RESIDENTIAL														ICI				INFILTRATION			PIPE										
ID	From	To	SINGLES		TOWNS		STACKED TOWNS		MEDIUM DENISTY		HIGH DENSITY		MIXED USE/ PARK & RIDE		TOTAL				Commercial Area (ha)	Institutional Area (ha)	Accum. Area (ha)	Peak Flow (l/s)	Total Area (ha)	Accum. Area (ha)	Infil. Flow (l/s)	Total Flow (l/s)	Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q <sub>full</sub> (%)		
			Units	Pop.	Units	Pop.	Area	Pop.	Area	Pop.	Units	Pop.	Units	Pop.	Pop.	Accum. Pop.	Peak Factor	Peak Flow (l/s)																
<b>Outlet 1</b>																																		
<b>Stittsville Diversion Trunk</b>																																		
	SA100	SA101		0.0		0.0								0.0	0.0	0	3.8	0.0			0.00	0.0	0.00	0.00	0.00	0.00	0.0	493.4	900	0.41	32	1209.3	1.84	40.8%
A1-1	SA101	SA102		0.0		0.0								0.0	0.0	0.0	3.8	0.0			0.00	0.0	0.00	0.91	0.91	0.3	493.7	900	0.41	134	1209.3	1.84	40.8%	
A1-2	SA102	SA104		0.0		0.0								0.0	0.0	0.0	3.8	0.0			0.00	0.0	0.00	1.12	2.03	0.7	494.1	900	0.16	240	755.4	1.15	65.4%	
A1-3	SA104	SA106		0.0		0.0		2.38	278.5					0.0	278.5	278.5	3.5	3.1			0.00	0.0	0.00	7.80	9.83	3.2	499.8	900	0.16	167	755.4	1.15	66.2%	
A1-4	222	SA106	9	30.6	41	110.7		0.73	85.4					0.0	226.7	226.7	3.5	2.6			0.80	0.80	0.4	3.74	3.74	1.2	4.2	200	0.35	105	20.2	0.62	20.7%	
A1-5	SA106	SA107a		0.0		0.0								0.0	0.0	505.2	3.4	5.5			0.80	0.4	0.56	14.13	4.7	504.0	900	0.16	126	755.4	1.15	66.7%		
A1-6	212	SA107a	46	156.4	45	121.5		1.98	231.7					0.0	509.6	509.6	3.4	5.6			0.80	0.80	0.4	7.68	7.68	2.5	8.5	200	0.35	109	20.2	0.62	42.0%	
A1-7	SA107a	SA108		0.0		0.0								0.0	0.0	1014.7	3.2	10.6			1.60	0.8	1.17	22.98	7.6	512.4	900	0.16	234	755.4	1.15	67.8%		
A1-8	148	SA108	40	136.0	109	294.3		2.90	339.3					0.0	769.6	769.6	3.3	8.2			0.00	0.0	9.39	9.39	3.1	11.3	200	0.35	115	20.2	0.62	55.9%		
A1-9	190	SA108	93	316.2	11	29.7		1.31	153.3					0.0	499.2	499.2	3.4	5.5			3.24	3.24	1.6	10.95	10.95	3.6	10.7	250	0.20	109	27.7	0.55	38.4%	
A1-10	SA108	SA112		0.0		0.0								0.0	0.0	2283.5	3.0	22.4			4.84	2.4	1.78	45.10	14.9	533.1	900	0.16	367	755.4	1.15	70.6%		
A1-11	112	SA112	8	27.2	67	180.9		2.16	252.7					0.0	460.8	460.8	3.4	5.1			0.83	0.83	0.4	6.24	6.24	2.1	7.5	200	0.75	115	29.6	0.91	25.4%	
A1-12	120	SA112		0.0	70	189.0		2.14	250.4				160	288.0	727.4	727.4	3.3	7.8	1.36	0.82	2.18	1.1	7.36	7.36	2.4	11.3	250	0.25	109	31.0	0.61	36.4%		
A1-13	SA112	SA114		0.0		0.0								0.0	0.0	3471.7	2.9	32.7			7.85	3.8	1.66	60.36	19.9	549.9	900	0.16	241	755.4	1.15	72.8%		
A1-14	SA114	SA115		0.0		0.0							300	540.0	540.0	4011.7	2.9	37.3	1.82	2.28	11.95	5.8	2.28	62.64	20.7	557.1	900	1.42	93	2250.5	3.43	24.8%		
<b>Outlet 2</b>																																		
A2-1, A2-2	R20	R19	69	234.6	147	396.9		2.38	278.5					0.0	910	910	3.3	9.6			1.64	1.64	0.8	16.65	16.65	5.5	15.9	300	0.50	43	71.3	0.98	22.3%	
<b>Outlet 3</b>																																		
A3-1	404	R30	23	78.2		0.0								0.0	78.2	78.2	3.6	0.9			0.00	0.0	1.74	1.74	0.6	1.5	200	0.35	11	20.2	0.62	7.4%		
<b>Outlet 4</b>																																		
A4-1	604	RCAP1		0.0		0.0				360	648.0	300	540.0	1188.0	1188.0		3.2	12.3	1.90		1.90	0.9	7.21	7.21	2.4	15.6	200	1.00	4	34.2	1.06	45.7%		
<b>Design Parameters:</b>																	<b>Population Density:</b>				<b>Project: Kizell Lands (108195)</b>													
Avg Flow/Person =			280 l/day														ppl/unit				units/net ha													
Comm./Inst. Flow =			28000 l/ha/day														Mixed Use/HDR 1.80				85													
Infiltration =			0.33 l/s/ha														Singles 3.40																	
Pipe Friction n =			0.013														Towns 2.70																	
Residential Peaking Factor = Harmon Equation (max 4, min 2)																	Stacked Towns 2.70				49													
Peaking Factor Comm./Inst. =			1.5														Medium Density 1.80				65													
																					Designed: LRW Checked: MAB Date: December 13, 2019													



## Lucas Wilson

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**From:** Surprenant, Eric <Eric.Surprenant@ottawa.ca>  
**Sent:** September-29-16 8:30 AM  
**To:** Lucas Wilson  
**Subject:** FW: Fernbank Community - Kizell Lands: WM Boundary Conditions

Lucas,

Here are the requested boundary conditions:

Hazeldean Connection (900mm feedermain):

PKHR = 155.5m

MAX HGL = 162.4m

MXDY+Fire (167 L/s) = 155.6m

MXDY+Fire (217 L/s) = 155.6m

Abbott Street Connection (400mm watermain):

PKHR = 154.5m

MAX HGL = 162.1m

MXDY+Fire (167 L/s) = 154.5m

MXDY+Fire (217 L/s) = 153.6m

*Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.*

---

**From:** Lucas Wilson [<mailto:l.wilson@novatech-eng.com>]  
**Sent:** September 26, 2016 1:44 PM  
**To:** Surprenant, Eric  
**Subject:** Fernbank Community - Kizell Lands: WM Boundary Conditions

Eric,

Not sure who will be assigned to this project but I thought I'd start with you. I'm looking for boundary conditions to complete a hydraulic analysis in support of Draft Plan Submission.

The site is located north of Fernbank Crossing, between Abbott Street and Hazeldean. I've included a drawing which highlights the connections at Hazeldean and Abbott Street within the extended Robert Grant ROW. I've also attached the projected water demand for the Concept Site. Please let me know if you require additional information.

Thanks,

**Lucas Wilson** | P.Eng.

Project Engineer

**NOVATECH**

**Engineers, Planners & Landscape Architects** | 200-240 Michael Cowpland Drive, Ottawa, ON K2M 1P6

**Office** 613.254.9643 x282 | **Fax** 613.254.5867 | **Email** [l.wilson@novatech-eng.com](mailto:l.wilson@novatech-eng.com)

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**Kizell Lands  
Water Demand**

	Area (ha)	Units	Population	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
<b>Singles</b>	N/A	288	979	3.173	7.933	17.453
<b>Towns</b>	N/A	475	1283	4.156	10.391	22.859
<b>Medium Density Residential</b>	15.98	1039	1870	6.059	15.148	33.325
<b>High Density Residential</b>	N/A	360	648	2.100	5.250	11.550
<b>Mixed Use Residential</b>	N/A	460	828	2.683	6.708	14.758
<b>Mixed Use Commercial</b>	3.26	N.A	N/A	1.056	1.585	2.853
<b>Schools</b>	3.23	N/A	N/A	1.047	1.570	2.826
<b>Park</b>	4.90	N/A	N/A	1.588	2.382	4.288
<b>Park N' Ride Residential</b>	N/A	300	540	1.750	4.375	9.625
<b>Park N' Ride Commercial</b>	1.82	N/A	N/A	0.590	0.885	1.593
<b>Total</b>	<b>29.19</b>	<b>2922</b>	<b>6147</b>	<b>24.203</b>	<b>56.227</b>	<b>121.130</b>

**Water Demand Parameters**

Singles	3.4	ppl/unit		
Towns	2.7	ppl/unit		
Medium Density Residential	1.8	ppl/unit	65	units/net ha
Mixed Use Residential	1.8	ppl/unit		
Residential Demand	280	L/c/day		
Institutional/Commercial Demand	28000	L/gross ha/day		
Residential Max Day	2.5	x Avg Day		
Residential Peak Hour	2.2	x Max Day		
Institutional/Commercial Max Day	1.5	x Avg Day		
Institutional/Commercial Peak Hour	1.8	x Max Day		
Residential Fire Flow	167	L/s		
Institutional/Commercial Fire Flow	217	L/s		

Fernbank Community - Kizell Lands: Watermain Demand

Node	Singles	Towns	Stacked Towns (ha)	Medium Density Area (ha)	High Density (Units)	Mixed Use (Units)	Institutional/Commercial Area (ha)	Total Population	Total IC Area (ha)	Average Day Residential Demand (L/s)	Average Day IC Demand (L/s)	Total Average Day Demand (L/s)	Maximum Day Residential Demand (L/s)	Maximum Day IC Demand (L/s)	Total Maximum Day Demand (L/s)	Peak Hour Residential Demand (L/s)	Peak Hour IC Demand (L/s)	Total Peak Hour Demand (L/s)	Fire Flow (L/s)
MD1				2.38				278	0.00	0.902	0.000	0.902	2.256	0.000	2.256	4.963	0.000	4.963	217
N1	26	82		2.12			0.80	558	0.80	1.808	0.259	2.067	4.520	0.389	4.908	9.943	0.700	10.643	167
N2	8	58		1.25			0.83	330	0.83	1.070	0.269	1.339	2.674	0.403	3.077	5.883	0.726	6.609	167
N3		28		1.07	360	460	4.08	1676.8	4.08	5.434	1.322	6.756	13.585	1.983	15.568	29.887	3.570	33.457	217
N4	121	57		2.38				844	0.00	2.734	0.000	2.734	6.836	0.000	6.836	15.039	0.000	15.039	167
N5								0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N/A
N6	45	58		1.98			4.04	541	4.04	1.754	1.309	3.063	4.385	1.964	6.349	9.647	3.535	13.182	217
N7								0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	167
N8								0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	167
N9								0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N/A
N10	65	115		2.40			1.64	812	1.64	2.632	0.531	3.164	6.581	0.797	7.378	14.478	1.435	15.913	N/A
PR1						300	1.82	540	1.82	1.750	0.590	2.340	4.375	0.885	5.260	9.625	1.593	11.218	167
T1								0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N/A
T2	23	77		2.40				567	0.00	1.837	0.000	1.837	4.593	0.000	4.593	10.104	0.000	10.104	167
<b>Total</b>	<b>288</b>	<b>475</b>	<b>0.0</b>	<b>15.98</b>	<b>360</b>	<b>760</b>	<b>13.21</b>	<b>6147</b>	<b>13.21</b>	<b>19.922</b>	<b>4.281</b>	<b>24.203</b>	<b>49.805</b>	<b>6.422</b>	<b>56.227</b>	<b>109.571</b>	<b>11.559</b>	<b>121.130</b>	

Water Demand Parameters

Singles	3.4	ppl/unit	Residential Max Day	2.5	x Avg Day
Towns	2.7	ppl/unit	Residential Peak Hour	2.2	x Max Day
Stacked Towns	132.3	ppl/net ha			
Medium Density Area	117	ppl/net ha	Institutional/Commercial Max Day	1.5	x Avg Day
Mixed Use Residential	1.8	ppl/unit	Institutional/Commercial Peak Hour	1.8	x Max Day
High Density Residential	1.8	ppl/unit			
Residential Demand	280	L/c/day	Residential Fire Flow	167	L/s
Institutional/Commercial Demand	28000	L/gross ha/day	Institutional/Commercial Fire Flow	217	L/s



# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes - (Peak Hour)

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	4.96	154.44	51.51	505.31	73.29
Junc N1	103.78	10.64	154.42	50.64	496.78	72.05
Junc N2	103.04	6.61	154.78	51.74	507.57	73.62
Junc N3	101.61	33.46	154.98	53.37	523.56	75.94
Junc N4	102.28	15.04	154.37	52.09	511.00	74.11
Junc N5	101.45	0	154.4	52.95	519.44	75.34
Junc N6	102.27	13.18	154.37	52.1	511.10	74.13
Junc N7	101.52	0	154.37	52.85	518.46	75.20
Junc N8	100.7	0	155.17	54.47	534.35	77.50
Junc N9	96.68	0	155.5	58.82	577.02	83.69
Junc N10	102.7	15.89	154.47	51.77	507.86	73.66
Junc PR1	101.11	11.22	155.37	54.26	532.29	77.20
Junc T1	102.26	0	154.99	52.73	517.28	75.03
Junc T2	103.08	10.1	154.42	51.34	503.65	73.05
Resvr 1	155.5	-80.87	155.5	0	0.00	0.00
Resvr 2	154.5	-40.25	154.5	0	0.00	0.00

Network Table - Links - (Peak Hour)

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	11.51	0.17	0.14	0.030
Pipe 2	240	297	120	11.51	0.17	0.14	0.030
Pipe 3	406	297	120	6.54	0.09	0.05	0.033
Pipe 4	216	297	120	4.10	0.06	0.02	0.035
Pipe 5	436	297	120	29.58	0.43	0.82	0.026
Pipe 6	172	297	120	36.19	0.52	1.19	0.025
Pipe 7	242	297	120	-42.38	0.61	1.60	0.025
Pipe 8	52	297	120	-53.60	0.77	2.47	0.024
Pipe 9	576	900	120	-27.26	0.04	0.00	0.031
Pipe 10	262	297	120	-27.26	0.39	0.71	0.027
Pipe 11	137	297	120	6.20	0.09	0.05	0.033
Pipe 12	216	297	120	15.37	0.22	0.24	0.029
Pipe 13	246	297	120	0.33	0.00	0.00	0.047
Pipe 14	469	297	120	0.33	0.00	0.00	0.050
Pipe 15	283	297	120	12.85	0.19	0.18	0.030
Pipe 16	123	297	120	12.85	0.19	0.18	0.030
Pipe 17	173	400	120	-28.74	0.23	0.18	0.027
Pipe 18	472	297	120	-27.26	0.39	0.71	0.027
Pipe 19	147	297	120	-12.85	0.19	0.18	0.030

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes - (Max Pressure Check)

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	0.9	162.11	59.18	580.56	84.20
Junc N1	103.78	2.07	162.12	58.34	572.32	83.01
Junc N2	103.04	1.34	162.27	59.23	581.05	84.27
Junc N3	101.61	6.76	162.33	60.72	595.66	86.39
Junc N4	102.28	2.73	162.12	59.84	587.03	85.14
Junc N5	101.45	0	162.1	60.65	594.98	86.29
Junc N6	102.27	3.06	162.1	59.83	586.93	85.13
Junc N7	101.51	0	162.12	60.61	594.58	86.24
Junc N8	100.7	0	162.35	61.65	604.79	87.72
Junc N9	96.68	0	162.4	65.72	644.71	93.51
Junc N10	102.7	3.16	162.1	59.4	582.71	84.52
Junc PR1	101.11	2.34	162.38	61.27	601.06	87.18
Junc T1	102.26	0	162.32	60.06	589.19	85.45
Junc T2	103.08	1.84	162.14	59.06	579.38	84.03
Resvr 1	162.4	-27.38	162.4	0	0.00	0.00
Resvr 2	162.1	3.18	162.1	0	0.00	0.00

Network Table - Links - (Max Pressure Check)

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	-4.48	0.06	0.02	0.035
Pipe 2	240	297	120	-4.48	0.06	0.02	0.035
Pipe 3	406	297	120	-5.38	0.08	0.03	0.034
Pipe 4	216	297	120	7.45	0.11	0.06	0.032
Pipe 5	436	297	120	16.95	0.24	0.29	0.028
Pipe 6	172	297	120	18.29	0.26	0.34	0.028
Pipe 7	242	297	120	-15.46	0.22	0.25	0.029
Pipe 8	52	297	120	-17.80	0.26	0.32	0.028
Pipe 9	576	900	120	-9.58	0.02	0.00	0.035
Pipe 10	262	297	120	-9.58	0.14	0.10	0.031
Pipe 11	137	297	120	-2.82	0.04	0.01	0.037
Pipe 12	216	297	120	7.66	0.11	0.07	0.032
Pipe 13	246	297	120	4.93	0.07	0.03	0.034
Pipe 14	469	297	120	4.93	0.07	0.03	0.034
Pipe 15	283	297	120	-1.86	0.03	0.00	0.039
Pipe 16	123	297	120	-1.86	0.03	0.00	0.039
Pipe 17	173	400	120	-1.30	0.01	0.00	0.040
Pipe 18	472	297	120	-9.58	0.14	0.10	0.031
Pipe 19	147	297	120	1.86	0.03	0.00	0.040

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes - (Fire Flow Summary)

Fire Flow		Minimum Pressure		
Node	Flow (L/s)	Pressure (kPa)	Pressure (PSI)	Node
N10	217	497.47	72.15	N1
MD1	217	471.76	68.42	MD1
N1	167	459.89	66.70	N1
N2	167	480.98	69.76	N2
N3	217	480.30	69.66	N3
N4	167	468.53	67.95	N4
N6	217	427.62	62.02	N6
N7	167	468.92	68.01	N7
N8	167	485.01	70.34	N8
PR1	217	488.83	70.90	N1
T2	167	473.33	68.65	N1

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N1')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	152.5	49.57	486.28	70.53
Junc N1	103.78	171.91	150.66	46.88	459.89	66.70
Junc N2	103.04	3.08	154.05	51.01	500.41	72.58
Junc N3	101.61	15.57	154.85	53.24	522.28	75.75
Junc N4	102.28	6.84	152.48	50.2	492.46	71.43
Junc N5	101.45	0	153.7	52.25	512.57	74.34
Junc N6	102.27	6.35	153.44	51.17	501.98	72.81
Junc N7	101.51	0	152.81	51.3	503.25	72.99
Junc N8	100.7	0	155.11	54.41	533.76	77.42
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	154.43	51.73	507.47	73.60
Junc PR1	101.11	5.26	155.44	54.33	532.98	77.30
Junc T1	102.26	0	154.8	52.54	515.42	74.75
Junc T2	103.08	4.59	152.27	49.19	482.55	69.99
Resvr 1	155.6	-94.11	155.6	0	0.00	0.00
Resvr 2	154.5	-121.74	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'N1')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	76.72	1.11	4.79	0.023
Pipe 2	240	297	120	76.72	1.11	4.79	0.023
Pipe 3	406	297	120	74.46	1.07	4.53	0.023
Pipe 4	216	297	120	97.45	1.41	7.46	0.022
Pipe 5	436	297	120	70.20	1.01	4.06	0.023
Pipe 6	172	297	120	73.28	1.06	4.40	0.023
Pipe 7	242	297	120	-55.52	0.80	2.63	0.024
Pipe 8	52	297	120	-60.78	0.88	3.11	0.024
Pipe 9	576	900	120	-33.33	0.05	0.00	0.030
Pipe 10	262	297	120	-33.33	0.48	1.02	0.026
Pipe 11	137	297	120	-17.77	0.26	0.32	0.028
Pipe 12	216	297	120	-31.84	0.46	0.94	0.026
Pipe 13	246	297	120	-38.67	0.56	1.35	0.025
Pipe 14	469	297	120	-38.67	0.56	1.35	0.025
Pipe 15	283	297	120	45.02	0.65	1.79	0.025
Pipe 16	123	297	120	45.02	0.65	1.79	0.025
Pipe 17	173	400	120	-45.02	0.36	0.42	0.026
Pipe 18	472	297	120	-33.33	0.48	1.02	0.026
Pipe 19	147	297	120	-45.02	0.65	1.79	0.025

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N2')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.87	50.94	499.72	72.48
Junc N1	103.78	4.91	153.32	49.54	485.99	70.49
Junc N2	103.04	170.08	152.07	49.03	480.98	69.76
Junc N3	101.61	15.57	154.04	52.43	514.34	74.60
Junc N4	102.28	6.84	153.2	50.92	499.53	72.45
Junc N5	101.45	0	153.97	52.52	515.22	74.73
Junc N6	102.27	6.35	153.8	51.53	505.51	73.32
Junc N7	101.51	0	153.41	51.9	509.14	73.84
Junc N8	100.7	0	154.6	53.9	528.76	76.69
Junc N9	96.68	0	155.59	58.91	577.91	83.82
Junc N10	102.7	0	154.45	51.75	507.67	73.63
Junc PR1	101.11	5.26	155.27	54.16	531.31	77.06
Junc T1	102.26	0	153.9	51.64	506.59	73.47
Junc T2	103.08	4.59	153.09	50.01	490.60	71.16
Resvr 1	155.6	-138.72	155.6	0	0.00	0.00
Resvr 2	154.5	-77.12	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'N2')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	41.05	0.59	1.50	0.025
Pipe 2	240	297	120	41.05	0.59	1.50	0.025
Pipe 3	406	297	120	38.79	0.56	1.36	0.025
Pipe 4	216	297	120	-33.89	0.49	1.05	0.026
Pipe 5	436	297	120	-52.18	0.75	2.35	0.024
Pipe 6	172	297	120	117.89	1.70	10.62	0.021
Pipe 7	242	297	120	-84.11	1.21	5.68	0.022
Pipe 8	52	297	120	-89.37	1.29	6.36	0.022
Pipe 9	576	900	120	-49.35	0.08	0.01	0.028
Pipe 10	262	297	120	-49.35	0.71	2.12	0.024
Pipe 11	137	297	120	-33.78	0.49	1.05	0.026
Pipe 12	216	297	120	-22.89	0.33	0.51	0.027
Pipe 13	246	297	120	-29.73	0.43	0.83	0.026
Pipe 14	469	297	120	-29.73	0.43	0.83	0.026
Pipe 15	283	297	120	36.07	0.52	1.18	0.025
Pipe 16	123	297	120	36.07	0.52	1.18	0.025
Pipe 17	173	400	120	-36.07	0.29	0.28	0.026
Pipe 18	472	297	120	-49.35	0.71	2.12	0.024
Pipe 19	147	297	120	-36.07	0.52	1.18	0.025

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N4')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.48	50.55	495.90	71.92
Junc N1	103.78	4.91	152.57	48.79	478.63	69.42
Junc N2	103.04	3.08	154	50.96	499.92	72.51
Junc N3	101.61	15.57	154.83	53.22	522.09	75.72
Junc N4	102.28	173.84	150.04	47.76	468.53	67.95
Junc N5	101.45	0	152.83	51.38	504.04	73.10
Junc N6	102.27	6.35	152.27	50	490.50	71.14
Junc N7	101.51	0	150.81	49.3	483.63	70.15
Junc N8	100.7	0	155.1	54.4	533.66	77.40
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	154.35	51.65	506.69	73.49
Junc PR1	101.11	5.26	155.43	54.32	532.88	77.29
Junc T1	102.26	0	154.78	52.52	515.22	74.73
Junc T2	103.08	4.59	152.17	49.09	481.57	69.85
Resvr 1	155.6	-95.39	155.6	0	0.00	0.00
Resvr 2	154.5	-120.46	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'N4')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	53.27	0.77	2.44	0.024
Pipe 2	240	297	120	53.27	0.77	2.44	0.024
Pipe 3	406	297	120	51.01	0.74	2.25	0.024
Pipe 4	216	297	120	-46.10	0.67	1.87	0.025
Pipe 5	436	297	120	71.48	1.03	4.20	0.023
Pipe 6	172	297	120	74.56	1.08	4.54	0.023
Pipe 7	242	297	120	-56.33	0.81	2.70	0.024
Pipe 8	52	297	120	-61.59	0.89	3.19	0.024
Pipe 9	576	900	120	-33.79	0.05	0.00	0.030
Pipe 10	262	297	120	-33.79	0.49	1.05	0.026
Pipe 11	137	297	120	-18.23	0.26	0.33	0.028
Pipe 12	216	297	120	112.99	1.63	9.81	0.022
Pipe 13	246	297	120	-60.84	0.88	3.12	0.024
Pipe 14	469	297	120	-60.84	0.88	3.12	0.024
Pipe 15	283	297	120	67.19	0.97	3.75	0.023
Pipe 16	123	297	120	67.19	0.97	3.75	0.023
Pipe 17	173	400	120	-67.19	0.53	0.88	0.024
Pipe 18	472	297	120	-33.79	0.49	1.05	0.026
Pipe 19	147	297	120	-67.19	0.97	3.75	0.023

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N7')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.7	50.77	498.05	72.24
Junc N1	103.78	4.91	152.99	49.21	482.75	70.02
Junc N2	103.04	3.08	154.23	51.19	502.17	72.83
Junc N3	101.61	15.57	154.92	53.31	522.97	75.85
Junc N4	102.28	6.84	151	48.72	477.94	69.32
Junc N5	101.45	0	152.18	50.73	497.66	72.18
Junc N6	102.27	6.35	151.41	49.14	482.06	69.92
Junc N7	101.51	167	149.31	47.8	468.92	68.01
Junc N8	100.7	0	155.16	54.46	534.25	77.49
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	154.29	51.59	506.10	73.40
Junc PR1	101.11	5.26	155.45	54.34	533.08	77.32
Junc T1	102.26	0	154.89	52.63	516.30	74.88
Junc T2	103.08	4.59	152.69	49.61	486.67	70.59
Resvr 1	155.6	-88.9	155.6	0	0.00	0.00
Resvr 2	154.5	-126.95	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'N7')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	46.72	0.67	1.91	0.025
Pipe 2	240	297	120	46.72	0.67	1.91	0.025
Pipe 3	406	297	120	44.47	0.64	1.74	0.025
Pipe 4	216	297	120	-39.56	0.57	1.40	0.025
Pipe 5	436	297	120	64.99	0.94	3.52	0.023
Pipe 6	172	297	120	68.07	0.98	3.84	0.023
Pipe 7	242	297	120	-52.18	0.75	2.35	0.024
Pipe 8	52	297	120	-57.44	0.83	2.80	0.024
Pipe 9	576	900	120	-31.46	0.05	0.00	0.030
Pipe 10	262	297	120	-31.46	0.45	0.92	0.026
Pipe 11	137	297	120	-15.89	0.23	0.26	0.029
Pipe 12	216	297	120	99.96	1.44	7.82	0.022
Pipe 13	246	297	120	93.12	1.34	6.86	0.022
Pipe 14	469	297	120	-73.88	1.07	4.47	0.023
Pipe 15	283	297	120	80.23	1.16	5.20	0.023
Pipe 16	123	297	120	80.23	1.16	5.20	0.023
Pipe 17	173	400	120	-80.23	0.64	1.22	0.024
Pipe 18	472	297	120	-31.46	0.45	0.92	0.026
Pipe 19	147	297	120	-80.23	1.16	5.20	0.023



# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N10')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	154.49	51.56	505.80	73.36
Junc N1	103.78	4.91	154.49	50.71	497.47	72.15
Junc N2	103.04	3.08	155.02	51.98	509.92	73.96
Junc N3	101.61	15.57	155.27	53.66	526.40	76.35
Junc N4	102.28	6.84	154.32	52.04	510.51	74.04
Junc N5	101.45	0	153.93	52.48	514.83	74.67
Junc N6	102.27	6.35	153.97	51.7	507.18	73.56
Junc N7	101.51	0	154.2	52.69	516.89	74.97
Junc N8	100.7	0	155.39	54.69	536.51	77.81
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	167	153.82	51.12	501.49	72.73
Junc PR1	101.11	5.26	155.53	54.42	533.86	77.43
Junc T1	102.26	0	155.27	53.01	520.03	75.42
Junc T2	103.08	4.59	154.49	51.41	504.33	73.15
Resvr 1	155.6	-60.63	155.6	0	0.00	0.00
Resvr 2	154.5	-155.22	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'N10')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	4.27	0.06	0.02	0.035
Pipe 2	240	297	120	4.27	0.06	0.02	0.035
Pipe 3	406	297	120	2.01	0.03	0.01	0.039
Pipe 4	216	297	120	2.90	0.04	0.01	0.037
Pipe 5	436	297	120	36.72	0.53	1.22	0.025
Pipe 6	172	297	120	39.80	0.57	1.42	0.025
Pipe 7	242	297	120	-34.17	0.49	1.07	0.026
Pipe 8	52	297	120	-39.43	0.57	1.40	0.025
Pipe 9	576	900	120	-21.20	0.03	0.00	0.032
Pipe 10	262	297	120	-21.20	0.31	0.44	0.028
Pipe 11	137	297	120	-5.63	0.08	0.04	0.034
Pipe 12	216	297	120	29.23	0.42	0.80	0.026
Pipe 13	246	297	120	22.40	0.32	0.49	0.027
Pipe 14	469	297	120	22.40	0.32	0.49	0.027
Pipe 15	283	297	120	-16.05	0.23	0.26	0.029
Pipe 16	123	297	120	-16.05	0.23	0.26	0.029
Pipe 17	173	400	120	-150.95	1.20	3.94	0.021
Pipe 18	472	297	120	-21.20	0.31	0.44	0.028
Pipe 19	147	297	120	16.05	0.23	0.26	0.029

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'T2')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.21	50.28	493.25	71.54
Junc N1	103.78	4.91	152.03	48.25	473.33	68.65
Junc N2	103.04	3.08	153.71	50.67	497.07	72.09
Junc N3	101.61	15.57	154.71	53.1	520.91	75.55
Junc N4	102.28	6.84	151.79	49.51	485.69	70.44
Junc N5	101.45	0	153.45	52	510.12	73.99
Junc N6	102.27	6.35	153.11	50.84	498.74	72.34
Junc N7	101.51	0	152.25	50.74	497.76	72.19
Junc N8	100.7	0	155.02	54.32	532.88	77.29
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	154.41	51.71	507.28	73.57
Junc PR1	101.11	5.26	155.41	54.3	532.68	77.26
Junc T1	102.26	0	154.65	52.39	513.95	74.54
Junc T2	103.08	171.59	151.5	48.42	475.00	68.89
Resvr 1	155.6	-103.03	155.6	0	0.00	0.00
Resvr 2	154.5	-112.82	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'T2')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	60.70	0.88	3.10	0.024
Pipe 2	240	297	120	60.70	0.88	3.10	0.024
Pipe 3	406	297	120	58.44	0.84	2.89	0.024
Pipe 4	216	297	120	-53.54	0.77	2.46	0.024
Pipe 5	436	297	120	79.13	1.14	5.07	0.023
Pipe 6	172	297	120	82.20	1.19	5.44	0.023
Pipe 7	242	297	120	-61.23	0.88	3.16	0.024
Pipe 8	52	297	120	-66.49	0.96	3.68	0.023
Pipe 9	576	900	120	-36.54	0.06	0.01	0.029
Pipe 10	262	297	120	-36.54	0.53	1.21	0.025
Pipe 11	137	297	120	-20.98	0.30	0.43	0.028
Pipe 12	216	297	120	-38.93	0.56	1.36	0.025
Pipe 13	246	297	120	-45.77	0.66	1.84	0.025
Pipe 14	469	297	120	-45.77	0.66	1.84	0.025
Pipe 15	283	297	120	52.12	0.75	2.34	0.024
Pipe 16	123	297	120	52.12	0.75	2.34	0.024
Pipe 17	173	400	120	-52.12	0.41	0.55	0.025
Pipe 18	472	297	120	-36.54	0.53	1.21	0.025
Pipe 19	147	297	120	-52.12	0.75	2.34	0.024

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'MD1')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	169.26	151.02	48.09	471.76	68.42
Junc N1	103.78	4.91	152.48	48.7	477.75	69.29
Junc N2	103.04	3.08	154.52	51.48	505.02	73.25
Junc N3	101.61	15.57	155.05	53.44	524.25	76.04
Junc N4	102.28	6.84	153.45	51.17	501.98	72.81
Junc N5	101.45	0	154.06	52.61	516.10	74.85
Junc N6	102.27	6.35	153.92	51.65	506.69	73.49
Junc N7	101.51	0	153.61	52.1	511.10	74.13
Junc N8	100.7	0	155.25	54.55	535.14	77.61
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	154.46	51.76	507.77	73.65
Junc PR1	101.11	5.26	155.48	54.37	533.37	77.36
Junc T1	102.26	0	155.03	52.77	517.67	75.08
Junc T2	103.08	4.59	153.36	50.28	493.25	71.54
Resvr 1	155.6	-79.68	155.6	0	0.00	0.00
Resvr 2	154.5	-136.17	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'MD1')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	103.56	1.49	8.35	0.022
Pipe 2	240	297	120	103.56	1.49	8.35	0.022
Pipe 3	406	297	120	-65.70	0.95	3.60	0.023
Pipe 4	216	297	120	70.61	1.02	4.11	0.023
Pipe 5	436	297	120	55.78	0.81	2.65	0.024
Pipe 6	172	297	120	58.85	0.85	2.93	0.024
Pipe 7	242	297	120	-46.29	0.67	1.88	0.025
Pipe 8	52	297	120	-51.55	0.74	2.29	0.024
Pipe 9	576	900	120	-28.13	0.04	0.00	0.031
Pipe 10	262	297	120	-28.13	0.41	0.75	0.026
Pipe 11	137	297	120	-12.56	0.18	0.17	0.030
Pipe 12	216	297	120	-19.42	0.28	0.38	0.028
Pipe 13	246	297	120	-26.26	0.38	0.66	0.027
Pipe 14	469	297	120	-26.26	0.38	0.66	0.027
Pipe 15	283	297	120	32.61	0.47	0.98	0.026
Pipe 16	123	297	120	32.61	0.47	0.98	0.026
Pipe 17	173	400	120	-32.61	0.26	0.23	0.027
Pipe 18	472	297	120	-28.13	0.41	0.75	0.026
Pipe 19	147	297	120	-32.61	0.47	0.98	0.026

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'PR1')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.6	50.67	497.07	72.09
Junc N1	103.78	4.91	153.61	49.83	488.83	70.90
Junc N2	103.04	3.08	153.84	50.8	498.35	72.28
Junc N3	101.61	15.57	154.08	52.47	514.73	74.66
Junc N4	102.28	6.84	153.6	51.32	503.45	73.02
Junc N5	101.45	0	153.59	52.14	511.49	74.19
Junc N6	102.27	6.35	153.59	51.32	503.45	73.02
Junc N7	101.51	0	153.6	52.09	511.00	74.11
Junc N8	100.7	0	154.62	53.92	528.96	76.72
Junc N9	96.68	0	155.59	58.91	577.91	83.82
Junc N10	102.7	0	153.6	50.9	499.33	72.42
Junc PR1	101.11	222.26	153.93	52.82	518.16	75.15
Junc T1	102.26	0	153.94	51.68	506.98	73.53
Junc T2	103.08	4.59	153.62	50.54	495.80	71.91
Resvr 1	155.6	-263.29	155.6	0	0.00	0.00
Resvr 2	153.6	-2.56	153.6	0	0.00	0.00

Network Table - Links (Max Day + FF 'PR1')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	-0.88	0.01	0.00	0.043
Pipe 2	240	297	120	-0.88	0.01	0.00	0.045
Pipe 3	406	297	120	-3.14	0.05	0.01	0.037
Pipe 4	216	297	120	8.05	0.12	0.07	0.032
Pipe 5	436	297	120	22.39	0.32	0.49	0.027
Pipe 6	172	297	120	25.46	0.37	0.62	0.027
Pipe 7	242	297	120	7.65	0.11	0.07	0.032
Pipe 8	52	297	120	-214.61	3.10	32.20	0.020
Pipe 9	576	900	120	-48.68	0.08	0.01	0.028
Pipe 10	262	297	120	-48.68	0.70	2.06	0.024
Pipe 11	137	297	120	-33.11	0.48	1.01	0.026
Pipe 12	216	297	120	9.75	0.14	0.10	0.031
Pipe 13	246	297	120	2.91	0.04	0.01	0.037
Pipe 14	469	297	120	2.91	0.04	0.01	0.037
Pipe 15	283	297	120	3.44	0.05	0.02	0.036
Pipe 16	123	297	120	3.44	0.05	0.02	0.036
Pipe 17	173	400	120	-3.44	0.03	0.00	0.037
Pipe 18	472	297	120	-48.68	0.70	2.06	0.024
Pipe 19	147	297	120	-3.44	0.05	0.02	0.036

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N3')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.3	50.37	494.13	71.67
Junc N1	103.78	4.91	153.06	49.28	483.44	70.12
Junc N2	103.04	3.08	152.66	49.62	486.77	70.60
Junc N3	101.61	232.57	150.57	48.96	480.30	69.66
Junc N4	102.28	6.84	153	50.72	497.56	72.17
Junc N5	101.45	0	153.33	51.88	508.94	73.82
Junc N6	102.27	6.35	153.25	50.98	500.11	72.54
Junc N7	101.51	0	153.08	51.57	505.90	73.37
Junc N8	100.7	0	152.36	51.66	506.78	73.50
Junc N9	96.68	0	155.58	58.9	577.81	83.80
Junc N10	102.7	0	153.58	50.88	499.13	72.39
Junc PR1	101.11	5.26	155.02	53.91	528.86	76.70
Junc T1	102.26	0	152.56	50.3	493.44	71.57
Junc T2	103.08	4.59	152.97	49.89	489.42	70.98
Resvr 1	155.6	-213.54	155.6	0	0.00	0.00
Resvr 2	153.6	-52.31	153.6	0	0.00	0.00

Network Table - Links (Max Day + FF 'N3')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	27.43	0.40	0.71	0.027
Pipe 2	240	297	120	27.43	0.40	0.71	0.027
Pipe 3	406	297	120	25.17	0.36	0.61	0.027
Pipe 4	216	297	120	-20.26	0.29	0.41	0.028
Pipe 5	436	297	120	-27.37	0.40	0.71	0.027
Pipe 6	172	297	120	-24.29	0.35	0.57	0.027
Pipe 7	242	297	120	-115.38	1.67	10.20	0.021
Pipe 8	52	297	120	-120.64	1.74	11.08	0.021
Pipe 9	576	900	120	-92.90	0.15	0.03	0.026
Pipe 10	262	297	120	-92.90	1.34	6.83	0.022
Pipe 11	137	297	120	139.67	2.02	14.53	0.021
Pipe 12	216	297	120	-11.70	0.17	0.15	0.030
Pipe 13	246	297	120	-18.53	0.27	0.35	0.028
Pipe 14	469	297	120	-18.53	0.27	0.35	0.028
Pipe 15	283	297	120	24.88	0.36	0.60	0.027
Pipe 16	123	297	120	24.88	0.36	0.60	0.027
Pipe 17	173	400	120	-24.88	0.20	0.14	0.028
Pipe 18	472	297	120	-92.90	1.34	6.83	0.022
Pipe 19	147	297	120	-24.88	0.36	0.60	0.027

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N6')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153	50.07	491.19	71.24
Junc N1	103.78	4.91	152.48	48.7	477.75	69.29
Junc N2	103.04	3.08	154.04	51	500.31	72.56
Junc N3	101.61	15.57	154.85	53.24	522.28	75.75
Junc N4	102.28	6.84	150.62	48.34	474.22	68.78
Junc N5	101.45	0	147.78	46.33	454.50	65.92
Junc N6	102.27	223.35	145.86	43.59	427.62	62.02
Junc N7	101.51	0	148.98	47.47	465.68	67.54
Junc N8	100.7	0	155.11	54.41	533.76	77.42
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	153.07	50.37	494.13	71.67
Junc PR1	101.11	5.26	155.44	54.33	532.98	77.30
Junc T1	102.26	0	154.8	52.54	515.42	74.75
Junc T2	103.08	4.59	152.27	49.19	482.55	69.99
Resvr 1	155.6	-94.18	155.6	0	0.00	0.00
Resvr 2	153.6	-171.66	153.6	0	0.00	0.00

Network Table - Links (Max Day + FF 'N6')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	39.95	0.58	1.43	0.025
Pipe 2	240	297	120	39.95	0.58	1.43	0.025
Pipe 3	406	297	120	37.70	0.54	1.29	0.025
Pipe 4	216	297	120	-32.79	0.47	0.99	0.026
Pipe 5	436	297	120	70.28	1.01	4.07	0.023
Pipe 6	172	297	120	73.36	1.06	4.41	0.023
Pipe 7	242	297	120	-55.56	0.80	2.64	0.024
Pipe 8	52	297	120	-60.82	0.88	3.12	0.024
Pipe 9	576	900	120	-33.36	0.05	0.00	0.030
Pipe 10	262	297	120	-33.36	0.48	1.02	0.026
Pipe 11	137	297	120	-17.79	0.26	0.32	0.028
Pipe 12	216	297	120	98.48	1.42	7.61	0.022
Pipe 13	246	297	120	91.64	1.32	6.66	0.022
Pipe 14	469	297	120	91.64	1.32	6.66	0.022
Pipe 15	283	297	120	131.71	1.90	13.03	0.021
Pipe 16	123	297	120	131.71	1.90	13.03	0.021
Pipe 17	173	400	120	-131.71	1.05	3.06	0.022
Pipe 18	472	297	120	-33.36	0.48	1.02	0.026
Pipe 19	147	297	120	-131.71	1.90	13.03	0.021

# Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N8')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.45	50.52	495.60	71.88
Junc N1	103.78	4.91	153.34	49.56	486.18	70.51
Junc N2	103.04	3.08	153.24	50.2	492.46	71.43
Junc N3	101.61	15.57	151.96	50.35	493.93	71.64
Junc N4	102.28	6.84	153.31	51.03	500.60	72.61
Junc N5	101.45	0	153.46	52.01	510.22	74.00
Junc N6	102.27	6.35	153.41	51.14	501.68	72.76
Junc N7	101.51	0	153.35	51.84	508.55	73.76
Junc N8	100.7	217	150.14	49.44	485.01	70.34
Junc N9	96.68	0	155.57	58.89	577.71	83.79
Junc N10	102.7	0	153.59	50.89	499.23	72.41
Junc PR1	101.11	5.26	155.15	54.04	530.13	76.89
Junc T1	102.26	0	153.23	50.97	500.02	72.52
Junc T2	103.08	4.59	153.31	50.23	492.76	71.47
Resvr 1	155.6	-229.23	155.6	0	0.00	0.00
Resvr 2	153.6	-36.61	153.6	0	0.00	0.00

Network Table - Links (Max Day + FF 'N8')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	18.87	0.27	0.36	0.028
Pipe 2	240	297	120	18.87	0.27	0.36	0.028
Pipe 3	406	297	120	16.61	0.24	0.28	0.029
Pipe 4	216	297	120	-11.70	0.17	0.15	0.030
Pipe 5	436	297	120	-11.67	0.17	0.15	0.030
Pipe 6	172	297	120	-8.59	0.12	0.08	0.031
Pipe 7	242	297	120	-100.82	1.46	7.95	0.022
Pipe 8	52	297	120	-106.08	1.53	8.73	0.022
Pipe 9	576	900	120	-123.15	0.19	0.05	0.024
Pipe 10	262	297	120	93.85	1.35	6.96	0.022
Pipe 11	137	297	120	109.42	1.58	9.25	0.022
Pipe 12	216	297	120	-4.56	0.07	0.03	0.035
Pipe 13	246	297	120	-11.40	0.16	0.14	0.030
Pipe 14	469	297	120	-11.40	0.16	0.14	0.030
Pipe 15	283	297	120	17.75	0.26	0.32	0.028
Pipe 16	123	297	120	17.75	0.26	0.32	0.028
Pipe 17	173	400	120	-17.75	0.14	0.07	0.029
Pipe 18	472	297	120	-123.15	1.78	11.51	0.021
Pipe 19	147	297	120	-17.75	0.26	0.32	0.028

## **Appendix B: Stormwater Documentation**

- Technical Memorandum – Carp River PCSWMM Model
- PCSWMM Model Schematic
- Pond 1 Design Sheet
- Chicago Design Storms
- SCS Design Storms
- 100-year Model Output – Kizell Lands only
- 100-year Model Output – Carp River model – future conditions
- 100-year Model Output – Carp River model – interim conditions



# MEMORANDUM

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**DATE:** DECEMBER 13, 2019  
**TO:** LAURENT JOLLIET  
**FROM:** KALLIE AULD  
**RE:** KIZELL LANDS AND FERNBANK POND 1:  
INTEGRATION WITH CARP RIVER PCSWMM MODEL (REV. 2)  
**CC:** MIKE PETEPIECE, P.ENG., MARK BISSETT, P.ENG.

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## 1.0 BACKGROUND

The City has developed a PCSWMM model of the Carp River subwatershed and indicated that all new development within the watershed is to be represented in this model to confirm that the cumulative impacts of development are accounted for and that the proposed stormwater management strategies will have no adverse impact on water levels in the Carp River.

This technical memorandum provides an overview of how the PCSWMM model for the Kizell Lands and Fernbank Pond 1 has been integrated into the City of Ottawa Carp River PCSWMM model (March, 2017) and changes that have been made to the Carp River model.

## 2.0 UPSTREAM DRAINAGE AREAS

### Existing Conditions

Storm runoff from the Granite Ridge subdivision (47.21 ha) and a portion of the Iber Road industrial area (18.11 ha + 10.45 ha) is tributary to an existing 1350 mm storm sewer. This sewer runs across the existing high school site south of the Kizell Lands, then outlets to an open ditch that conveys flows north across the Kizell Lands to the Carp River West Tributary and ultimately the Carp River.

The design flows used to size the 1350 mm storm sewer were taken from the *Granite Ridge Subdivision Stormwater Site Management Plan and Summary of Calculations* (Simmering & Associates, February 2000). The sewer was sized to accommodate the controlled 100-year peak flow from the upstream drainage area.

### Proposed Conditions

As part of the proposed development, the existing storm sewer crossing the High school property will be extended through the Kizell Lands to a new SWM facility (Fernbank Pond 1) that will provide stormwater quality and quantity control for the proposed subdivision. This sewer will also collect storm runoff from a portion of the proposed development.

## 2.1 Model Revisions to Upstream Areas

Several changes have been made to the Carp River PCSWMM models (Existing, Interim, and Future) to better represent the flows from the upstream drainage areas:

### Granite Ridge Subdivision:

- Slight changes have been made to area CS254\_1 in all PCSWMM models;
- The percent impervious has been updated from 47.2% to 44.2%, based on the impervious surface layer provided by the City;
- No changes have been made to the Subarea Routing method or Percent Routed.

### Iber Road:

- Slight changes have been made to areas CS254\_2 (Iber West) and CS252 (Iber East) in all PCSWMM models;
- The percent impervious for each area has been updated based on the impervious surface layer provided by the City;
  - The % impervious for area CS254-2 has changed from 40% to 36.1%
  - The % impervious for area CS252 has changed from 66% to 56.4%
- Storage nodes have been added to both areas to represent the amount of on-site storage outlined in the attached MOECC Environmental Compliance Approvals (**Attachment 1**). Refer to the following tables for details:

**Table 1: Iber Road East Storage Volumes (m<sup>3</sup>/ha) & Release Rates (L/s)**

Area (ha)	Storage Volume (m <sup>3</sup> )	Release Rate (L/s)	Storage Volume (m <sup>3</sup> /ha)	Release Rate (L/s/ha)
0.27	69	10	257	37
0.43	116	29	270	67
0.59	180	30	305	51
0.52	252	14	484	26
0.69	75	22	109	32
0.38	70	16	184	42
0.97	150	62	155	64
1.13	154	N/A	136	N/A

**Table 2: Iber Road West Storage Volumes (m<sup>3</sup>/ha) & Release Rates (L/s)**

Area (ha)	Storage Volume (m <sup>3</sup> )	Release Rate (L/s)	Storage Volume (m <sup>3</sup> /ha)	Release Rate (L/s/ha)
0.51	67	16	131	31
1.17	380	37	325	32
0.56	90	62	161	110
1.74	447	125	257	72
0.84	304	79	362	94

Based on the values outlined in **Tables 1** and **2**, overall release rates were determined:

**Table 3: Overall Iber Road Release Rates**

Iber Road Area	Total Area (ha)	Release Rate			
		Minimum (L/s/ha)	Maximum (L/s/ha)	Average (L/s/ha)	Average Overall (L/s)
Iber Road East	10.45	26	67	46	<b>477</b>
Iber Road West	18.12	31	110	68	<b>1227</b>

For area CS254\_2 (Iber Road West) and CS252 (Iber Road East), the storage nodes have been updated to provide the same amount of storage as shown in the attached ECAs. Outlets from the storage nodes are sized to allow the above listed release rates, although weir links are provided to account for overflow from the known available storage.

Each of the Existing, Interim, Future, and stand-alone Pond 1 model have been updated to reflect these revisions. Model results outlined in the Conceptual Site Servicing and Stormwater Management report, and later in this memo, reflect these changes.

### 3.0 MODEL DEVELOPMENT & INTEGRATION

A PCSWMM model of the Kizell Lands was developed by Novatech based on the conceptual storm drainage area plan and storm sewer layout. This model was used to evaluate the storage requirements in the proposed SWM facility (Fernbank Pond 1) and the level of service provided by the conceptual major and minor system networks.

The nodes, links, and storage curves used to represent the major and minor drainage system network for the Kizell Lands development have been designed in accordance with City of Ottawa Technical Bulletin PIEDTB-2016-01 (September 2016).

Fernbank Pond 1 will provide stormwater quality and quantity control for the Kizell Lands (76.01 ha), and has been sized to accommodate the controlled outflows from the upstream Granite Ridge SWM Facility and a portion of the Iber Road industrial area – refer to **Drawing 108195-STM**. Additional details on the design of the subdivision are available in the Concept Servicing Report.

#### 3.1 Model Integration

The standalone PCSWMM model of the Kizell Lands has been integrated into the Carp River PCSWMM models (interim and future conditions) in accordance with the protocol outlined the *City of Ottawa Carp River PCSWMM Model Documentation*. The updated Carp River models are provided on the attached CD as a part of the *Kizell Lands – Fernbank Concept Servicing Report*.

##### Carp River - Interim Conditions

The Interim Conditions PCSWMM model has been updated to reflect the proposed design for the Kizell Lands and Fernbank Pond 1. Drainage area 'CS251' was adjusted to be consistent with the storm catchment areas from the standalone PCSWMM model of the Kizell Lands.

##### Carp River - Future (Ultimate) Conditions

The Future Conditions PCSWMM model has been updated to reflect ultimate development of the Fernbank Lands tributary to the Carp River including Fernbank Ponds 1, 2, and 3. The Future

Conditions Carp River PCSWMM model (March 2017) includes the stand alone PCSWMM model for Pond 1 and the latest development plans within the Pond 1 drainage area.

### 3.2 Model Results

**Table 5** (Interim Conditions) and **Table 6** (Future Conditions) provide a comparison of the 100-year water levels and flows along the main Branch of the Carp River between the updated Carp River Models and the original, unedited, models provided by the City in March 2017.

**Table 4: 100-year Flows and Water Levels in Carp River (Interim Conditions)**

Location on Carp River	PCSWMM Node	Original (March 2016)		Kizell Lands (Dec 2019)	
		Flow (m <sup>3</sup> /s)	Water Level (m)	Flow (m <sup>3</sup> /s)	Water Level (m)
Existing West Tributary	CJ201	12.48	94.51	12.84	94.54
Hazeldean Road	CJ199	11.41	94.49	11.93	94.52
Maple Grove Road	CJ172	11.22	94.44	11.86	94.46
Palladium Drive	CJ150	28.56	94.33	29.03	94.34
Highway 417	CJ120	29.09	94.24	29.69	94.25
Feedmill Creek	CJ106	30.03	94.00	30.31	94.01
Richardson Side Road	CJ050	39.38	93.38	40.02	93.39
Huntmar Drive	CJ032	53.97	93.06	54.37	93.06

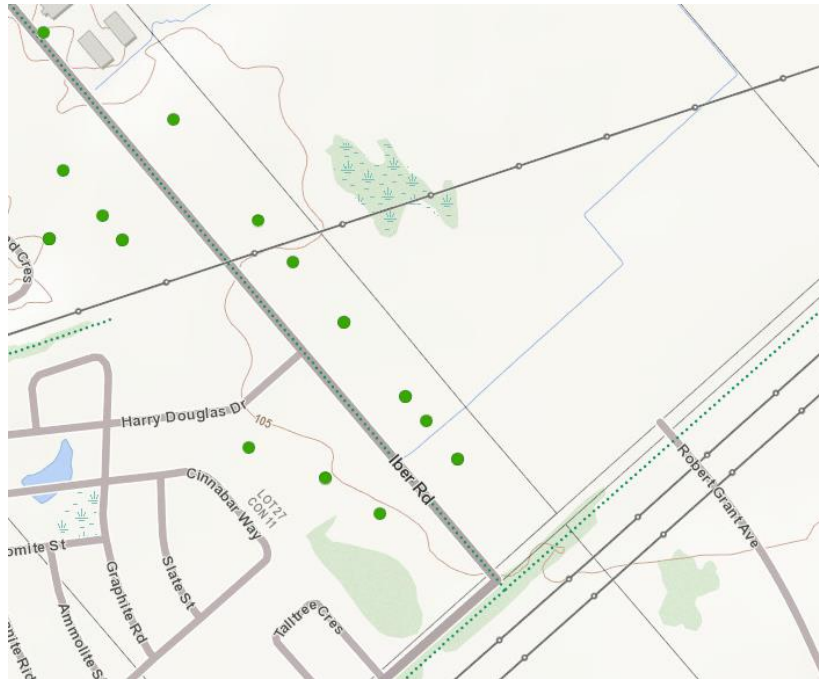
**Table 5: 100-year Flows and Water Levels in Carp River (Future Conditions)**

Location on Carp River	PCSWMM Node	Original (March 2016)		Kizell Lands (Dec 2019)	
		Flow (m <sup>3</sup> /s)	Water Level (m)	Flow (m <sup>3</sup> /s)	Water Level (m)
Existing West Tributary	CJ201	14.63	94.40	8.553	94.34
Hazeldean Road	CJ199	14.22	94.31	14.11	94.31
Maple Grove Road	CJ172	16.63	94.19	16.77	94.19
Palladium Drive	CJ150	55.11	94.15	51.60	94.15
Highway 417	CJ120	32.51	93.98	32.58	93.97
Feedmill Creek	CJ106	44.68	93.69	43.91	93.68
Richardson Side Road	CJ050	43.76	93.47	43.06	93.45
Huntmar Drive	CJ032	58.46	93.11	56.76	93.10

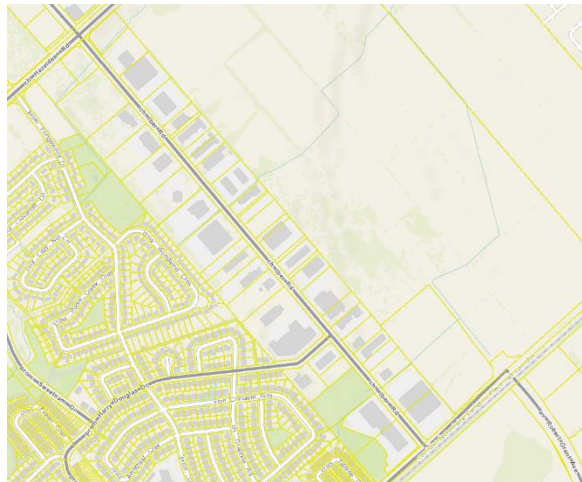
The model results indicate a slight increase in peak flow in the Carp River, as the 100-year release rates for Pond 1 have increased from the March 2017 model. The release rates are generally consistent with the release rates from the SWMHYMO model prepared as part of the Fernbank EMP.

The model results indicate that there will be no substantial change to the modeled 100-year water levels in the Carp River under interim or future development conditions. The PCSWMM model output has been reviewed and any increases in water level are generally less than 0.03m. Under ultimate there is no increase in water levels.

**ATTACHMENT 1**  
**Iber Road Industrial (East)**  
**MOE ECA's (SWM)**



Access Environment



GeoOttawa

**ATTACHMENT 1**  
**Iber Road Industrial (East)**  
**MOE ECA's (SWM)**

**Summary of MOE ECA's for Iber Road Industrial (from Access Environment Website)**

Site Location	MOE ECA #	SWM Strategy	Drainage Area	SWM Storage	Release Rate
<b>East Side of Iber Road</b>					
Block 12, Plan 4M-454 and Part of Blocks 7 & 8, Plan 4M-658	9724-6B9NSK	SWM Pond	0.27 ha	69.3 m <sup>3</sup>	10.1 L/s* (Post - 5yr Pre)
		SWM Pond	0.43 ha	116 m <sup>3</sup>	28.6 L/s* (Post - 5yr Pre)
149 Iber Rd	0305-78HL9L	SWM Pond	0.59 ha	180 m <sup>3</sup>	30.1 L/s
109 Iber Road	8975-A4VL6P	SWM Pond	0.52 ha	235 m <sup>3</sup> (+ 16.9 m <sup>3</sup> of infil)	13.7 L/s (Post - 5yr Pre)
185 Iber Road	8466-5SDK27	SWM pond	0.69 ha	75 m <sup>3</sup>	22.3 L/s
Lots 9 and 10, Registered Plan 4M-658	3222-56PSBR	SWM Pond	0.38 ha	70 m <sup>3</sup>	16 L/s
		SWM Pond	0.97 ha	150 m <sup>3</sup>	62 L/s
139 Iber Road, Lot 5, Part 4/5, Plan 4M-658	1916-5XEMBL	3x SWM Ponds	-	154 m <sup>3</sup>	Post - Pre
<b>West Side of Iber Road</b>					
150 Iber Road, Part of Lot 14, Registered Plan 4M-658	1015-6CANY3	Rooftop / Surface Ponding	-	39 m <sup>3</sup> (roof top) + 28 m <sup>3</sup> (surface)	4.6 L/s + 5.0 L/s + 3.9 L/s + 2.3 L/s
164 Iber Road	4789-6KJJT3	Inlet to GR SWM Pond	-	-	-
110 Iber Road	9230-95LSBM	Surface / Underground Storage & SWM Pond	1.17 ha	156 m <sup>3</sup> (surface) + 167 m <sup>3</sup> (underground) + 57 m <sup>3</sup> (pond)	37 L/s (pond)
86 Harry Douglas Drive (intersection with Iber Road)	0940-5G9JK3	SWM Pond	0.56 ha	90 m <sup>3</sup>	61.7 L/s
200 Iber Road	7685-7C8NXM	Rooftop / SWM Pond	-	446.5 m <sup>3</sup>	20.48 L/s (rooftop) + 40.5 L/s + 63.8 L/s.
118 Iber Road	9025-6EWRL8	Rooftop / SWM Pond	-	84 m <sup>3</sup> (rooftop) + 220 m <sup>3</sup> (pond)	8 L/s + 8 L/s + 63 L/s

Please refer to the attached ECA documents.



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CERTIFICATE OF APPROVAL  
INDUSTRIAL SEWAGE WORKS  
NUMBER 9724-6B9NSK

Campbell Bros. Movers Limited  
55 Midpark Crescent  
London, Ontario  
N6N 1A9

Site Location: Block 12, Plan 4M-454 and Part of Blocks 7 & 8, Plan 4M-658  
City of Ottawa

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

a stormwater management system to serve a 0.81 ha site being used for the existing office and warehouse building (moving and storage of furniture) and proposed addition at the above listed location, consisting of the following:

- stormwater management pond (known as North Pond), located in the north-east corner of the site, collecting up to 100-year storm event runoff from an area of 0.27 ha, having a total storage volume of 69.3 m<sup>3</sup> complete with overflow outlet and outlet structure consisting of a 150 mm diameter outflow pipe allowing a maximum discharge of 10.1 L/s (5-year storm event) to the existing drainage swale and eventually to Carp River;
- stormwater management pond (known as South Pond), located in the south-east corner of the site, collecting up to 100-year storm event runoff from an area of 0.43 ha, having a total storage volume of 116 m<sup>3</sup> complete with outlet structure consisting of a 200 mm diameter outflow pipe allowing a maximum discharge of 28.6 L/s (5-year storm event) to the existing drainage swale and eventually to Carp River;
- all other appurtenances essential for proper operation of the aforementioned sewage works;

all in accordance with the applications dated January 9, 2002 and February 24, 2005, including reports entitled "Report for Review by the City of Ottawa and the Mississippi Valley Conservation Authority, Proposed Warehouse and Office Building Campbell Moving Limited, Block 12, Plan 4M-454 and Part of Blocks 7 & 8, Plan 4M-658, Iber Road, Stittsville, Goulbourn, now City of Ottawa" dated February-March, 2001, revised 5/6 April, 2002 and 23 March, 2001 and "Amended Report for Review by the City of Ottawa and the Mississippi Valley Conservation Authority, Phase - II Proposed Addition to Existing Warehouse and Office Building Campbell Moving Limited, Block 12, Plan 4M-454 and Part of Blocks 7 & 8, Plan 4M-658, Iber Road, Stittsville, Goulbourn, now City of Ottawa" dated January 2005, final plans and specifications prepared by H. C. Morash, P.Eng.

*For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

1. "Certificate" means this entire Certificate of Approval document, issued in accordance with Section 53 of the Ontario Water Resources Act, and includes any schedules;
2. "Director" means any Ministry employee appointed by the Minister pursuant to Section 5 of the Ontario Water Resources Act;
3. "Ministry" means the Ontario Ministry of the Environment;
4. "District Manager" means the District Manager of the Ottawa District Office of the Ministry;
5. "Owner" means City of Ottawa and includes its successors and assignees; and
6. "Works" means the sewage works described in the Owner's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate.



*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

## **TERMS AND CONDITIONS**

### **1. GENERAL CONDITION**

1.1 The Owner shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the stormwater management works do not constitute a safety or health hazard to the general public.

1.2 Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Certificate, the application for approval of the Works and the submitted supporting documents and plans and specifications as submitted.

1.3 Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail:

1.4 The approval granted by this Certificate is based upon a review of the proposed works in the context of its effect on the environment, its process performance and principles of established engineering theory.

1.5 The review did not include a consideration of the architectural, mechanical or structural components of the Works except to the extent necessary to review the works as set out in the above paragraph.

1.6 The Owner shall ensure that, at all times, the Works and related equipment and appurtenances which are installed or used to achieve compliance with this Certificate are properly operated and maintained and meet with the operation and maintenance requirements of the Municipality.

### **2. EXPIRY OF APPROVAL**

2.1 The approval issued by this Certificate will cease to apply to those parts of the Works which have not been constructed within five (5) years of the date of this Certificate.

### **3. CHANGE OF OWNER**

3.1 The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within 30 days of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the District Manager;

(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the District Manager;

3.2 In the event of any change in ownership of the Works, other than a change to a successor Municipality, the Owner shall notify in writing the succeeding owner of the existence of this Certificate, and a copy of such notice shall be forwarded to the District Manager and the Director.

### **4. CLEANING AND MAINTENANCE**

4.1 The Owner shall ensure that sediment, debris and excessive decaying vegetation are removed from the above noted stormwater management ponds at least once a year to prevent the excessive build-up of sediment, debris and/or decaying vegetation to avoid any reduction of capacity of the ponds. The Owner shall also regularly inspect and clean out the inlet to and outlet from the Works to ensure that these are not obstructed.



## **5. RECORD KEEPING AND REPORTING**

5.1 The Owner shall prepare operational manual which should include, but not limited to, frequency and method of clean-out of stormwater management works within six (6) months from the date of issuance of this Certificate of Approval or the commissioning of the Works. The Owner shall keep the operations manual up to date with such revisions as may be required. Upon request, the Owner shall make the manual available for inspection by Ministry personnel and furnish a copy to the Ministry.

5.2 The Owner shall maintain a logbook to record the results of all inspections and any cleaning and maintenance operations undertaken and shall make the logbook available for inspection by the Ministry upon request.

5.3 The Owner shall retain all records related to the monitoring activities required by this Certificate, for a period of three (3) years from the date of their creation, unless otherwise directed in writing by the District Manager.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed because it is not in the public interest for the Director to approve facilities which, by reason of potential health and safety hazards do not generally comply with legal standards or approval requirements falling outside the purview of this Ministry.

2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the Works are made aware of the Certificate and continue to operate the Works in compliance with it.

4. Condition 4 is included as regular removal of sediment and excessive decaying vegetation from this approved stormwater management system are required to mitigate the impact of sediment and/or decaying vegetation on the downstream receiving watercourse. It is also required to ensure that adequate storage is maintained in the stormwater management facilities at all times as required by the design.

5. Condition 5 is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this Certificate, so that the Ministry can work with the Owner in resolving any problems in a timely manner.

**This Certificate of Approval revokes and replaces Certificate(s) of Approval Municipal and Private Sewage Works Number 8662-576Q6F issued on February 14, 2002.**

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;

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8. The municipality within which the works are located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., 12th Floor  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

AND

The Director  
Section 53, *Ontario Water Resources Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

DATED AT TORONTO this 13th day of April, 2005

Mohamed Dhalla, P.Eng.  
Director  
Section 53, *Ontario Water Resources Act*

KC/  
c: District Manager, MOE Ottawa District Office  
Henry Morash, P.Eng.  
R. L. Phillips, C.E.T., Program Manager, City of Ottawa



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CERTIFICATE OF APPROVAL  
INDUSTRIAL SEWAGE WORKS  
NUMBER 0940-5G9JK3

4063767 Canada Inc.  
PO Box 11336 Stn H  
Nepean, Ontario  
K2H 7V1

Site Location: Microzone Complex  
86 Harry Douglas Drive  
City of Ottawa

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

stormwater management facility to serve a light manufacturing operation at the above location on a site area of approximately 0.8 hectare with discharge of the stormwater to an existing municipal wet pond located south of the site, consisting of the following:

- one (1) catchbasin at the loading ramp for collection of stormwater with discharge via a 150 millimeter diameter pipe to an outlet structure located at a dry pond;
- one (1) rectangular shaped dry pond at the south-east corner of the site having a volumetric capacity of approximately 90 cubic metres at an elevation of 104.25 metre for collection of runoff from approximately 0.56 hectare of the site with a maximum release rate of 61.7 litres/second from the pond achieved during a 100-year storm due to flow restriction from the pond by installation of a 173 millimetre diameter orifice at the outlet structure; and
- all other appurtenances essential for proper operation of the aforementioned sewage works;

all in accordance with the Application for Approval of Industrial Sewage Works dated October 24, 2002 submitted by the Principal, Dynar Architect and Associates Inc., and the Stormwater Management Report for Microzone Complex, Ottawa dated October 12, 2002, prepared by Simmering and Associates Ltd, Ottawa.

*For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

"Certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act*;

"District Manager" means the District Manager of the Ottawa District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means 4063767 Canada Inc., and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

**TERMS AND CONDITIONS**

## **1. GENERAL CONDITION**

Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications.

## **2. OPERATION AND MAINTENANCE**

(1) The Owner shall undertake an inspection of the condition of the stormwater management pond, at least six (6) times a year, and undertake any necessary cleaning and maintenance to prevent the excessive buildup of sediment and/or decaying vegetation.

(2) The owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken and shall keep the logbook at the site for inspection by the Ministry.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted.
2. Condition 2 is included to ensure that any buildup of sediment and/or decaying vegetation does not impair the performance of the stormwater management facility.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., 12th Floor  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

AND

The Director  
Section 53, *Ontario Water Resources Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

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DATED AT TORONTO this 11th day of December, 2002

Mohamed Dhalla, P.Eng.  
Director  
Section 53, *Ontario Water Resources Act*

AC/  
c: District Manager, MOE Ottawa  
Douglas Kerr, Simmering & Associates Ltd.



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AMENDED CERTIFICATE OF APPROVAL  
INDUSTRIAL SEWAGE WORKS  
NUMBER 0305-78HL9L  
Issue Date: November 28, 2007

Ontario

The Duncan Group Limited  
149 Iber Rd  
Ottawa, Ontario  
K2S 1E7

Site Location: Sani-Sol  
149 Iber Rd  
City of Ottawa  
K2S 1E7

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

stormwater management facility to serve a new sales and service centre for cleaning products and equipment on a site area covering approximately 0.59 hectares at the above location, consisting of the following:

- one (1) in-line storage pond at the eastern part of the site with a storage capacity of approximately 180 m<sup>3</sup> with 100-millimetre diameter outlet control device installed in a 300-millimetre diameter CSP pipe with a controlled maximum flow rate of 30.1 litres per second for the 100-year return storm; and
- all other appurtenances essential for proper operation of the aforementioned sewage works;

all in accordance with the following documents:

1. Application for Approval of Industrial Sewage Works dated July 29, 2002 and the associated documents submitted by the Owner, The Duncan Group Limited, Stittsville, Ontario.
2. Application for Approval of Industrial Sewage Works submitted by David Duncan of the The Duncan Group Limited, received on September 6, 2007 and all supporting information.

*For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

"Certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act*;

"District Manager" means the District Manager of the Ottawa District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means The Duncan Group Limited, and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

## TERMS AND CONDITIONS

### 1. GENERAL PROVISIONS

(1) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

(2) Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(3) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

### 2. EXPIRY OF APPROVAL

The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

### 3. CHANGE OF OWNER

The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within thirty (30) days of the change occurring:

- (a) change of *Owner*;
- (b) change of address of the *Owner*;
- (c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*; and
- (d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager*.

### 4. OPERATION AND MAINTENANCE

(1) The *Owner* shall inspect the *Works* at least once a year and, if necessary, clean and maintain the *Works* to prevent the excessive build-up of sediments, oil/grit, and/or vegetation

(2) The *Owner* shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at 149 Iber Rd, Ottawa, for inspection by the *Ministry*. The logbook shall include the following:

- (a) the name of the *Works*;
- (b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed; and

(c) the date of each spill within the catchment area, including follow-up actions / remedial measures undertaken.

## 5. **RECORD KEEPING**

The *Owner* shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this *Certificate*.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.
2. Condition 2 is included to ensure that the *Works* are constructed in a timely manner so that standards applicable at the time of Approval of the *Works* are still applicable at the time of construction, to ensure the ongoing protection of the environment.
3. Condition 3 is included to ensure that the *Ministry* records are kept accurate and current with respect to approved works and to ensure that subsequent owners of the works are made aware of the certificate and continue to operate the works in compliance with it.
4. Condition 4 is included to require that the *Works* be properly operated and maintained such that the environment is protected.
5. Condition 5 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the *Works*.

**This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 3010-5G8HQR issued on November 27, 2002.**

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*



CONTENT COPY OF ORIGINAL

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., Suite 1700  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

AND

The Director  
Section 53, *Ontario Water Resources Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

DATED AT TORONTO this 28th day of November, 2007

Mohamed Dhalla, P.Eng.  
Director  
Section 53, *Ontario Water Resources Act*

KD/  
c: District Manager, MOE Ottawa.  
Todd Perry, McIntosh Perry Consulting Engineers Ltd.

Content Copy Of Original



Ministry of the Environment and Climate Change  
Ministère de l'Environnement et de l'Action en matière de changement  
climatique

**ENVIRONMENTAL COMPLIANCE APPROVAL**

NUMBER 8975-A4VL6P

Issue Date: December 11, 2015

8769028 Canada Inc.  
Post Office Box, No. 78013  
Ottawa, Ontario  
K2E 1B1

Site Location: 109 Iber Road  
City of Ottawa

*You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:*

establishment of stormwater management works for the industrial warehouse development (approximately 0.61 hectares in area), located at 109 Iber Road within the Carp River watershed in the City of Ottawa. The proposed works will drain to the existing Iber Road ditch which discharges into the Carp River. The works are to provide normal level water quality control and water quantity control attenuating the post-development peak flow from 5-year and 100-year design storms to the 5-year peak flow pre-development rates for 0.52 hectares of the site. The remaining 0.09 hectares, which consists mostly of landscaped areas, will be uncontrolled (drain via sheet flow off of the site). The works consist of the following:

**storm sewers** collecting stormwater runoff from the proposed warehouse building, parking areas, and landscaped areas and conveying it to a stormwater detention area located at the front of the site;

**stormwater management facility (catchment area 0.52 hectares, 85% impervious):** - one (1) dry pond located at the front of the property (between the proposed warehouse building and Iber Road) providing 111 m<sup>3</sup> of storage and a maximum release rate of 9.7 L/s under the 5-year storm and 235 m<sup>3</sup> of storage and a maximum release rate of 13.7 L/s under the 100-year storm. The pond is to discharge through an inlet control device to the existing ditch on Iber Road;

**stormwater management facility (catchment area 0.52 hectares, 85% impervious):** - one (1) clear stone infiltration trench underlying the proposed dry pond providing 16.9 m<sup>3</sup> of storage volume;

including erosion/sedimentation control measures during construction and all other controls and appurtenances essential for the proper operation of the aforementioned Works;

all in accordance with the submitted supporting documents listed in Schedule "A" forming part of this Approval.

*For the purpose of this environmental compliance approval, the following definitions apply:*

"Approval" means this entire document including the application and any supporting documents listed in any schedules in this Approval;

"Director" means a person appointed by the Minister pursuant to section 5 of the Environmental Protection Act for the purposes of Part II.1 of the Environmental Protection Act;

"District Manager" means the District Manager of the Ottawa office of the Ministry;

"Equivalent" means a substituted product that meets the required quality and performance standards of a named product;

"Ministry" means the ministry of the government of Ontario responsible for the Environmental Protection Act and the Ontario Water Resources Act and includes all officials, employees or other persons acting on its behalf;

"Owner" means 8769028 Canada Inc. and includes their successors and assignees;

"Water Supervisor" means the Water Supervisor of the Ottawa office of the Ministry;

"Works" means the sewage works described in the Owner's application(s) and this Approval.

*You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:*

## TERMS AND CONDITIONS

### 1. GENERAL PROVISIONS

(1) The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the Conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, and the application for approval of the Works.

(3) Where there is a conflict between a provision of any submitted document referred to in this Approval and the Conditions of this Approval, the Conditions in this Approval shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The Conditions of this Approval are severable. If any Condition of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such Condition to other circumstances and the remainder of this Approval shall not be affected thereby.

(6) The issuance of, and compliance with the Conditions of this Approval does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement, including, but not limited to, the obligation to obtain approval from the local conservation authority necessary to construct or operate the sewage Works; or

(b) limit in any way the authority of the Ministry to require certain steps be taken to require the Owner to furnish any further information related to compliance with this Approval.

## 2. EXPIRY OF APPROVAL

(1) This Approval will cease to apply to those parts of the Works which have not been constructed within **five (5) years** of the date of this Approval.

## 3. CHANGE OF OWNER

(1) The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within **thirty (30) days** of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act , R.S.O. 1990, c. B17 shall be included in the notification to the District Manager;

(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act , R.S.O. 1990, c. C39 shall be included in the notification to the District Manager.

## 4. OPERATION AND MAINTENANCE

(1) The Owner shall inspect the Works at least **once a year** and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.

(2) The Owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at the Owner's office for inspection by the Ministry. The logbook shall include the following:

(a) the name of the Works; and

(b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed.

## 5. MONITORING AND REPORTING

(1) The Owner shall carry out a monitoring program for the inspection and maintenance of the Works as outlined in this Approval, and shall copy the Water Supervisor on any and all reports related to the operation and maintenance of the Works.

## 6. SPILL CONTINGENCY AND POLLUTION PREVENTION PLAN

(1) Upon commencement of operation of the Works, the Owner shall implement a Spill Contingency and Pollution Prevention Plan that outlines procedures as to how to mitigate the impacts of a spill within the area serviced by the Works and/or prevent pollution incidents. The said plan shall include as a minimum, but not limited to:

(a) the name, job title and location (address) of the Owner, person in charge, management or control of the 109 Iber Road site;

(b) the name, job title and 24-hour telephone number of the person(s) responsible for activating the Spill Contingency and Pollution Prevention Plan;

(c) a site plan drawn to scale showing the facility, nearby buildings, streets, catchbasins & manholes, drainage patterns (including direction(s) of flow in storm sewers) and any features which need to be taken into account in terms of potential impacts on access and response (including physical obstructions and location of response and clean-up equipment);

(d) steps to be taken to report, contain, clean up and dispose of contaminants following a spill;

(e) a listing of telephone numbers for: local clean-up companies who may be called upon to assist in responding to spills; local emergency responders including health institution(s); and MOE Spills Action Centre 1-800-268-6060;

(f) Materials Safety Data Sheets (MSDS) for each and every hazardous material which may be transported or stored within the area serviced by the Works;

(g) the means (internal corporate procedures) by which the Spill Contingency and Pollution Prevention Plan is activated;

(h) a description of the spill response and pollution prevention training provided to employees assigned to work in the area serviced by the Works, the date(s) on which the training was provided and to whom;

(i) an inventory of response and clean-up equipment available to implement the Spill Contingency and Pollution Prevention Plan, location and date of maintenance/replacement if warranted, including testing and calibration of the equipment; and

(j) the date on which the Spill Contingency and Pollution Prevention Plan was prepared and subsequently, amended.

(2) The Spill Contingency and Pollution Prevention Plan shall be kept in a conspicuous place near the reception area on site.

(3) The Spill Contingency and Pollution Prevention Plan will be amended from time to time as needed by changes in the operation of the facility or to reflect updates in the Municipal By-Laws, or improved Best Management Practices by the Owner.

## 7. TEMPORARY EROSION AND SEDIMENT CONTROL

(1) The Owner shall install and maintain temporary sediment and erosion control measures during construction and conduct inspections once every **two (2) weeks** and after each significant storm event (a significant storm event is defined as a minimum of 25 mm of rain in any 24 hour period). The inspections and maintenance of the temporary sediment and erosion control measures shall continue until they are no longer required and at which time they shall be removed and all disturbed areas reinstated properly .

(2) The Owner shall maintain records of inspections and maintenance which shall be made available for inspection by the Ministry, upon request. The record shall include the name of the inspector, date of

inspection, and the remedial measures, if any, undertaken to maintain the temporary sediment and erosion control measures.

## 8. RECORD KEEPING

The Owner shall retain for a minimum of **five (5) years** from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this Approval.

### **Schedule "A"**

1. Application for Environmental Compliance Approval , dated August 4, 2015 and received on August 17, 2015, submitted by 8769028 Canada Inc.;
2. Storm Water Management Report , dated August 6, 2014, prepared by D. B. Gray Engineering Inc. for 8769028 Canada Inc.;
3. Servicing Brief , dated August 6, 2014, prepared by D. B. Gray Engineering Inc. for 8769028 Canada Inc.; and
4. Engineering Drawings - 14014-C1 – C14 , dated May 23, 2014, prepared by D. B. Gray Engineering Inc. for 8769028 Canada Inc.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed to ensure that the Works are built and operated in the manner in which they were described for review and upon which approval was granted. This Condition is also included to emphasize the precedence of Conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.
2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.
3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to approved Works and to ensure that any subsequent Owner of the Works is made aware of the Approval and continue to operate the Works in compliance with it.
4. Condition 4 is included to require that the Works be properly operated and maintained such that the environment is protected.
5. Condition 5 is included to enable the Owner to evaluate and demonstrate the performance of the Works on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives specified in the Approval and that the Works do not cause any impairment of the receiving watercourse.
6. Condition 6 is included to ensure that the Ministry is immediately informed of the occurrence of an emergency or otherwise abnormal situation so that appropriate steps are taken to address the immediate concerns regarding the protection of public health and minimizing environmental damage and to be able to devise an overall abatement strategy to prevent long term degradation and the re-occurrence of the situation.
7. Condition 7 is included as installation, regular inspection and maintenance of the temporary sediment and erosion control measures is required to mitigate the impact on the downstream receiving watercourse during construction, until they are no longer required.

8. Condition 8 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the Works.

*In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:*

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
655 Bay Street, Suite 1500  
Toronto, Ontario  
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act  
Ministry of the Environment and Climate Change  
135 St. Clair Avenue West, 1st Floor  
Toronto, Ontario  
M4V 1P5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.*

DATED AT TORONTO this 11th day of December,  
2015

Gregory Zimmer, P.Eng.  
Director  
appointed for the purposes of Part II.1 of  
the *Environmental Protection Act*

JW/  
c: District Manager, MOECC Ottawa District Office  
Douglas B. Gray, D.B. Gray Engineering







Ministry  
of the  
Environment

Ministère  
de  
l'Environnement

CERTIFICATE OF APPROVAL  
INDUSTRIAL SEWAGE WORKS  
NUMBER 1015-6CANY3

Torbram Electric Supply Corporation  
25 Van Kirk Drive  
Brampton, Ontario  
L7A 1A6

Site Location: Torbram Electric  
150 Iber Road, Part of Lot 14, Registered Plan 4M-658  
Ottawa City, Ontario  
K2S 1E7

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

a **stormwater management facility** to be constructed to service Torbram Electric warehouse/office development, at 150 Iber Road, Part of Lot 14, Registered Plan 4M-658, in the City of Ottawa, comprising the following:

Storage Component (for the 100 year storm event)

- storage provided on roof top of 39 cubic metres;
- storage provided on surface ponding of 28 cubic metres;

Flow Control (for the 100 year storm event)

- three (3) roof drains, releasing the flow at 4.6 L/s for a water depth of 123 mm;
  - one (1) flow control device in catchbasin "CB No.1", rated at 5.0 L/s for a head of 0.65 m;
  - one (1) flow control device in catchbasin "CB No.2", rated at 3.9 L/s for a head of 0.66 m; and
  - one (1) flow control device in catchbasin "CB No.3", rated at 2.3 L/s for a head of 0.75 m;
- discharging to the existing roadside ditches on Iber Road and Harry Douglas Drive;

all in accordance with the application dated March 14, 2005 and received on March 17, 2005, including a Stormwater Management Report, final plans, specifications and other supporting documentation prepared by Simmering & Associates Ltd.

*For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

- (1) "*Certificate*" means this entire Certificate of Approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;
- (2) "*Owner*" means Torbram Electric Supply Corporation, and includes its successors and assignees; and
- (3) "*Works*" means the sewage works described in the Owner's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate.

*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

TERMS AND CONDITIONS

1. GENERAL CONDITIONS

1.1 The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

## CONTENT COPY OF ORIGINAL

1.2 Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

1.3 Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

1.5 The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

### 2. EXPIRY OF APPROVAL

2.1 The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

### 3. OPERATION AND MAINTENANCE

3.1 The *Owner* shall carry out and maintain an annual inspection and maintenance program on the operation of the stormwater management works in accordance with the manufacturer's recommendation.

3.2 After a two (2) year period, the District Manager of the MOE Ottawa District Office may alter the frequency of inspection of the stormwater management works if he/she is requested to do so by the *Owner* and considers it acceptable upon review of information submitted in support of the request.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is imposed to ensure that the stormwater management works are operated and maintained without any adverse impact on the environment.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;

CONTENT COPY OF ORIGINAL

4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., 12th Floor  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

AND

The Director  
Section 53, *Ontario Water Resources Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

DATED AT TORONTO this 16th day of May, 2005

Aziz Ahmed, P.Eng.  
Director  
Section 53, *Ontario Water Resources Act*

NH/  
c: District Manager, MOE Ottawa District Office  
Scott Taylor, Simmering & Associates Ltd.

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Ministry of the Environment  
Ministère de l'Environnement

ENVIRONMENTAL COMPLIANCE APPROVAL  
NUMBER 9230-95LSBM  
Issue Date: March 22, 2013

City of Ottawa  
100 Constellation Crescent  
Ottawa, Ontario  
K2G 6J8

Site Location: City of Ottawa Works Garage and Offices Project  
110 Iber Road  
City of Ottawa  
K2S 1E9

*You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:*

the establishment of stormwater management Works to serve the 110 Iber Road site as part of the City of Ottawa Works Garage and Offices Project, in the City of Ottawa, for the collection and disposal of stormwater runoff from a total catchment area of 1.17 ha, to attenuate post-development peak flows to allowable release levels, discharging to the existing roadside ditch located along Iber Road and ultimately to Pool Creek River, for all storm events up to and including the 100-year return storm, consisting of the following:

surface storage provided in the southwest portion of the site, on the 1,200 m<sup>2</sup> parking lot area, having an available storage volume of approx. 156 m<sup>3</sup> and a maximum ponding depth of 0.3 m, discharging to a stormwater storage channel;

underground storage provided in a stormwater storage channel (clear stone storage area), located under the south ramp, having a total available storage volume of 167 m<sup>3</sup>, consisting of a 43 m long, 14.7 m wide and 0.58 m deep layer of 75 mm diameter clear stone surrounded by a geotextile fabric, complete with a 43 m long 150 mm diameter perforated subdrain located at the bottom of the storage area, discharging via a 150 mm diameter perforated outlet pipe to a stormwater management dry pond;

a stormwater management dry pond located in the landscaped area in the southeast portion of the site, adjacent to Iber Road, designed to accommodate up to and including the 100-year return storm runoff from a catchment area of 1.17 ha, having a total active storage volume of 57 m<sup>3</sup> and a maximum ponding depth of 0.5 m, complete with a 150 mm diameter perforated inlet subdrain, a 200 mm diameter inlet pipe, a berm along the east side of the pond and a 150 mm deep layer of 75 mm diameter clear stone on the bottom of the pond, discharging via a 150 mm diameter outlet pipe allowing a maximum discharge of 37 L/s (100-year return storm) to the existing roadside ditch located along Iber Road and ultimately to Pool Creek River;

all in accordance with the application dated August 13, 2012 and received August 15, 2012, including

the design report entitled "Report 110 Iber Road -Stormwater Management Report, Ottawa, Ontario" dated August 10, 2012, final plans and specifications prepared by Morrison Hershfield Limited.

*For the purpose of this environmental compliance approval, the following definitions apply:*

1. "Approval" means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation.
2. "Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the Part II.1 of the Environmental Protection Act;
3. "District Manager" means the District Manager of the Ottawa District Office of the Ministry;
4. "Ministry" means the Ontario Ministry of the Environment;
5. "Owner" means City of Ottawa, and includes its successors and assignees; and
6. "Works" means the sewage works described in the Owner's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval.

*You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:*

## **TERMS AND CONDITIONS**

### **1. GENERAL PROVISIONS**

1.1 The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

1.2 Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, the application for approval of the Works and the submitted supporting documents and plans and specifications as listed in this Approval.

1.3 Where there is a conflict between a provision of any submitted document referred to in this Approval and the Conditions of this Approval, the Conditions in this Approval shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

1.5 The requirements of this Approval are severable. If any requirement of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this Approval shall not be affected thereby.

### **2. EXPIRY OF APPROVAL**

The approval issued by this Approval will cease to apply to those parts of the Works which have not

been constructed within five (5) years of the date of this Approval.

### **3. CHANGE OF OWNER**

The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act , R.S.O. 1990, c.B17 shall be included in the notification to the District Manager; and

(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act , R.S.O. 1990, c. C39 shall be included in the notification to the District Manager.

### **4. SPILL CONTINGENCY PLAN**

4.1 Within six (6) months from the issuance of this Approval, the Owner shall implement a spill contingency plan - that is a set of procedures describing how to mitigate the impacts of a spill within the area serviced by the Works. This plan shall include as a minimum:

(i) the name, job title and location (address) of the Owner, person in charge, management or person(s) in control of the facility;

(ii) the name, job title and 24-hour telephone number of the person(s) responsible for activating the spill contingency plan;

(iii) a site plan drawn to scale showing the facility, nearby buildings, streets, catchbasins & manholes, drainage patterns (including direction(s) of flow in storm sewers), any receiving body(ies) of water that could potentially be significantly impacted by a spill and any features which need to be taken into account in terms of potential impacts on access and response (including physical obstructions and location of response and clean-up equipment);

(iv) steps to be taken to report, contain, clean up and dispose of contaminants following a spill;

(v) a listing of telephone numbers for: local clean-up company(ies) who may be called upon to assist in responding to spills; local emergency responders including health institution(s); and MOE Spills Action Centre 1-800-268-6060;

(vi) Materials Safety Data Sheets (MSDS) for each hazardous material which may be transported or stored within the area serviced by the Works;

(vii) the means (internal corporate procedures) by which the spill contingency plan is activated;

(viii) a description of the spill response training provided to employees assigned to work in the area serviced by the Works, the date(s) on which the training was provided and by whom;

(ix) an inventory of response and clean-up equipment available to implement the spill contingency plan, location and, date of maintenance/replacement if warranted; and

(x) the date on which the contingency plan was prepared and subsequently, amended.

4.2 The spill contingency plan shall be kept in a conspicuous, readily accessible location on-site.

4.3 The spill contingency plan shall be amended from time to time as required by changes in the operation of the facility.

## **5. OPERATION AND MAINTENANCE**

5.1 The Owner shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the stormwater management Works do not constitute a safety or health hazard to the general public.

5.2 The Owner shall ensure that the design storage volumes are maintained at all times.

5.3 The Owner shall undertake an inspection of the condition of the stormwater management Works, at least once a year, and undertake any necessary cleaning and maintenance to ensure that sediment, debris and excessive decaying vegetation are removed from the above noted stormwater management Works to prevent the excessive build-up of sediment, debris and/or decaying vegetation to avoid reduction of capacity of the Works. The Owner shall also regularly inspect and clean out the inlet to and outlet from the Works to ensure that these are not obstructed.

5.4 The Owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at the Owner's corporate office for inspection by the Ministry. The logbook shall include the following:

(a) the name of the Works; and

(b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed and method of clean-out of the stormwater management Works.

## **6. RECORD KEEPING**

The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this Approval.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed to ensure that the Works are built and operated in the manner in which they were described for review and upon which Approval was granted. This Condition is also included to emphasize the precedence of Conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The Condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this Approval of the existence of this Approval.

2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to approved Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

4. Condition 4 is included to ensure that the Owner will implement the Spill Contingency Plan, such that the environment is protected and deterioration, loss, injury or damage to any person(s) or property is prevented.

5. Condition 5 is included as regular inspection and necessary removal of sediment and excessive decaying vegetation from this approved stormwater management Works are required to mitigate the impact of sediment, debris and/or decaying vegetation on the treatment capacity of the Works. It is also required to ensure that adequate storage is maintained in the stormwater management facilities at all times as required by the design. Furthermore, Condition 5 is included to ensure that the stormwater management Works are operated and maintained to function as designed.

6. Condition 6 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the Works.

*In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:*

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
655 Bay Street, Suite 1500  
Toronto, Ontario  
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal 's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.*



DATED AT TORONTO this 22nd day of March, 2013

Sherif Hegazy, P.Eng.

Director

appointed for the purposes of Part II.1 of  
the *Environmental Protection Act*

KC/

c: District Manager, MOE Ottawa District Office

Meghan MacSween, P.Eng., Morrison Hershfield Limited



Ministry  
of the  
Environment

Ministère  
de  
l'Environnement

CERTIFICATE OF APPROVAL  
INDUSTRIAL SEWAGE WORKS  
NUMBER 8466-5SDK27

Almicnic Holdings Inc.  
40 Kenins Crescent  
Kanata, Ontario  
K2K 3E5

Site Location: 185 Iber Road  
Ottawa City,

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

a stormwater management facility to serve an office and warehouse on a site area of approximately 0.69 hectare at the above location, as follows:

- one (1) stormwater management pond at the south-east corner of the site with a total volumetric capacity of over 75 cubic metres for collection of runoff from the site with discharge to an adjacent ditch via a 600 mm high by 600 mm wide V-notched outlet control structure at a maximum rate of 22.3 litres/second; and
- all other appurtenances essential for proper operation of the aforementioned sewage works;

all in accordance with the Application for Approval of Industrial Sewage Works dated July 23, 2003, and the associated documents submitted by the President, Almicnic Holdings Inc., Kanata, Ontario.

*For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

"certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act*;

"District Manager" means the District Manager of the Ottawa District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means Almicnic Holdings Inc. and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

## **TERMS AND CONDITIONS**

### **1. GENERAL CONDITION**

Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications.

**2. OPERATION AND MAINTENANCE**

(1) The Owner shall undertake an inspection of the condition of the stormwater management facility, at least four (4) times a year, and undertake any necessary cleaning and maintenance to prevent the excessive build-up of sediment and/or decaying vegetation.

(2) The owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken and shall keep the logbook at the site for inspection by the Ministry.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted.

2. Condition 2 is included to ensure that any build-up of sediment and/or decaying vegetation does not impair the performance of the stormwater management facility.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., 12th Floor  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

AND

The Director  
Section 53, *Ontario Water Resources Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

DATED AT TORONTO this 21st day of October, 2003

Mohamed Dhalla, P.Eng.  
Director  
Section 53, *Ontario Water Resources Act*

AC/

c: District Manager, MOE Ottawa

Todd Perry, McIntosh Perry Consulting Engineers Ltd.


**CERTIFICATE OF APPROVAL**  
**INDUSTRIAL SEWAGE WORKS**  
 NUMBER 7685-7C8NXM  
 Issue Date: March 27, 2008

GML Industrial Fund GP Ltd.  
 200 Tremblay Rd  
 Ottawa, Ontario  
 K1G 3H5

Site Location: 200 Iber Road  
 200 Iber Rd  
 Ottawa City

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

a **stormwater management facility** to be constructed at 200 Iber Road, in the City of Ottawa, comprising the following:

Storage Component (for the 5 year storm event)

- storage on roof top of approximately 50.5 cubic metres;
- storage in the ditch ponding of approximately 183.1 cubic metres;

Storage Component (for the 100 year storm event)

- storage on roof top of approximately 103.8 cubic metres;
- storage in the ditch ponding of approximately 446.5 cubic metres;

Flow Control

- eleven(11) roof drains, releasing the flow at 20.48 L/s for a maximum depth of 143 mm;
- one (1) 164 mm diameter orifice rated at 40.5 L/s for a head of 0.52 m, discharging to ditch along Iber Road;
- one (1) 215 mm diameter orifice rated at 63.8 L/s for a head of 0.43 m, discharging to ditch along the north property limit;

all in accordance with the application dated August 14, 2007 and received on August 24, 2007, and all supporting documentation and information associated with the application including stormwater management report, final plans and specifications prepared by David McManus Engineering Ltd.

*For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

- (1) "Certificate" means this entire Certificate of Approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;
- (2) "Owner" means **GML Industrial Fund GP Ltd.**, and includes its successors and assignees; and
- (3) "Works" means the sewage works described in the Owner's application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate*.

*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

TERMS AND CONDITIONS

## **1. GENERAL CONDITIONS**

1.1 The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

1.2 Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

1.3 Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

1.5 The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

## **2. EXPIRY OF APPROVAL**

2.1 The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

## **3. OPERATION AND MAINTENANCE**

3.1 The *Owner* shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the stormwater works do not constitute a safety or health hazard to the general public.

3.2 The *Owner* shall undertake an inspection of the condition of the stormwater management system, at least once a year, and undertake any necessary cleaning and maintenance to ensure that sediment, debris and excessive decaying vegetation are removed from the above noted stormwater management system to prevent the excessive build-up of sediment, debris and/or decaying vegetation to avoid reduction of capacity of the pond. The *Owner* shall also regularly inspect and clean out the inlet to and outlet from the works to ensure that these are not obstructed.

3.3 The *Owner* shall prepare operational manual which should include, but not limited to, frequency and method of clean-out of stormwater management works within six (6) months from the date of issuance of this *Certificate* or the commissioning of the works. The *Owner* shall keep the operations manual up to date with such revisions as may be required. Upon request, the *Owner* shall make the manual available for inspection by *Ministry* personnel and furnish a copy to the *Ministry*.

3.4 The *Owner* shall maintain a logbook to record the results of all inspections and any cleaning and maintenance operations undertaken and shall make the logbook available for inspection by the *Ministry* upon request.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the *Owner* his/her responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

CONTENT COPY OF ORIGINAL

3. Condition 3.1 is imposed because it is not in the public interest for the *Director* to approve facilities which, by reason of potential health and safety hazards do not generally comply with legal standards or approval requirements falling outside the purview of this *Ministry*.

4. Condition 3.2 is included as regular inspection and necessary removal of sediment and excessive decaying vegetation from this approved stormwater management system are required to mitigate the impact of sediment, debris and/or decaying vegetation on the treatment capacity of the works. It is also required to ensure that adequate storage is maintained in the stormwater management facilities at all times as required by the design, and to prevent stormwater impounded in the works from becoming stagnant.

5. Conditions 3.3 and 3.4 are included to ensure that the stormwater management facility is operated and maintained to function as designed.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
655 Bay Street, 15th Floor  
Toronto, Ontario  
M5G 1E5

AND

The Director  
Section 53, *Ontario Water Resources Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

DATED AT TORONTO this 27th day of March, 2008

Zafar Bhatti, P.Eng.  
Director  
Section 53, *Ontario Water Resources Act*

AM/  
c: District Manager, MOE Ottawa  
Mike Keating, David McManus Engineering Ltd.



Ministry  
of the  
Environment

Ministère  
de  
l'Environnement

AMENDED CERTIFICATE OF APPROVAL  
MUNICIPAL AND PRIVATE SEWAGE WORKS  
NUMBER 9025-6EWRL8

Ontario

BVS Holdings Ltd.  
118 Iber Road  
Ottawa, Ontario  
K2S 1E9

Site Location: Excelcon Business Centre  
118 Iber Road  
Ottawa City, Ontario

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

**stormwater management facilities** and appurtenances to service Excelcon Business Centre at 118 Iber Road, in the City of Ottawa, comprising the following:

Storage Component (for the 100 year storm event)

- storage in rooftops of approximately 84 cubic metres;
- storage in a swale and on surface ponding of approximately 220 cubic metres;

Flow Control

- roofdrains on the roof top (0.13 ha) of the existing buildings, restricting the release rate at 8 L/s at a maximum depth of 100 mm;
- roofdrains on the rooftop (0.13 ha) of the new buildings, restricting the release rate at 8 L/s at a maximum depth of 100 mm; and
- an 182 mm diameter orifice plate, rated at 63 L/s for a head of 0.83 m, discharging to the existing roadside ditch on Iber Road;

all in accordance with the application dated May 30, 2005 and received on June 14, 2005, and all supporting documentation and information including a design brief revised June 1, 2005, a design brief dated Stage I/1997, final plans and specifications prepared by Capital Engineering Group Ltd.

*For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

- (1) "*Certificate*" means this entire Certificate of Approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;
- (2) "*Owner*" means BVS Holdings Ltd., and includes its successors and assignees; and
- (3) "*Works*" means the sewage works described in the *Owner's* application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate*.

*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

TERMS AND CONDITIONS

**1. GENERAL CONDITIONS**

1.1 The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.



## CONTENT COPY OF ORIGINAL

1.2 Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

1.3 Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

1.5 The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

### **2. EXPIRY OF APPROVAL**

2.1 The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

### **3. OPERATION AND MAINTENANCE**

3.1 The *Owner* shall carry out and maintain an annual inspection and maintenance program on the operation of the stormwater management works in accordance with the manufacturer's recommendation.

3.2 After a two (2) year period, the District Manager of the MOE District Office may alter the frequency of inspection of the stormwater management works if he/she is requested to do so by the *Owner* and considers it acceptable upon review of information submitted in support of the request.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is imposed to ensure that the stormwater management works are operated and maintained without any adverse impact on the environment.

**This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 3-1002-97-006 issued on August 26, 1997**

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

CONTENT COPY OF ORIGINAL

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., 12th Floor  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

AND

The Director  
Section 53, *Ontario Water Resources Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

DATED AT TORONTO this 5th day of August, 2005

Aziz Ahmed, P.Eng.  
Director  
Section 53, *Ontario Water Resources Act*

NH/  
c: District Manager, MOE Ottawa District Office  
Andy Naoum, P.Eng., Capital Engineering Group Ltd.



Ministry  
of the  
Environment

Ministère  
de  
l'Environnement

CERTIFICATE OF APPROVAL  
MUNICIPAL AND PRIVATE SEWAGE WORKS  
NUMBER 3222-56PSBR

Gary's Radiator & Welding Ltd.  
323 Coventry Road  
Ottawa, Ontario  
K1K 3X6

Site Location: Kingdom Auto Parts Warehouse  
Lots 9 and 10, Registered Plan 4M-658  
City of Ottawa

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

stormwater management system to serve the Kingdom Auto Parts Warehouse, in the City of Ottawa, consisting of the following:

**POND A**

stormwater management pond (known as Pond A) located adjacent to Iber Road, collecting up to 100-year storm event runoff from an area of 0.38 ha, having a total storage volume of 70 m<sup>3</sup>, complete with overflow channel and outlet structure consisting of a 300 mm diameter CSP complete with a 104 mm diameter orifice plate allowing a maximum discharge of 16 L/s (100-year storm event) to the existing ditch along Iber Road and ultimately to Carp River and all other items necessary to have a complete and operable stormwater management system;

**POND B**

stormwater management pond (known as Pond B) located in the north-east corner of the site, collecting up to 100-year storm event runoff from an area of 0.97 ha, having a total storage volume of 150 m<sup>3</sup>, complete with overflow channel and outlet structure consisting of a 300 mm diameter CSP complete with a 200 mm diameter orifice plate allowing a maximum discharge of 62 L/s (100-year storm event) to the existing ditch along the north side of the site and ultimately to Carp River and all other items necessary to have a complete and operable stormwater management system;

**STORM SEWER**

150 mm diameter storm sewer to serve the loading area, discharging to the existing ditch along the north side of the site and ultimately to Carp River;

all in accordance with the application dated December 13, 2001, including report entitled "Stormwater Management Report, Kingdom Auto Parts Proposed Warehouse, Iber Road, Ottawa, Ontario" dated February 1, 2001, Revised June 21, 2001, prepared by Simmering & Associates Ltd., Consulting Engineers.

*For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

"Owner" means Gary's Radiator & Welding Ltd.;

*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

**TERMS AND CONDITIONS**

1. The Owner shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the stormwater works do not constitute a safety or health hazard to the general public.
2. The Owner shall ensure that sediment and excessive decaying vegetation are removed from the above noted stormwater

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management system at such a frequency as to prevent the excessive buildup and potential overflow of sediment and/or decaying vegetation into the receiving watercourse.

3. Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this Certificate.

4. Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed because it is not in the public interest for the Director to approve facilities which, by reason of potential health and safety hazards do not generally comply with legal standards or approval requirements falling outside the purview of this Ministry.

2. Condition 2 is included as regular removal of sediment and excessive decaying vegetation from this approved stormwater management system are required to mitigate the impact of sediment and/or decaying vegetation on the downstream receiving watercourse. It is also required to ensure that adequate storage is maintained in the stormwater management facilities at all times as required by the design.

3. Conditions 3 and 4 are imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted. These conditions are also included to emphasize the precedence of Conditions in the Certificate and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., 12th Floor  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

AND

The Director  
Section 53, *Ontario Water Resources Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the**

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**Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

DATED AT TORONTO this 31st day of January, 2002

Mohamed Dhalla, P.Eng.  
Director  
Section 53, *Ontario Water Resources Act*

KC/

c: District Manager, MOE Ottawa District Office  
Douglas Kerr, E.I.T., Simmering & Associates Ltd.  
R. L. Phillips, C.E.T., Program Manager-Ottawa West, City of Ottawa



**AMENDMENT TO CERTIFICATE OF APPROVAL  
MUNICIPAL AND PRIVATE SEWAGE WORKS**

NUMBER 4789-6KJJT3

Notice No. 1

Issue Date: March 12, 2008

154 Iber Road Corp.  
204-880 Lady Ellen Pl NOTICE -2  
Ottawa, Ontario  
K1Z 5L9

Site Location: 164 Iber Road,  
The City of Ottawa.

*You are hereby notified that I have amended Certificate of Approval No. 4789-6KJJT3 issued on January 27, 2006 for the City of Ottawa, as follows:*

- a new 200mm diameter storm sewer inlet to the existing Granite Park Stormwater Management Facility from Pond "B", to be constructed in the City of Ottawa;

all in accordance with the application from Iber Road Corp., dated September 7, 2007, including final plan sketch #1 dated February 12, 2008 and specifications prepared by Scott MacKichan, P.Eng., of Novatech Engineering Consultants Ltd.

**This Notice shall constitute part of the approval issued under Certificate of Approval No. 4789-6KJJT3 dated January 27, 2006**

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

CONTENT COPY OF ORIGINAL

The Secretary\*  
Environmental Review Tribunal  
655 Bay Street, 15th Floor  
Toronto, Ontario  
M5G 1E5

AND

The Director  
Section 53, *Ontario Water Resources Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

DATED AT TORONTO this 12th day of March, 2008

Mansoor Mahmood, P.Eng.  
Director  
Section 53, *Ontario Water Resources Act*

MN/  
c: District Manager, MOE Ottawa  
Clerk, the City of Ottawa.  
Scott Makichan, P.Eng, Novatech Engineering Consultants Ltd.



Ministry  
of the  
Environment

Ministère  
de  
l'Environnement

CERTIFICATE OF APPROVAL  
INDUSTRIAL SEWAGE WORKS  
NUMBER 1916-5XEMBL

3843173 Canada Inc.  
93 Hines Road, No. 1  
Kanata, Ontario  
K2K 2M5

Site Location: L-D Tool and Die  
139 Iber Road, Lot 5, Part 4/5, Plan 4M-658  
Ottawa City,

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

the establishment of sewage works for the collection, transmission and disposal of stormwater runoff and to attenuate post-development peak flows to pre-development levels, for all storm events up to and including the 100-year return storm, consisting of the following:

- three (3) stormwater ponds with total ponding volume requirement of approximately 86 cubic metres for the 5-year return storm event and 154 cubic metres for the 100-year return storm event, two of the ponds being equipped with 200 millimetre diameter control discharge pipe and a 250 millimetre diameter control discharge pipe for the third pond;

all in accordance with the Application for Approval of Industrial Sewage Works dated January 7, 2004 and signed by David Tait, President of 3843173 Canada Inc. and all supporting information.

*For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

"Certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act*;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means 3843173 Canada Inc. and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

## TERMS AND CONDITIONS

### 1. GENERAL CONDITION

(1) Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this Certificate.

(2) Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between



the listed submitted documents, the document bearing the most recent date shall prevail.

## 2. OPERATION AND MAINTENANCE

(1) The Owner shall undertake an inspection of the condition of the stormwater management ponds, at least once a year, and undertake any necessary cleaning and maintenance to prevent the excessive buildup of sediment and/or decaying vegetation.

(2) The owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken and shall keep the logbook at the site for inspection by the Ministry.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the Certificate and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. This condition is included to ensure that any buildup of sediment and/or decaying vegetation does not impair the performance of the stormwater management facility.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., 12th Floor  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

AND

The Director  
Section 53, *Ontario Water Resources Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

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DATED AT TORONTO this 14th day of April, 2004

Mohamed Dhalla, P.Eng.  
Director  
Section 53, *Ontario Water Resources Act*

KD/  
c: District Manager, MOE Ottawa  
Neil S. Caldwell, Jp2g Consultants Inc.

**Fernbank Community - Kizell Lands**  
**HGL Elevations**

Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	Outlet pipe invert (m)	Outlet Pipe Diameter (m)	Outlet Pipe Obvert (m)	HGL Elevation (MTO SCS) (m)	WL Above Obvert (MTO SCS) (m)	HGL Elevation (Chicago) (m)	WL Above Obvert (Chicago) (m)
101_(STM)	97.65	101.59	97.65	1.80	99.45	99.49	0.04	99.38	-0.07
101a_(STM)	97.65	101.59	97.65	1.80	99.45	99.36	-0.09	99.17	-0.28
103_(STM)	97.71	101.69	97.71	1.80	99.51	99.81	0.30	99.76	0.25
105_(STM)	97.78	101.50	97.78	1.80	99.58	99.98	0.40	99.91	0.33
107_(STM)	98.20	101.67	98.20	1.50	99.70	100.11	0.41	100.04	0.34
109_(STM)	98.31	101.82	98.31	1.50	99.81	100.14	0.33	100.17	0.36
111_(STM)	98.79	102.06	98.79	1.20	99.99	100.53	0.54	100.46	0.47
113_(STM)	99.17	102.28	99.17	1.05	100.22	100.83	0.61	100.75	0.53
147_(STM)	97.93	101.82	97.93	1.95	99.88	100.31	0.43	100.21	0.33
153_(STM)	98.01	102.12	98.01	1.95	99.96	100.44	0.48	100.33	0.37
165_(STM)	98.10	102.31	98.10	1.95	100.05	100.55	0.50	100.42	0.37
169_(STM)	98.15	102.42	98.15	1.95	100.10	100.63	0.53	100.49	0.39
171_(STM)	98.29	102.51	98.29	1.95	100.24	100.72	0.48	100.57	0.33
173_(STM)	99.46	103.07	99.24	1.05	100.29	101.11	0.82	100.96	0.67
203_(STM)	98.67	103.15	98.67	1.80	100.47	101.12	0.65	100.95	0.48
205_(STM)	98.91	103.66	98.91	1.80	100.71	101.34	0.63	101.17	0.46
207_(STM)	99.16	103.20	99.16	1.80	100.96	101.51	0.55	101.36	0.40
209_(STM)	100.46	103.50	100.46	0.75	101.21	101.77	0.56	101.62	0.41
215_(STM)	99.54	102.77	99.54	1.65	101.19	101.73	0.54	101.60	0.41
215A_(STM)	101.01	103.40	101.10	0.45	101.55	102.21	0.66	102.03	0.48
217_(STM)	99.89	103.08	99.89	1.65	101.54	101.99	0.45	101.87	0.33
217A_(STM)	101.17	103.06	101.17	0.75	101.92	102.03	0.11	101.90	-0.02
219_(STM)	100.64	103.45	100.64	1.20	101.84	102.19	0.35	102.00	0.16
219A_(STM)	101.19	102.84	101.19	0.75	101.94	102.22	0.28	102.30	0.36
221_(STM)	100.69	102.42	100.69	0.75	101.44	101.95	0.51	101.83	0.39
221a_(STM)	99.69	102.90	99.69	1.65	101.34	101.86	0.52	101.74	0.40
301_(STM)	97.69	101.83	97.69	1.35	99.04	99.35	0.31	99.17	0.13
301a_(STM)	97.69	101.83	97.70	1.34	99.04	99.36	0.32	99.17	0.13
305_(STM)	97.77	101.84	97.77	1.34	99.11	99.37	0.26	99.34	0.23
309_(STM)	98.72	101.75	98.72	0.83	99.55	100.72	1.18	100.73	1.19
319_(STM)	97.85	101.51	97.85	1.34	99.19	99.58	0.39	99.56	0.37
321_(STM)	98.03	101.66	98.03	1.34	99.37	99.99	0.62	100.00	0.63
327_(STM)	98.63	102.51	98.63	1.05	99.68	100.57	0.89	100.63	0.95
337_(STM)	99.17	102.84	99.17	0.83	100.00	101.11	1.11	101.16	1.16
349_(STM)	101.62	103.95	101.62	0.60	102.22	102.78	0.56	102.33	0.11
351_(STM)	101.35	103.76	101.35	0.75	102.10	102.49	0.39	102.01	-0.09
364_(STM)	100.50	103.08	100.50	1.35	101.85	102.13	0.28	102.00	0.15
391_(STM)	100.91	103.45	100.91	0.98	101.89	102.29	0.41	102.10	0.22
EX. 472 (STM)	101.51	103.55	101.51	1.35	102.86	103.25	0.39	102.87	0.01
EX. 501 (STM)	101.18	104.04	101.18	1.35	102.53	103.00	0.47	102.61	0.08
EX. 502 (STM)	101.12	103.98	101.12	1.35	102.47	102.87	0.40	102.50	0.03
EX. 503 (STM)	100.87	103.75	100.87	1.35	102.22	102.42	0.20	102.25	0.03
EX. 504 (STM)	100.63	102.89	100.63	1.35	101.98	102.24	0.26	102.10	0.12

**Pond 1**

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**Pond Inflow Summary**

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**Drainage Areas**

Drainage Area to North Forebay	17.33	ha	
Drainage Area Imperviousness	76	%	
Drainage Area to South Forebay	54.33	ha	
Drainage Area Imperviousness	70	%	
Total Pond Drainage Area	76.01	ha	<i>Refer to Drawing 108195-STM for drainage area delineation</i>
Total Area Imperviousness	71.00	%	

**Minor System Inflows**

<b>Table 1: Minor System Inflow Summary</b>	
<b>Design Storm</b>	<b>Inflow (m<sup>3</sup>/s)</b>
15mm	-
25mm	6.192
2-year	7.797
5-year	10.812
10-year	12.300
100-year	15.203

*Flows determined from the PCSWMM model*



**Kizell Lands - Fernbank Community**  
**Wet Pond Design Sheet**  
 Project Number: 108195



**Pond 1**

**North Forebay Design**

Table 6: North Forebay Inflow Summary	
Design Storm	Inflow (m <sup>3</sup> /s)
15mm	
25mm	1.686
2-year	2.206
5-year	2.814
10-year	3.120
100-year	3.491

Flows determined from the PCSWMM model

Settling Calculation:  $Dist = \sqrt{\frac{rQ_p}{V_s}}$

Equation 4.5 of the SWM Planning and Design Manual (MOE, 2003)

Length to width ratio (r): 3.5 :1

Settling Velocity (V<sub>s</sub>): 0.000593 m/s

Per Table 5

Peak Water Quality Flow (Q<sub>p</sub>): 1.686 m<sup>3</sup>/s

Per Section 3.5 of the SWMP Planning and Design Manual (MOE 1994)

Dist (Forebay Length): 100 m

Dispersion/Resuspension Calculation:  $Dist = \frac{8Q}{dV_f}$

Equation 4.6 of the SWM Planning and Design Manual (MOE, 2003)

Forebay Velocity, V: 0.5 m/s

Per Section 4.6.2 of the SWM Planning and Design Manual (MOE, 2003)

Forebay Depth, D: 1.5 m

Effective Depth, d: 1.01 m

Forebay Depth - Sediment Accumulation

Inlet Flow Rate, Q: 1.686 m<sup>3</sup>/s

(Water Quality event)

Dist (Forebay Length): 17.9872 m

Forebay Length based on d: 27 m

Table 7: North Forebay Characteristics Summary		
Characteristic	Minimum	Provided
Length (m)	100	75
Bottom Width (m)	2.2	6.0
Top Width (m)	29	15
L:W Ratio (H:1V)	2	5.0
Minimum Depth (m)	1.5	1.5
Approx. Flow Area (m <sup>2</sup> )	-	16
Average Velocity (m/s)	-	0.11
Approx. Volume (m <sup>3</sup> )	-	1181

Trapezoidal cross-section assumed

Must be less than 0.15m/s

**Kizell Lands - Fernbank Community**  
**Wet Pond Design Sheet**  
 Project Number: 108195



**Pond 1**

**South Forebay Design**

Table 6b: South Forebay Inflow Summary	
Design Storm	Inflow (m <sup>3</sup> /s)
15mm	
25mm	3.987
2-year	5.239
5-year	7.461
10-year	8.052
100-year	9.500

Flows determined from the PCSWMM model

Settling Calculation:  $Dist = \sqrt{\frac{rQ_p}{V_s}}$

Equation 4.5 of the SWM Planning and Design Manual (MOE, 2003)

Length to width ratio (r): 4.5 :1

Settling Velocity (V<sub>s</sub>): 0.000593 m/s

Per Table 5

Peak Water Quality Flow (Q<sub>p</sub>): 3.987 m<sup>3</sup>/s

Per Section 3.5 of the SWMP Planning and Design Manual (MOE 1994)

Dist (Forebay Length): 174 m

Dispersion/Resuspension Calculation:  $Dist = \frac{8Q}{dV_f}$

Equation 4.6 of the SWM Planning and Design Manual (MOE, 2003)

Forebay Velocity, V: 0.5 m/s

Per Section 4.6.2 of the SWM Planning and Design Manual

Forebay Depth, D: 1.5 m

(MOE, 2003)

Effective Depth, d: 1.07 m

Forebay Depth - Sediment Accumulation

Inlet Flow Rate, Q: 3.987 m<sup>3</sup>/s

(Water Quality event)

Dist (Forebay Length): 42.53067 m

Effective d Forebay Length: 59 m

Table 7b: South Forebay Characteristics Summary		
Characteristic	Minimum	Provided
Length (m)	174	135
Bottom Width (m)	5.3	14.0
Top Width (m)	39	23
L:W Ratio (H:1V)	2	5.9
Minimum Depth (m)	1.5	1.5
Approx. Flow Area (m <sup>2</sup> )	-	28
Average Velocity (m/s)	-	0.14
Approx. Volume (m <sup>3</sup> )	-	3746

Trapezoidal cross-section assumed

Must be less than 0.15m/s

**Pond 1**

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**Outlet Design**

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**Extended Detention**

Drawdown Time:  $t = \frac{2A_p}{CA_o(2g)^{0.5}} (h_1^{0.5} - h_2^{0.5})$  *Equation 4.10 of the SWM Planning and Design Manual (MOE, 2003)*

Pond Surface Area ( $A_p$ ):	12553 m <sup>2</sup>	
Orifice Diameter:	220 mm	
Orifice Flow Area ( $A_o$ ):	0.0380 m <sup>2</sup>	
Orifice Coefficient (C):	0.61	<i>Per Section 8.3.8.1 of the OSDG.</i>
Extended Detention Depth (h):	0.35 m	
Drawdown Time (t):	40.2 hours	



**Pond 1**

**Quantity Control**

**Table 8: Quantity Control Summary**

Service Level	Elevation (m)	Stage (m)	Outflow (L/s)					Total	Target
			ED	Struct. 1	Struct. 2	Struct. 3			
NWL	97.65	0	0	0	0	0	0	0	
Ex. Det	98.00	0.35	50	0	0	0	50	50	
2-year	98.57	0.92	92	1032	0	0	1125	1710	
5-year	98.80	1.15	105	1733	0	0	1838	2670	
100-year	99.40	1.75	132	3839	403	0	4373	5430	
Overflow	99.70		143	4953	1268	2432	8796	-	

**Extended Detention Orifice**

C                    0.61  
 Diameter            220 mm  
 Area                0.0380 m<sup>2</sup>  
 Invert               97.65 m  
 C/L                  97.76 m

$Q_{\text{orifice}} = C \times A \times (2 \times g \times H)^{0.5}$

**Structure 1 (Rectangular Weir)**

Weir Coefficient (C)                    1.84  
 Bottom Width                            1.60 m  
 Bottom of Weir Elevation            98.05 m

$Q \text{ (m}^3\text{/s)} = C \times (L - 0.2H) \times H^{(3/2)}$

**Structure 2 (Rectangular Weir)**

Weir Coefficient (C)                    1.84  
 Bottom Width                            1.80 m  
 Bottom of Weir Elevation            99.15 m

$Q \text{ (m}^3\text{/s)} = C \times (L - 0.2H) \times H^{(3/2)}$

**Structure 3 (Broad-Crested Weir)**

Weir Coefficient (C)                    1.48  
 Bottom Width                            10.0 m  
 Bottom of Weir Elevation            99.40 m

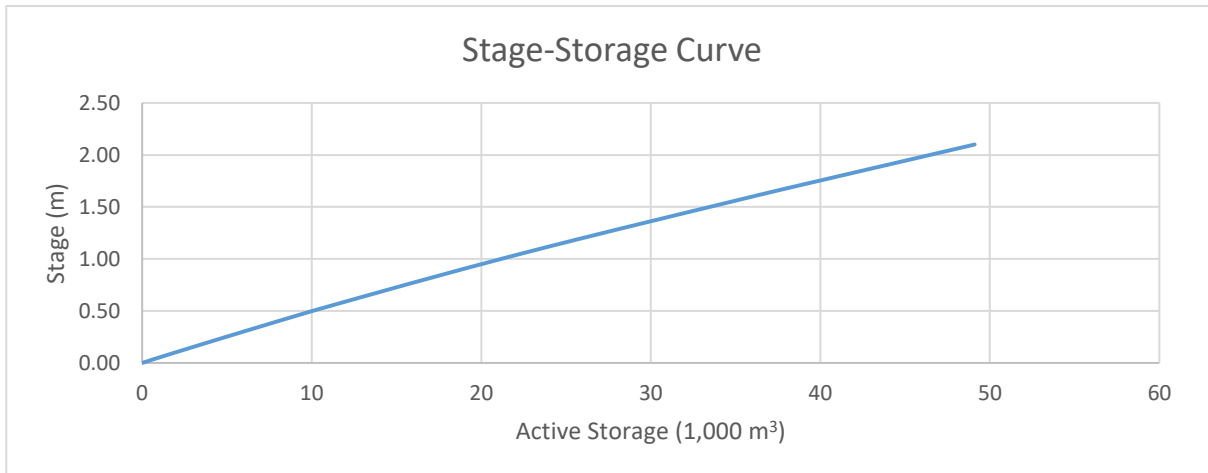
$Q \text{ (m}^3\text{/s)} = C \times L \times H^{(3/2)}$

**Pond 1**

**Pond Design Summary**

**Stage-Storage-Discharge Table**

Table 9: Stage-Storage-Discharge					
Service Level	Elevation (m)	Stage (m)	Total Volume (m <sup>3</sup> )	Active Volume (m <sup>3</sup> )	Approximate Discharge (m <sup>3</sup> /s)
Bottom	96.25	-	0		
NWL	97.65	0.00	23763	0	0
	97.75	0.10	25698	1935	0
Ex.Det.	98.05	0.40	31741	7978	55
	98.25	0.60	35975	12213	329
2-year	98.55	0.90	42629	18867	1067
	98.75	1.10	47302	23540	1676
5-year	98.79	1.14	48267	24505	1805
10-year	98.94	1.29	51953	28191	2308
	99.25	1.60	59769	36006	3518
100-year	99.35	1.70	62340	38577	4074
Overflow	99.75	2.10	72867	49104	9785



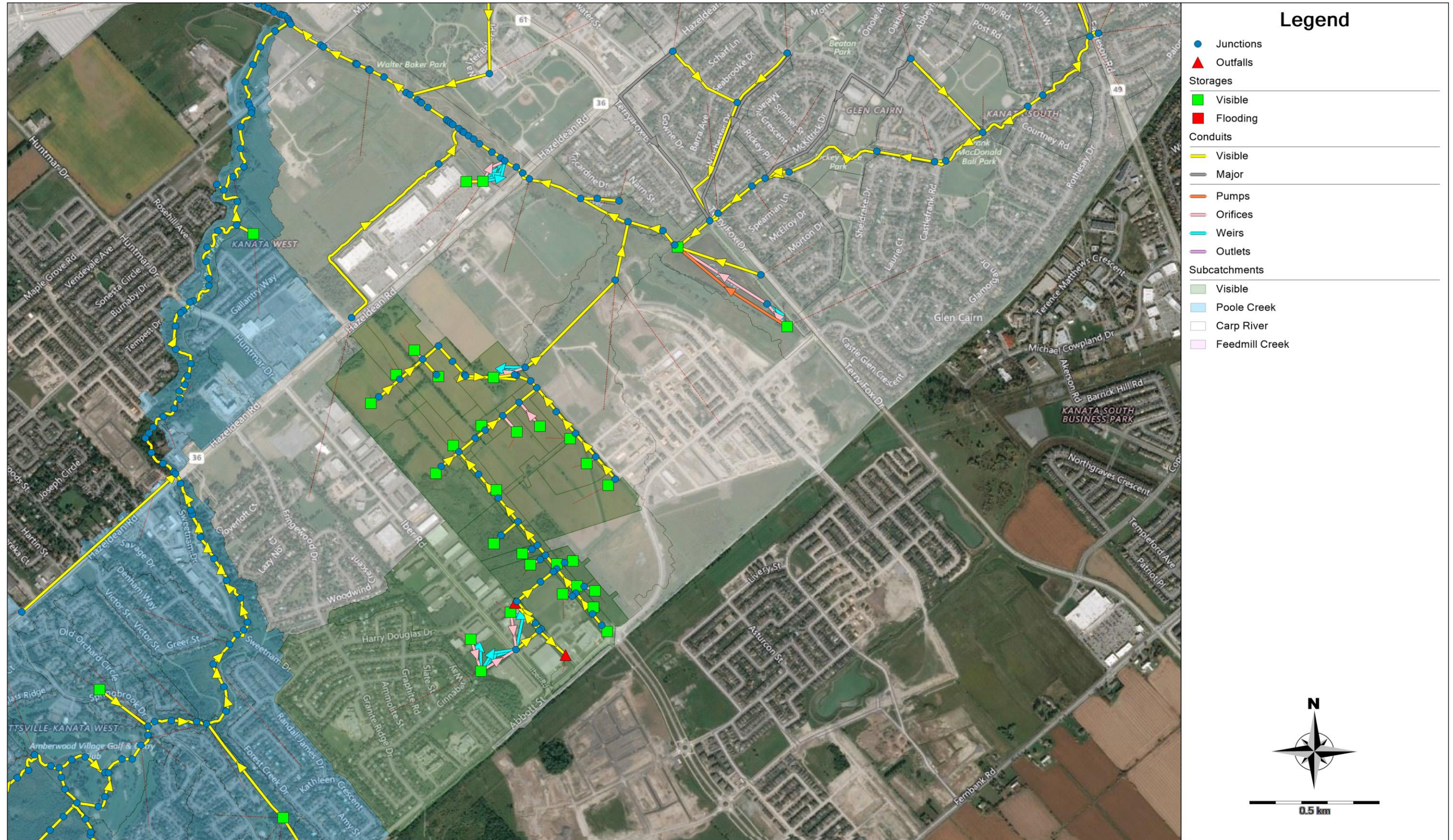


**Kizell Lands - Fernbank 5618 Hazeldean Road**  
**Overall PCSWMM Model Schematic**





**Kizell Lands - Fernbank 5618 Hazeldean Road**  
**Overall PCSWMM Model Schematic Interim Conditions**





**Kizell Lands - Fernbank 5618 Hazeldean Road**  
**Overall PCSWMM Model Schematic Ultimate Conditions**





**Kizell Lands - Fernbank 5618 Hazeldean Road**  
**Design Storm Time Series Data**  
**Chicago Design Storms**



C25mm-3.stm		C2-3.stm		C5-3.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0	0:00	0	0:00	0
0:10	2.21	0:10	2.81	0:10	3.68
0:20	2.75	0:20	3.5	0:20	4.58
0:30	3.68	0:30	4.69	0:30	6.15
0:40	5.73	0:40	7.3	0:40	9.61
0:50	14.29	0:50	18.21	0:50	24.17
1:00	60.28	1:00	76.81	1:00	104.19
1:10	18.9	1:10	24.08	1:10	32.04
1:20	9.7	1:20	12.36	1:20	16.34
1:30	6.53	1:30	8.32	1:30	10.96
1:40	4.94	1:40	6.3	1:40	8.29
1:50	3.99	1:50	5.09	1:50	6.69
2:00	3.37	2:00	4.29	2:00	5.63
2:10	2.92	2:10	3.72	2:10	4.87
2:20	2.58	2:20	3.29	2:20	4.3
2:30	2.32	2:30	2.95	2:30	3.86
2:40	2.1	2:40	2.68	2:40	3.51
2:50	1.93	2:50	2.46	2:50	3.22
3:00	1.79	3:00	2.28	3:00	2.98

C10-3.stm		C100-3.stm	
Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr
0:00	0	0:00	0
0:10	4.25	0:10	6.05
0:20	5.29	0:20	7.54
0:30	7.11	0:30	10.16
0:40	11.13	0:40	15.97
0:50	28.1	0:50	40.65
1:00	122.14	1:00	178.56
1:10	37.28	1:10	54.05
1:20	18.95	1:20	27.32
1:30	12.7	1:30	18.24
1:40	9.59	1:40	13.74
1:50	7.73	1:50	11.06
2:00	6.5	2:00	9.29
2:10	5.63	2:10	8.02
2:20	4.97	2:20	7.08
2:30	4.46	2:30	6.35
2:40	4.05	2:40	5.76
2:50	3.71	2:50	5.28
3:00	3.43	3:00	4.88

**Kizell Lands - Fernbank 5618 Hazeldean Road**  
**Design Storm Time Series Data**  
**SCS Design Storms - MTO Distribution**



S2-12.stm		S5-12.stm		S10-12.stm		S100-12.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr	min	mm/hr
0:00	1.08	0:00	1.44	0:00	1.68	0:00	2.40
0:15	1.08	0:15	1.44	0:15	1.68	0:15	2.40
0:30	1.08	0:30	1.44	0:30	1.68	0:30	2.40
0:45	1.08	0:45	1.44	0:45	1.68	0:45	2.40
1:00	1.08	1:00	1.44	1:00	1.68	1:00	2.40
1:15	1.08	1:15	1.44	1:15	1.68	1:15	2.40
1:30	1.08	1:30	1.44	1:30	1.68	1:30	2.40
1:45	1.08	1:45	1.44	1:45	1.68	1:45	2.40
2:00	1.30	2:00	1.73	2:00	2.02	2:00	2.88
2:15	1.30	2:15	1.73	2:15	2.02	2:15	2.88
2:30	1.30	2:30	1.73	2:30	2.02	2:30	2.88
2:45	1.30	2:45	1.73	2:45	2.02	2:45	2.88
3:00	1.73	3:00	2.30	3:00	2.69	3:00	3.84
3:15	1.73	3:15	2.30	3:15	2.69	3:15	3.84
3:30	1.73	3:30	2.30	3:30	2.69	3:30	3.84
3:45	1.73	3:45	2.30	3:45	2.69	3:45	3.84
4:00	2.59	4:00	3.46	4:00	4.03	4:00	5.76
4:15	2.59	4:15	3.46	4:15	4.03	4:15	5.76
4:30	3.46	4:30	4.61	4:30	5.38	4:30	7.68
4:45	3.46	4:45	4.61	4:45	5.38	4:45	7.68
5:00	5.18	5:00	6.91	5:00	8.06	5:00	11.52
5:15	5.18	5:15	6.91	5:15	8.06	5:15	11.52
5:30	20.74	5:30	27.65	5:30	32.26	5:30	46.08
5:45	57.02	5:45	76.03	5:45	88.70	5:45	126.72
6:00	7.78	6:00	10.37	6:00	12.10	6:00	17.28
6:15	7.78	6:15	10.37	6:15	12.10	6:15	17.28
6:30	3.46	6:30	4.61	6:30	5.38	6:30	7.68
6:45	3.46	6:45	4.61	6:45	5.38	6:45	7.68
7:00	2.59	7:00	3.46	7:00	4.03	7:00	5.76
7:15	2.59	7:15	3.46	7:15	4.03	7:15	5.76
7:30	2.59	7:30	3.46	7:30	4.03	7:30	5.76
7:45	2.59	7:45	3.46	7:45	4.03	7:45	5.76
8:00	1.51	8:00	2.02	8:00	2.35	8:00	3.36
8:15	1.51	8:15	2.02	8:15	2.35	8:15	3.36
8:30	1.51	8:30	2.02	8:30	2.35	8:30	3.36
8:45	1.51	8:45	2.02	8:45	2.35	8:45	3.36
9:00	1.51	9:00	2.02	9:00	2.35	9:00	3.36
9:15	1.51	9:15	2.02	9:15	2.35	9:15	3.36
9:30	1.51	9:30	2.02	9:30	2.35	9:30	3.36
9:45	1.51	9:45	2.02	9:45	2.35	9:45	3.36
10:00	0.86	10:00	1.15	10:00	1.34	10:00	1.92
10:15	0.86	10:15	1.15	10:15	1.34	10:15	1.92
10:30	0.86	10:30	1.15	10:30	1.34	10:30	1.92
10:45	0.86	10:45	1.15	10:45	1.34	10:45	1.92
11:00	0.86	11:00	1.15	11:00	1.34	11:00	1.92
11:15	0.86	11:15	1.15	11:15	1.34	11:15	1.92
11:30	0.86	11:30	1.15	11:30	1.34	11:30	1.92
11:45	0.86	11:45	1.15	11:45	1.34	11:45	1.92
12:00	0.00	12:00	0.00	12:00	0.00	12:00	0.00

```

00001> 2
00002> *#####
00003> *#####
00004> *##### INPUT FILE FOR CARP RIVER, CITY OF KANATA #####
00005> *##### FERNBANK CDP: POST-DEVELOPMENT CONDITIONS - MAY 2009 #####
00006> *##### EVENT BASED MODELING (5 MINUTE TIMESTEP) #####
00007> *
00008> *
00009> * REFERENCE DRAINAGE AREA PLANS:
00010> *
00011> * FIGURE 8.1
00012> *
00013> *#####
00014> * EVENT BASED SIMULATION
00015> *#####
00016> START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[1]
00017> C25m=3.stm
00018> *
00019> READ STORM STORM_FILENAME=["storm.001"]
00020> *#####
00021> DEFAULT VALUES ICASEDef=[1], read and print values
00022> DEFVAL_FILENAME=["ottawa.def"]
00023> *
00024> COMPUTE API API=[20], APIK=[0.9]/day
00025> *#####
00026> * LANDS UPSTREAM OF FERNBANK COMMUNITY (GRANITE RIDGE)
00027> *
00028> READ HYD ID=[9], NHYD=["101-3"],
00029> HYD_FILENAME=["H-101-3"]
00030> *#####
00031> * FERNBANK COMMUNITY LANDS TO CARP RIVER TRIBUTARY
00032> * (GLEN CAIRN SWMP OUTLET CHANNEL)
00033> *
00034> * HEADWATER P1
00035> *#####
00036> CONTINUOUS STANDHYD ID=[1], NHYD=["P1"], DT=[5](min), AREA=[77.13](ha),
00037> XIMP=[0.45], TIMP=[0.70], DWF=[0](cms), LOSS=[2],
00038> SCS curve number CN=[80.5],
00039> Pervious surfaces: IAPER=[4.67](mm), SLP=[1.0](%),
00040> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00041> Impervious surfaces: IAIMP=[1.57](mm), SLP=[0.5](%),
00042> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00043> Continuous simulation parameters:
00044> IARCPER=[4](hrs), IARCIIMP=[2](hrs),
00045> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00046> InterEventTime=[12](hrs), END=-1
00047> *
00048> COMPUTE DUALHYD IDIN=[1], CINLET=[7.71](cms), NINLET=[1],
00049> MAJID=[2], MAJNHYD=["P1ma"],
00050> MINID=[3], MINNHYD=["P1min"],
00051> TMJSTO=[3857](cu-m)
00052> *
00053> CONTINUOUS NASHYD ID=[4], NHYD=["SWM1"] DT=[5]min, AREA=[4.50](ha),
00054> DWF= 0 CN= 90 IA= 9.8 N=2 TP=0.25
00055> Continuous simulation parameters:
00056> IARCPER=[4](hrs),
00057> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00058> InterEventTime=[12](hrs)
00059> Baseflow simulation parameters:
00060> BaseFlowOption=[1],
00061> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00062> VHydCond=[10](mm/hr), END=-1
00063> *
00064> ADD HYD IDsum=[1], NHYD=["P1in"], IDs to add=[2,3,4,9]
00065> *
00066> ROUTE RESERVOIR IDout=[2], NHYD=["P1out"], IDin=[1],
00067> RDT=[5](min),
00068> TABLE of ( OUTFLOW-STORAGE ) values
00069> (cms) - (ha-m)
00070> [ 0.000 , 0.000 ]
00071> [ 0.050 , 0.499 ]
00072> [ 1.500 , 2.030 ]
00073> [ 2.500 , 2.810 ]
00074> [ 4.500 , 2.920 ]
00075> [ 4.800 , 3.500 ]
00076> [ 5.000 , 3.930 ]
00077> [ 5.300 , 4.500 ]
00078> [ -1 , -1 ] (max twenty pts)
00079> *
00080> CONTINUOUS NASHYD ID=[3], NHYD=["CRTRIB"] DT=[5]min, AREA=[3.69](ha),
00081> DWF= 0 CN= 82 IA= 9.8 N=2 TP=0.25
00082> Continuous simulation parameters:
00083> IARCPER=[4](hrs),
00084> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00085> InterEventTime=[12](hrs)
00086> Baseflow simulation parameters:
00087> BaseFlowOption=[1],
00088> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00089> VHydCond=[10](mm/hr), END=-1
00090> *
00091> * CARP RIVER TRIBUTARY AT CARP RIVER
00092> *
00093> ADD HYD IDsum=[9], NHYD=["1012NC"], IDs to add=[1,3]
00094> *
00095> ADD HYD IDsum=[9], NHYD=["101-2"], IDs to add=[2,3]
00096> *
00097> SAVE HYD ID=[9], # OF PCYCLES=[1], ICASEsh=[1]
00098> HYD_COMMENT=["Carp Tributary @ Carp River - XP2054"]
00099> *#####
00100> * FERNBANK COMMUNITY LANDS TO SOUTH TRIBUTARY
00101> * (CHANNEL FLOWING NORTH ADJACENT TO GLEN CAIRN POND)
00102> *
00103> * SOUTH POND P3
00104> * 10yr control
00105> *#####
00106> CONTINUOUS STANDHYD ID=[1], NHYD=["P3"], DT=[5](min), AREA=[91.68](ha),
00107> XIMP=[0.34], TIMP=[0.43], DWF=[0](cms), LOSS=[2],
00108> SCS curve number CN=[80.5],
00109> Pervious surfaces: IAPER=[4.67](mm), SLP=[1.0](%),
00110> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00111> Impervious surfaces: IAIMP=[1.57](mm), SLP=[0.5](%),
00112> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00113> Continuous simulation parameters:
00114> IARCPER=[4](hrs), IARCIIMP=[2](hrs),
00115> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00116> InterEventTime=[12](hrs), END=-1
00117> *
00118> COMPUTE DUALHYD IDIN=[1], CINLET=[9.17](cms), NINLET=[1],
00119> MAJID=[2], MAJNHYD=["P3ma"],
00120> MINID=[3], MINNHYD=["P3min"],
00121> TMJSTO=[4584](cu-m)
00122> *
00123> CONTINUOUS NASHYD ID=[4], NHYD=["SWM3"] DT=[5]min, AREA=[2.60](ha),
00124> DWF= 0 CN= 82 IA= 9.8 N=2 TP=0.25
00125> Continuous simulation parameters:
00126> IARCPER=[4](hrs),
00127> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00128> InterEventTime=[12](hrs)
00129> Baseflow simulation parameters:
00130> BaseFlowOption=[1],
00131> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00132> VHydCond=[10](mm/hr), END=-1
00133> *
00134> ADD HYD IDsum=[1], NHYD=["P3in"], IDs to add=[2,3,4]
00135> *

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00136> ROUTE RESERVOIR IDout=[2], NHYD=["P3out"], IDin=[1],
00137> RDT=[5](min),
00138> TABLE of ( OUTFLOW-STORAGE ) values
00139> (cms) - (ha-m)
00140> [ 0.000 , 0.000 ]
00141> [ 0.050 , 0.427 ]
00142> [ 0.300 , 1.568 ]
00143> [ 0.800 , 2.120 ]
00144> [ 1.750 , 2.905 ]
00145> [ -1 , -1 ] (max twenty pts)
00146> IDovf=[3], NHYDovf=["P3OVF"]
00147> *
00148> * SOUTH POND (P3) AT CARP RIVER
00149> *
00150> ADD HYD IDsum=[8], NHYD=["*500*"], IDs to add=[2,3]
00151> *
00152> SAVE HYD ID=[8], # OF PCYCLES=[1], ICASEsh=[1]
00153> HYD_COMMENT=["South Pond @ Carp River"]
00154> *#####
00155> * HEC-RAS inflow hydrograph @ 44751
00156> * NODE 2054
00157> *
00158> *#####
00159> ADD HYD IDsum=[10], NHYD=["*2054*"], IDs to add=[8,9]
00160> *
00161> SAVE HYD ID=[10], # OF PCYCLES=[1], ICASEsh=[1]
00162> HYD_COMMENT=["HEC-RAS Inflow Node 2054 / Station 44751"]
00163> *#####
00164> * LAND DRAINING TO CARP RIVER @ HAZELDEAN RD (Section 44548)
00165> * (28/35/36)
00166> *
00167> * NORTH POND P2
00168> * 10yr control
00169> *#####
00170> CONTINUOUS STANDHYD ID=[1], NHYD=["P2"], DT=[5](min), AREA=[23.14](ha),
00171> XIMP=[0.47], TIMP=[0.59], DWF=[0](cms), LOSS=[2],
00172> SCS curve number CN=[80.5],
00173> Pervious surfaces: IAPER=[4.67](mm), SLP=[1.0](%),
00174> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00175> Impervious surfaces: IAIMP=[1.57](mm), SLP=[0.5](%),
00176> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00177> Continuous simulation parameters:
00178> IARCPER=[4](hrs), IARCIIMP=[2](hrs),
00179> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00180> InterEventTime=[12](hrs), END=-1
00181> *
00182> COMPUTE DUALHYD IDIN=[1], CINLET=[2.31](cms), NINLET=[1],
00183> MAJID=[2], MAJNHYD=["P2ma"],
00184> MINID=[3], MINNHYD=["P2min"],
00185> TMJSTO=[1157](cu-m)
00186> *
00187> CONTINUOUS NASHYD ID=[4], NHYD=["SWM2"] DT=[5]min, AREA=[0.99](ha),
00188> DWF= 0 CN= 90 IA= 9.8 N=2 TP=0.25
00189> Continuous simulation parameters:
00190> IARCPER=[4](hrs),
00191> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00192> InterEventTime=[12](hrs)
00193> Baseflow simulation parameters:
00194> BaseFlowOption=[1],
00195> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00196> VHydCond=[10](mm/hr), END=-1
00197> *
00198> ADD HYD IDsum=[1], NHYD=["P2in"], IDs to add=[2,3,4]
00199> *#####
00200> ROUTE RESERVOIR IDout=[2], NHYD=["P2out"], IDin=[1],
00201> RDT=[5](min),
00202> TABLE of ( OUTFLOW-STORAGE ) values
00203> (cms) - (ha-m)
00204> [ 0.000 , 0.000 ]
00205> [ 0.030 , 0.130 ]
00206> [ 0.150 , 0.277 ]
00207> [ 0.350 , 0.441 ]
00208> [ 0.700 , 0.675 ]
00209> [ -1 , -1 ] (max twenty pts)
00210> IDovf=[3], NHYDovf=["P2OVF"]
00211> *
00212> ADD HYD IDsum=[6], NHYD=["PND2"], IDs to add=[2,3]
00213> *
00214> * NORTH POND (P2) AT CARP RIVER
00215> *
00216> SAVE HYD ID=[6], # OF PCYCLES=[1], ICASEsh=[1]
00217> HYD_COMMENT=["PND2-outflow/overflow"]
00218> *
00219> *
00220> CONTINUOUS NASHYD ID=[4], NHYD=["CRFP"] DT=[5]min, AREA=[24.18](ha),
00221> DWF= 0 CN= 82 IA= 9.8 N=2 TP=0.50
00222> Continuous simulation parameters:
00223> IARCPER=[4](hrs),
00224> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00225> InterEventTime=[12](hrs)
00226> Baseflow simulation parameters:
00227> BaseFlowOption=[1],
00228> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00229> VHydCond=[10](mm/hr), END=-1
00230> *
00231> CONTINUOUS STANDHYD ID=[5], NHYD=["*28*"], DT=[5](min), AREA=[12.5](ha),
00232> XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
00233> Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
00234> DCAY=[4](/hr), F=[0](mm),
00235> Pervious surfaces: IAPER=[4.67](mm), SLP=[1.0](%),
00236> LGP=[205](m), MNP=[0.10], SCP=[0](min),
00237> Impervious surfaces: IAIMP=[1.57](mm), SLP=[1.0](%),
00238> LGI=[700](m), MNI=[0.013], SCI=[0](min),
00239> Continuous simulation parameters:
00240> IARCPER=[4](hrs), IARCIIMP=[2](hrs),
00241> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00242> InterEventTime=[12](hrs), END=-1
00243> *
00244> *
00245> *
00246> * HEC-RAS inflow hydrograph @ 44548
00247> * NODE 2065
00248> * (INCLUDES 24.18 HA OF CARP RIVER FLOODPLAIN)
00249> * (INCLUDES 12.50 HA OF WEST CREEK MEADOWS)
00250> *#####
00251> ADD HYD IDsum=[7], NHYD=["*2065*"], IDs to add=[4,5,6]
00252> *
00253> SAVE HYD ID=[7], # OF PCYCLES=[1], ICASEsh=[1]
00254> HYD_COMMENT=["HEC-RAS Inflow Node 2065 / Station 44548"]
00255> *#####
00256> * LANDS UPSTREAM OF HAZELDEAN ROAD TRIBUTARY TO HAZELDEAN CREEK
00257> * (INCLUDES NORTHWEST CORNER OF FERNBANK CDP LANDS)
00258> *
00259> CONTINUOUS STANDHYD ID=[5], NHYD=["*100-1*"], DT=[5](min), AREA=[61.17](ha),
00260> XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
00261> Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
00262> DCAY=[4](/hr), F=[0](mm),
00263> Pervious surfaces: IAPER=[4.67](mm), SLP=[0.8](%),
00264> LGP=[1200](m), MNP=[0.10], SCP=[0](min),
00265> Impervious surfaces: IAIMP=[1.57](mm), SLP=[0.8](%),
00266> LGI=[1700](m), MNI=[0.013], SCI=[0](min)
00267> Continuous simulation parameters:
00268> IARCPER=[4](hrs), IARCIIMP=[2](hrs),
00269> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00270> InterEventTime=[12](hrs), END=-1

```



```
00271> *%-----|-----|
00272> *% LANDS NORTH OF HAZELDEAN ROAD - TO HAZELDEAN CREEK
00273> *% (USED IN MODEL CALIBRATION)
00274> *% -----|-----|
00275> CONTINUOUS NASHYD ID=[6], NHYD=["102-1"], DT=[5]min, AREA=[39.8](ha),
00276> DWF=[0](cms), CN/C=[78], IA=[9.8](mm),
00277> N=[2], TP=[1.10]hrs
00278> Continuous simulation parameters:
00279> IaRSCper=[4](hrs),
00280> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00281> InterEventTime=[12](hrs)
00282> Baseflow simulation parameters:
00283> BaseFlowOption=[1],
00284> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00285> VHydCond=[10](mm/hr), END=-1
00286> *%-----|-----|
00287> * HEC-RAS inflow hydrograph @ 43966
00288> * (Hazeldean Creek @ Carp River)
00289> * -----|-----|
00290> ADD HYD IDsum=[10], NHYD=["3894"], IDs to add=[5,6]
00291> *
00292> SAVE HYD ID=[10], # OF PCYCLES=[1], ICASEsh=[1]
00293> HD_COMMENT=["HEC-RAS Inflow Node 3894 / Station 43966*"]
00294> *%-----|-----|
00295> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[2]
00296> * S2-24.stm
00297> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[3]
00298> * S5-24.stm
00299> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[4]
00300> * S10-24.stm
00301> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[5]
00302> * S25-24.stm
00303> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[6]
00304> * S50-24.stm
00305> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[7]
00306> * S100-24.stm
00307> *%-----|-----|
00308> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[8]
00309> * S2-12.stm
00310> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[9]
00311> * S5-12.stm
00312> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[10]
00313> * S10-12.stm
00314> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[11]
00315> * S25-12.stm
00316> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[12]
00317> * S50-12.stm
00318> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[13]
00319> * S100-12.stm
00320> *%-----|-----|
00321> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[14]
00322> * C2-3.stm
00323> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[15]
00324> * C5-3.stm
00325> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[16]
00326> * C10-3.stm
00327> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[17]
00328> * C25-3.stm
00329> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[18]
00330> * C50-3.stm
00331> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[19]
00332> * C100-3.stm
00333> *%-----|-----|
00334> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00335> * C25mm-3.stm
00336> *%-----|-----|
00337> FINISH
00338>
00339>
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00001> =====
00002>
00003> SSSSS W W M M H H Y Y M M O O 999 999
00004> S W W W M M M H H Y Y M M M O O 9 9 9 9
00005> SSSSS W W M M M H H H Y Y M M M O # 9 9 9 9 Ver 4.05
00006> S W W M M H H Y Y M M O O 9999 9999 Sept 2011
00007> SSSSS W W M M H H Y Y M M O O 9 9 9 9
00008> StormWater Management Hydrologic Model 999 999
00009>
00010> *****
00011> ***** SWMHYMO Ver/4.05 *****
00012> ***** A single event and continuous hydrologic simulation model *****
00013> ***** based on the principles of HYMO and its successors *****
00014> ***** OTTHYMO-83 and OTTHYMO-89. *****
00015> *****
00016> *****
00017> ***** Distributed by: J.F. Sabourin and Associates Inc. *****
00018> ***** Ottawa, Ontario: (613) 836-3884 *****
00019> ***** Gatineau, Quebec: (819) 243-6858 *****
00020> ***** E-Mail: swmhyo@jfaa.com *****
00021> *****
00022> *****
00023> ***** Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD *****
00024> ***** Nepean SERIAL#5320763 *****
00025> *****
00026> *****
00027> *****
00028> *****
00029> ***** PROGRAM ARRAY DIMENSIONS *****
00030> ***** Maximum value for ID numbers : 10 *****
00031> ***** Max. number of rainfall points: 105408 *****
00032> ***** Max. number of flow points : 105408 *****
00033> *****
00034> *****
00035> ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
00036> *****
00037> ***** ID: Hydrograph Identification numbers, (1-10). *****
00038> ***** NHTD: Hydrograph reference numbers, (6 digits or characters). *****
00039> ***** AREA: Drainage area associated with hydrograph, (ac.) or (ha.). *****
00040> ***** PEAK: Peak flow of simulated hydrograph, (ft3/s) or (m3/s). *****
00041> ***** TpeakDate_hh:mm is the date and time of the peak flow. *****
00042> ***** R.V.: Runoff Volume of simulated hydrograph, (in) or (mm). *****
00043> ***** R.C.: Runoff Coefficient of simulated hydrograph, (ratio). *****
00044> ***** *: see WARNING or NOTE message printed at end of run. *****
00045> ***** **: see ERROR message printed at end of run. *****
00046> *****
00047> *****
00048> *****
00049> *****
00050> *****
00051> *****
00052> *****
00053> ***** SUMMARY OUTPUT *****
00054> *****
00055> * DATE: 2017-07-14 TIME: 10:13:41 RUN COUNTER: 000742 *
00056> *****
00057> * Input filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-Dce.dat *
00058> * Output filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-Dce.out *
00059> * Summary filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-Dce.sum *
00060> * User comments:
00061> * 1:
00062> * 2:
00063> * 3:
00064> *****
00065> *****
00066> *****
00067> RUN:COMMAND#
00068> 001-0002-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00069> START
00070> [TZERO = .00 hrs on 0]
00071> [METOUT= 2 (1=imperial, 2=metric output)]
00072> [NSTORM= 1]
00073> [ENRUN = 1]
00074> 001-0002-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00075> READ STORM
00076> Filename = storm.001
00077> Comment =
00078> [TPT=10.0;SDUR= 3.00;PTOT= 25.00]
00079> 001-0003-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00080> DEFAULT VALUES
00081> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
00082> ICASRDV = 1 (read and print data)
00083> FileTitle = ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE
00084> [ENRUN = 1] ***** PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 ----
00085> Horton's infiltration equation parameters:
00086> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00087> Parameters for Pervious surfaces in STANDHYD:
00088> [IAimp= 4.67 mm] [LGP=40.00 mm] [MNP= 250]
00089> Parameters for IMPERVIOUS surfaces in STANDHYD:
00090> [IAimp= 1.57 mm] [CLI= 1.50] [MNI= .013]
00091> Parameters used in NASHYD:
00092> [Ia= 4.67 mm] [N= 2.00]
00093> 001-0004-----COMPUTE API
00094> [APIini= 20.00; APIkdy= 9000; APIkdt= .9993]
00095> [APIend= 44.55; APIavg= 33.46; APImin= 20.35]
00096> *****
00097> 001-0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00098> READ HYD 09:101-3 69.53 605 No_date 2:30 18.08
00099> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.001
00100> Comment = GRANITE RIDGE AREA 101-3
00101> 001-0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00102> CONTINUOUS STANDHYD01:P1 77.13 3.058 No_date 1:30 18.08
00103> [XIMP= 45;TIMP= 70]
00104> [LOSS= 2 ;CN= 80.5]
00105> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 40.;MNP= 200;SCP= .0]
00106> [Impervious area: IAimp= 1.57;SLPI= .50;LGI=1400.;MNI=.013;SCI= .0]
00107> [IARClmp= 2.00; IARCPper= 4.00]
00108> [SMIN= 26.32; SMAX=175.50; SK=1.000]
00109> 001-0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00110> COMPUTE DUALHYD 01:P1 77.13 3.058 No_date 1:30 18.08
00111> Major System / 02:P3maj .00 .000 No_date 0:00 .00
00112> Minor System \ 03:P3min 77.13 3.058 No_date 1:30 18.08
00113> [MjSysSto=.0000E+00; TotOvfVol=.0000E+00; N-Ovf= 0; TotDurOvf= 0 hrs]
00114> 001-0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00115> CONTINUOUS NASHYD 04:SWM1 4.50 .079 No_date 1:35 8.24
00116> [CN= 90.0; N= 2.00]
00117> [Tp= 25;DT= 5.00]
00118> [IARCE= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
00119> [InterEventTime= 12.00]
00120> 001-0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00121> ADD HYD 02:P1maj .00 .000 No_date 0:00 .00
00122> + 03:P1min 77.13 3.058 No_date 1:30 18.08
00123> + 09:101-3 69.53 605 No_date 2:30 18.08
00124> + 05:101-3 69.53 605 No_date 2:30 18.08
00125> [DT= 5.00] SUM= 01:P1in 151.16 3.541 No_date 1:35 16.22
00126> 001-0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00127> ROUTE RESERVOIR -> 01:P1in 151.16 3.541 No_date 1:35 16.22
00128> [RTR= 5.00] SUM= 02:P3out 151.16 .869 No_date 3:30 16.22
00129> [MxStoUsed=.1364E+01]
00130> 001-0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00131> CONTINUOUS NASHYD 03:CRTRIB 3.69 .045 No_date 1:35 5.93
00132> [CN= 82.0; N= 2.00]
00133> [Tp= 25;DT= 5.00]
00134> [IARCE= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00135> [InterEventTime= 12.00]

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00136> 001-0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00137> ADD HYD 01:P1in 151.16 3.541 No_date 1:35 16.22
00138> + 03:CRTRIB 3.69 .045 No_date 1:35 5.93
00139> [IARClmp= 2.00; IARCPper= 4.00]
00140> 001-0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00141> ADD HYD 02:Plout 151.16 .869 No_date 3:30 16.22
00142> + 03:CRTRIB 3.69 .045 No_date 1:35 5.93
00143> + 07:5:101-2 154.85 .875 No_date 3:25 15.98
00144> 001-0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00145> SAVE HYD 09:101-2 154.85 .875 No_date 3:25 15.98
00146> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.001
00147> remark:Carp Tributary @ Carp River - XP2054
00148> 001-0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00149> CONTINUOUS STANDHYD01:P3 91.68 2.593 No_date 1:30 14.61
00150> [XIMP=.34;TIMP=.43]
00151> [LOSS= 2 ;CN= 80.5]
00152> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 40.;MNP= 200;SCP= .0]
00153> [Impervious area: IAimp= 1.57;SLPI= .50;LGI=1400.;MNI=.013;SCI= .0]
00154> [IARClmp= 2.00; IARCPper= 4.00]
00155> [SMIN= 26.32; SMAX=175.50; SK=1.000]
00156> 001-0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00157> COMPUTE DUALHYD 01:P3 91.68 2.593 No_date 1:30 14.61
00158> Major System / 02:P3maj .00 .000 No_date 0:00 .00
00159> Minor System \ 03:P3min 91.68 2.593 No_date 1:30 14.61
00160> [MjSysSto=.0000E+00; TotOvfVol=.0000E+00; N-Ovf= 0; TotDurOvf= 0 hrs]
00161> 001-0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00162> CONTINUOUS NASHYD 04:SWM3 2.60 .031 No_date 1:35 5.93
00163> [CN= 82.0; N= 2.00]
00164> [Tp= 25;DT= 5.00]
00165> [IARCE= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00166> [InterEventTime= 12.00]
00167> 001-0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00168> ADD HYD 02:P3maj 91.68 2.593 No_date 1:30 14.61
00169> + 04:SWM3 2.60 .031 No_date 1:35 5.93
00170> [DT= 5.00] SUM= 01:P3in 94.28 2.623 No_date 1:30 14.37
00171> 001-0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00172> ROUTE RESERVOIR -> 02:P3out 94.28 2.623 No_date 1:30 14.37
00173> [RTR= 5.00] out< 02:P3out 94.28 .222 No_date 3:55 14.37
00174> overflow <= 03:P3OVF .00 .000 No_date 0:00 .00
00175> [MxStoUsed=.1168E+01; TotOvfVol=.0000E+00; N-Ovf= 0; TotDurOvf= 0 hrs]
00176> 001-0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00177> ADD HYD 02:P3maj 94.28 .222 No_date 3:55 14.37
00178> + 03:P3OVF .00 .000 No_date 0:00 .00
00179> [DT= 5.00] SUM= 08:500 94.28 .212 No_date 3:55 14.37
00180> 001-0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00181> SAVE HYD 08:500 94.28 .212 No_date 3:55 14.37
00182> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.001
00183> remark:South Pond @ Carp River
00184> 001-0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00185> ADD HYD 08:500 94.28 .212 No_date 3:55 14.37
00186> + 09:101-2 154.85 .875 No_date 3:25 15.98
00187> [DT= 5.00] SUM= 249.13 1.084 No_date 3:30 15.37
00188> 001-0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00189> SAVE HYD 10:2054 249.13 1.084 No_date 3:30 15.37
00190> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.001
00191> remark:HEC-RAS Inflow Node 2054 / Station 44751
00192> 001-0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00193> CONTINUOUS STANDHYD01:P2 23.14 .834 No_date 1:30 16.82
00194> [XIMP=.47;TIMP=.59]
00195> [LOSS= 2 ;CN= 80.5]
00196> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 40.;MNP= 200;SCP= .0]
00197> [Impervious area: IAimp= 1.57;SLPI= .50;LGI=1400.;MNI=.013;SCI= .0]
00198> [IARClmp= 2.00; IARCPper= 4.00]
00199> [SMIN= 26.32; SMAX=175.50; SK=1.000]
00200> 001-0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00201> COMPUTE DUALHYD 01:P2 23.14 .834 No_date 1:30 16.82
00202> Major System / 02:P2maj .00 .000 No_date 0:00 .00
00203> Minor System \ 03:P2min 23.14 .834 No_date 1:30 16.82
00204> [MjSysSto=.0000E+00; TotOvfVol=.0000E+00; N-Ovf= 0; TotDurOvf= 0 hrs]
00205> 001-0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00206> CONTINUOUS NASHYD 04:SWM2 .99 .017 No_date 1:35 8.24
00207> [CN= 90.0; N= 2.00]
00208> [Tp= 25;DT= 5.00]
00209> [IARCE= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
00210> [InterEventTime= 12.00]
00211> 001-0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00212> ADD HYD 02:P3maj 23.14 .834 No_date 1:30 16.82
00213> + 03:P2min .99 .017 No_date 1:35 8.24
00214> [DT= 5.00] SUM= 01:P2in 24.13 .851 No_date 1:30 16.47
00215> 001-0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00216> ROUTE RESERVOIR -> 02:P2out 24.13 .851 No_date 1:30 16.47
00217> [RTR= 5.00] out< 02:P2out 24.13 .164 No_date 3:10 16.47
00218> overflow <= 03:P2OVF .00 .000 No_date 0:00 .00
00219> [MxStoUsed=.2888E+00; TotOvfVol=.0000E+00; N-Ovf= 0; TotDurOvf= 0 hrs]
00220> 001-0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00221> ADD HYD 02:P2maj 24.13 .164 No_date 3:10 16.47
00222> + 03:P2OVF .00 .000 No_date 0:00 .00
00223> [DT= 5.00] SUM= 06:PND2 24.13 .164 No_date 3:10 16.47
00224> 001-0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00225> SAVE HYD 06:PND2 24.13 .164 No_date 3:10 16.47
00226> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.001
00227> remark:POND2-outflow/overflow
00228> 001-0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00229> CONTINUOUS NASHYD 04:CRFP 24.18 .196 No_date 2:00 5.93
00230> [CN= 82.0; N= 2.00]
00231> [Tp= 50;DT= 3.00]
00232> [IARCE= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00233> [InterEventTime= 12.00]
00234> 001-0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00235> CONTINUOUS STANDHYD05:28 12.50 .519 No_date 1:15 10.12
00236> [XIMP=.38;TIMP=.45]
00237> [Horton parameters: Fo= 76.20;Fc= 13.20;DCAY=4.00; F= .00]
00238> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 205.;MNP= 100;SCP= .0]
00239> [Impervious area: IAimp= 1.57;SLPI=1.00;LGI= 700.;MNI=.013;SCI= .0]
00240> [IARClmp= 2.00; IARCPper= 4.00]
00241> 001-0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00242> ADD HYD 04:CRFP 24.18 .196 No_date 2:00 5.93
00243> + 05:28 12.50 .519 No_date 1:15 10.12
00244> + 06:PND2 24.13 .164 No_date 3:10 16.47
00245> [DT= 5.00] SUM= 07:2065 60.81 .564 No_date 1:15 10.97
00246> 001-0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00247> SAVE HYD 07:2065 60.81 .564 No_date 1:15 10.97
00248> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.001
00249> remark:HEC-RAS Inflow Node 2065 / Station 44548
00250> 001-0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00251> CONTINUOUS STANDHYD05:100-1 61.17 1.610 No_date 1:25 10.12
00252> [XIMP=.38;TIMP=.45]
00253> [Horton parameters: Fo= 76.20;Fc= 13.20;DCAY=4.00; F= .00]
00254> [Pervious area: IAper= 4.67;SLPP= 80.;LGP=1200.;MNP= 100;SCP= .0]
00255> [Impervious area: IAimp= 1.57;SLPI= .80;LGI=1700.;MNI=.013;SCI= .0]
00256> [IARClmp= 2.00; IARCPper= 4.00]
00257> 001-0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00258> CONTINUOUS NASHYD 06:102-1 39.80 .165 No_date 3:00 5.00
00259> [CN= 78.0; N= 2.00]
00260> [Tp= 10;DT= 5.00]
00261> [IARCE= 4.00; SMIN= 29.88; SMAX=199.22; SK=1.000]
00262> [InterEventTime= 12.00]
00263> 001-0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00264> ADD HYD 05:100-1 61.17 1.610 No_date 1:25 10.12
00265> + 06:102-1 39.80 .165 No_date 3:00 5.00
00266> [DT= 5.00] SUM= 01:3894 61.17 1.610 No_date 1:25 8.10
00267> 001-0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00268> SAVE HYD 01:3894 61.17 1.610 No_date 1:25 8.10
00269> 001-0039-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00270> ADD HYD 01:3894 61.17 1.610 No_date 1:25 8.10

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00271>      fname : M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.001
00272>      remark:HEC-RAS Inflow Node 3894 / Station 43966
00273> ** END OF RUN : 7
00274>
00275> *****
00276>
00277>
00278>
00279>
00280>
00281> RUN:COMMAND#
00282> 008:0001-----
00283> START
00284> [TZERO = .00 hrs on 0]
00285> [METOUT= 2 (1=imperial, 2=metric output)]
00286> [NSTORM= 1 ]
00287> [NRUN = 8 ]
00288>
00289> READ STORM
00290> Filename = storm.001
00291> Comment =
00292> [SDT=30.00:SDUR= 12.00:PTOT= 42.34]
00293>
00294> DEFAULT VALUES
00295> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
00296> ICASEdv = 1 (read and print data)
00297> FileTitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
00298> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
00299> Horton's infiltration equation parameters:
00300> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00301> Parameters for PERVIOUS surfaces in STANDHYD:
00302> [IAPER= 4.67 mm] [LGP=40.00 m] [MNP= .250]
00303> Parameters for IMPERVIOUS surfaces in STANDHYD:
00304> [IaImp= 1.57 mm] [CLI=1.50] [MNI= .013]
00305> Parameters used in NASHYD:
00306> [Ia= 4.67 mm] [N= 2.00]
00307>
00308> *****
00309> [APIIn= 20.00: APIKdy= .9000: APIKdt= .9978]
00310> [APImax= 60.24: APIavg= 39.87: APImin= 20.59]
00311> 008:0005-----
00312> READ HYD 09:101-3 69.53 1.068 No_date 7:05 29.55
00313> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.008
00314> Comment = GRANITE RIDGE AREA 101-3
00315> 008:0006-----
00316> CONTINUOUS STANDHYD01:P1 77.13 3.984 No_date 6:15 34.42
00317> [XIMP= 45:TIMP= 70]
00318> [LOSS= 2 :CN= 80.5]
00319> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
00320> [Impervious area: IAImp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00321> [IaRCImp= 2.00: IaRCPer= 4.00]
00322> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00323> *****
00324> COMPUTE DUALHYD 01:P1 77.13 3.984 No_date 6:15 34.42
00325> Major System \ 02:P1maj .00 .000 No_date 0:00 .00
00326> Minor System \ 03:P1min 77.13 3.984 No_date 6:15 34.42
00327> [MJSysSto=.0000E+00, TotOvVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00328> 008:0007-----
00329> CONTINUOUS NASHYD 04:SWM1 4.50 .186 No_date 6:10 23.33
00330> [CN= 90.0: N= 2.00]
00331> [Tp= .25:DT= 5.00]
00332> [IaRC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00333> [InterEventTime= 12.00]
00334> 008:0009-----
00335> ADD HYD 02:P1maj .00 .000 No_date 0:00 .00
00336> + 03:P1min 77.13 3.984 No_date 6:15 34.42
00337> + 04:SWM1 4.50 .186 No_date 6:10 23.33
00338> + 03:P3out 69.53 1.068 No_date 7:05 29.55
00339> [DT= 5.00] SUM= 01:P1in 151.16 4.951 No_date 6:15 31.85
00340> 008:0010-----
00341> ROUTE RESERVOIR -> 01:P1in 151.16 4.951 No_date 6:15 31.85
00342> [RDT= 5.00] out<- 02:P1out 151.16 1.601 No_date 8:10 31.85
00343> [MxStoUsed=.2109E+01, TotOvVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00344> 008:0011-----
00345> CONTINUOUS NASHYD 03:CRTRIB 3.69 .115 No_date 6:10 18.79
00346> [CN= 82.0: N= 2.00]
00347> [Tp= .25:DT= 5.00]
00348> [IaRC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00349> [InterEventTime= 12.00]
00350> 008:0012-----
00351> ADD HYD 01:P1in 151.16 4.951 No_date 6:15 31.85
00352> + 03:CRTRIB 3.69 .115 No_date 6:10 18.79
00353> + 09:101-2 154.85 1.621 No_date 8:05 31.54
00354> 008:0013-----
00355> ADD HYD 02:P1out 151.16 1.601 No_date 8:10 31.85
00356> + 03:CRTRIB 3.69 .115 No_date 6:10 18.79
00357> [DT= 5.00] SUM= 09:101-2 154.85 1.621 No_date 8:05 31.54
00358> 008:0014-----
00359> SAVE HYD 09:101-2 154.85 1.621 No_date 8:05 31.54
00360> fname : M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.008
00361> remark:Carp Tributary - XP2054
00362> 008:0015-----
00363> CONTINUOUS STANDHYD01:P3 91.68 3.874 No_date 6:15 29.72
00364> [XIMP= 34:TIMP= 43]
00365> [LOSS= 2 :CN= 80.5]
00366> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
00367> [Impervious area: IAImp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00368> [IaRCImp= 2.00: IaRCPer= 4.00]
00369> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00370> 008:0016-----
00371> COMPUTE DUALHYD 01:P3 91.68 3.874 No_date 6:15 29.72
00372> Major System \ 02:P3maj .00 .000 No_date 0:00 .00
00373> Minor System \ 03:P3min 91.68 3.874 No_date 6:15 29.72
00374> [MJSysSto=.0000E+00, TotOvVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00375> 008:0017-----
00376> CONTINUOUS NASHYD 04:SWM3 2.60 .081 No_date 6:10 18.79
00377> [CN= 82.0: N= 2.00]
00378> [Tp= .25:DT= 5.00]
00379> [IaRC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00380> [InterEventTime= 12.00]
00381> 008:0018-----
00382> ADD HYD 02:P3maj .00 .000 No_date 0:00 .00
00383> + 03:P3min 91.68 3.874 No_date 6:15 29.72
00384> + 04:SWM3 2.60 .081 No_date 6:10 18.79
00385> [DT= 5.00] SUM= 01:P3in 94.28 3.953 No_date 6:15 29.42
00386> 008:0019-----
00387> ROUTE RESERVOIR -> 01:P3in 94.28 3.953 No_date 6:15 29.42
00388> [RDT= 5.00] out<- 02:P3out 94.28 .601 No_date 8:35 29.42
00389> overflow <= 03:P3OVF .00 .000 No_date 0:00 .00
00390> [MxStoUsed=.1900E+01, TotOvVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00391> 008:0020-----
00392> ADD HYD 02:P3out 94.28 .601 No_date 8:35 29.42
00393> + 04:SWM3 2.60 .081 No_date 6:10 18.79
00394> [DT= 5.00] SUM= 08:500 94.28 .601 No_date 8:35 29.42
00395> 008:0021-----
00396> SAVE HYD 08:500 94.28 .601 No_date 8:35 29.42
00397> fname : M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.008
00398> remark:South Pond - Carp River
00399> 008:0022-----
00400> ADD HYD 08:500 94.28 .601 No_date 8:35 29.42
00401> + 09:101-2 154.85 1.621 No_date 8:05 31.54
00402> [DT= 5.00] SUM= 10:2054 249.13 2.213 No_date 8:15 30.74
00403> 008:0023-----
00404> SAVE HYD 10:2054 249.13 2.213 No_date 8:15 30.74
00405> fname : M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.008

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00406> remark:HEC-RAS Inflow Node 2054 / Station 44751
00407>
00408> 008:0024-----
00409> CONTINUOUS STANDHYD01:P2 23.14 1.118 No_date 6:15 32.61
00410> [XIMP= 47:TIMP= 59]
00411> [LOSS= 2 :CN= 80.5]
00412> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
00413> [Impervious area: IAImp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00414> [IaRCImp= 2.00: IaRCPer= 4.00]
00415> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00416> 008:0025-----
00417> COMPUTE DUALHYD 01:P2 23.14 1.118 No_date 6:15 32.61
00418> Major System \ 02:P2maj .00 .000 No_date 0:00 .00
00419> Minor System \ 03:P2min 23.14 1.118 No_date 6:15 32.61
00420> [MJSysSto=.0000E+00, TotOvVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00421> 008:0026-----
00422> CONTINUOUS NASHYD 04:SWM2 .99 .041 No_date 6:10 23.33
00423> [CN= 90.0: N= 2.00]
00424> [IaRC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00425> [InterEventTime= 12.00]
00426> 008:0027-----
00427> ADD HYD 02:P2maj .00 .000 No_date 0:00 .00
00428> + 03:P2min 23.14 1.118 No_date 6:15 32.61
00429> + 04:SWM2 .99 .041 No_date 6:10 23.33
00430> [DT= 5.00] SUM= 01:P2in 24.13 1.158 No_date 6:15 32.23
00431> 008:0028-----
00432> ROUTE RESERVOIR -> 01:P2in 24.13 1.158 No_date 6:15 32.23
00433> [RDT= 5.00] out<- 02:P2out 24.13 .333 No_date 7:30 32.23
00434> overflow <= 03:P2OVF .00 .000 No_date 0:00 .00
00435> [MxStoUsed=.4269E+00, TotOvVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00436> 008:0029-----
00437> ADD HYD 02:P2out 24.13 .333 No_date 7:30 32.23
00438> + 03:P2OVF .00 .000 No_date 0:00 .00
00439> [DT= 5.00] SUM= 06:PND2 24.13 .333 No_date 7:30 32.23
00440> 008:0030-----
00441> SAVE HYD 06:PND2 24.13 .333 No_date 7:30 32.23
00442> fname : M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.008
00443> remark:PND2-outflow
00444> 008:0031-----
00445> CONTINUOUS NASHYD 04:CRFP 24.18 .494 No_date 6:35 18.79
00446> [CN= 82.0: N= 2.00]
00447> [Tp= .50:DT= 5.00]
00448> [IaRC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00449> [InterEventTime= 12.00]
00450> 008:0032-----
00451> CONTINUOUS STANDHYD05:28 12.50 .445 No_date 6:00 18.26
00452> [XIMP= 38:TIMP= 45]
00453> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00454> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
00455> [Impervious area: IAImp= 1.57:SLPI=1.00:LGI= 700. ....]
00456> [IaRCImp= 2.00: IaRCPer= 4.00]
00457> 008:0033-----
00458> ADD HYD 01:P1in 151.16 4.951 No_date 6:15 31.85
00459> + 05:28 12.50 .445 No_date 6:00 18.26
00460> + 06:PND2 24.13 .333 No_date 7:30 32.23
00461> [DT= 5.00] SUM= 07:2065 60.81 .912 No_date 6:35 24.01
00462> 008:0034-----
00463> SAVE HYD 07:2065 60.81 .912 No_date 6:35 24.01
00464> fname : M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.008
00465> remark:HEC-RAS Inflow Node 2065 / Station 44548
00466> 008:0035-----
00467> CONTINUOUS STANDHYD05:100-1 61.17 1.647 No_date 6:10 18.26
00468> [XIMP= 38:TIMP= 45]
00469> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00470> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
00471> [Impervious area: IAImp= 1.57:SLPI=1.00:LGI= 700. ....]
00472> [IaRCImp= 2.00: IaRCPer= 4.00]
00473> 008:0036-----
00474> CONTINUOUS NASHYD 06:102-1 39.80 .404 No_date 7:25 16.64
00475> [CN= 78.0: N= 2.00]
00476> [Tp= 1.10:DT= 5.00]
00477> [IaRC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
00478> [InterEventTime= 12.00]
00479> 008:0037-----
00480> ADD HYD 05:100-1 61.17 1.647 No_date 6:10 18.26
00481> + 06:102-1 39.80 .404 No_date 7:25 16.64
00482> [DT= 5.00] SUM= 10:3894 100.97 1.794 No_date 6:10 17.62
00483> 008:0038-----
00484> SAVE HYD 10:3894 100.97 1.794 No_date 6:10 17.62
00485> fname : M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.008
00486> remark:HEC-RAS Inflow Node 3894 / Station 43966
00487> *** END OF RUN : 8
00488> *****
00489> *****
00490>
00491>
00492>
00493>
00494>
00495> RUN:COMMAND#
00496> 009:0001-----
00497> START
00498> [TZERO = .00 hrs on 0]
00499> [METOUT= 2 (1=imperial, 2=metric output)]
00500> [NSTORM= 1 ]
00501> [NRUN = 9 ]
00502> 009:0002-----
00503> READ STORM
00504> Filename = storm.001
00505> Comment =
00506> [SDT=30.00:SDUR= 12.00:PTOT= 56.18]
00507>
00508> DEFAULT VALUES
00509> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
00510> ICASEdv = 1 (read and print data)
00511> FileTitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
00512> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
00513> Horton's infiltration equation parameters:
00514> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00515> Parameters for PERVIOUS surfaces in STANDHYD:
00516> [IAPER= 4.67 mm] [LGP=40.00 m] [MNP= .250]
00517> Parameters for IMPERVIOUS surfaces in STANDHYD:
00518> [IaImp= 1.57 mm] [CLI= 1.50] [MNI= .013]
00519> Parameters used in NASHYD:
00520> [Ia= 4.67 mm] [N= 2.00]
00521> 009:0004-----
00522> COMPUTE API
00523> [APIIn= 20.00: APIKdy= .9000: APIKdt= .9978]
00524> [APImax= 73.73: APIavg= 46.81: APImin= 20.80]
00525> 009:0005-----
00526> READ HYD 09:101-3 69.53 1.597 No_date 6:55 42.20
00527> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.009
00528> Comment = GRANITE RIDGE AREA 101-3
00529> 009:0006-----
00530> CONTINUOUS STANDHYD01:P1 77.13 5.939 No_date 6:10 47.84
00531> [XIMP= 45:TIMP= 70]
00532> [LOSS= 2 :CN= 80.5]
00533> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
00534> [Impervious area: IAImp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00535> [IaRCImp= 2.00: IaRCPer= 4.00]
00536> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00537> 009:0007-----
00538> COMPUTE API 77.13 5.939 No_date 6:10 47.84
00539> Major System \ 02:P1maj .00 .000 No_date 0:00 .00
00540> Minor System \ 03:P1min 77.13 5.939 No_date 6:10 47.84

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00541> [MjSysSto=0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00542> 009:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS NASHYD 04:SWM1 4.50 .308 No\_date 6:05 36.39
00544> [CN= 90.0: N= 2.00]
00545> [Tp=.25:DT= 5.00]
00546> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00547> [InterEventTime= 12.00]
00548> 009:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 02:P3maj .00 .000 No\_date 0:00 .00
00550> + 03:P3min 77.13 5.939 No\_date 6:10 47.84
00551> + 04:SWM1 4.50 .308 No\_date 6:05 36.39
00552> + 09:101-3 69.53 1.597 No\_date 6:55 42.20
00553> [DT= 5.00] SUM= 01:P3min 151.16 7.448 No\_date 6:10 44.91
00554> 009:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ROUTE RESERVOIR -> 01:P3in 151.16 7.448 No\_date 6:10 44.91
[RDT= 5.00] out<- 02:P3out 151.16 2.758 No\_date 7:35 44.91
00555> [MxStoUsed=.2824E+01]
00556> 009:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS NASHYD 03:CRTRIB 3.69 .202 No\_date 6:05 30.76
00560> [CN= 82.0: N= 2.00]
00561> [Tp=.25:DT= 5.00]
00562> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00563> [InterEventTime= 12.00]
00564> 009:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 01:P3in 151.16 7.448 No\_date 6:10 44.91
00566> + 03:CRTRIB 3.69 .202 No\_date 6:05 30.76
00567> [DT= 5.00] SUM= 09:1012NC 154.85 7.649 No\_date 6:10 44.57
00568> 009:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 02:P3out 151.16 2.758 No\_date 7:35 44.91
00569> + 03:CRTRIB 3.69 .202 No\_date 6:05 30.76
00570> [DT= 5.00] SUM= 09:101-2 154.85 2.799 No\_date 7:35 44.57
00572> 009:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
SAVE HYD 01:P3P3VF 154.85 2.799 No\_date 7:35 44.57
00573> [MxStoUsed=.2506E+01, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00574> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.009
remark:Carp Tributary @ Carp River - XP2054
00575> 009:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS STANDHYD01:P3 91.68 6.001 No\_date 6:15 42.53
00577> [XIMP= 34:TIMP= 45]
00578> [LOSS= 2 :CN= 80.51]
00579> [Pervious area: IAper= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00581> [Impervious area: IAimp= 1.57:SLPI=.50:LGI=1400.:MNI=.013:SCI=.0]
00582> [IaRECimp= 2.00: IaRECper= 4.00]
00583> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00584> 009:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
COMPUTE DUALHYD 01:P3 91.68 6.001 No\_date 6:15 42.53
00585> Major System / 02:P3maj .00 .000 No\_date 0:00 .00
00586> Minor System \ 03:P3min 91.68 6.001 No\_date 6:15 42.53
00587> [MjSysSto=0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00588> 009:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS NASHYD 04:SWM3 2.60 .142 No\_date 6:05 30.76
00590> [CN= 82.0: N= 2.00]
00591> [Tp=.25:DT= 5.00]
00592> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00593> [InterEventTime= 12.00]
00595> 009:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 02:P3maj .00 .000 No\_date 0:00 .00
00597> + 03:P3min 91.68 6.001 No\_date 6:15 42.53
00598> + 04:SWM2 2.60 .142 No\_date 6:05 30.76
00599> [DT= 5.00] SUM= 01:P3in 94.28 6.141 No\_date 6:10 42.21
00600> 009:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ROUTE RESERVOIR -> 01:P3in 94.28 6.141 No\_date 6:10 42.21
00602> [RDT= 5.00] out<- 02:P3out 94.28 1.267 No\_date 7:45 42.21
00603> [MxStoUsed=.2506E+01, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00604> 009:0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 02:P3out 94.28 1.267 No\_date 7:45 42.21
00607> [DT= 5.00] SUM= 03:P3P3VF .00 .000 No\_date 0:00 .00
00608> 009:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
SAVE HYD 01:P3in 94.28 1.267 No\_date 7:45 42.21
00610> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.009
remark:South Pond @ Carp River
00611> 009:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 08:SWM 94.28 1.267 No\_date 7:45 42.21
00615> + 09:101-2 154.85 2.799 No\_date 7:35 44.57
00616> [DT= 5.00] SUM= 10:2054 249.13 4.058 No\_date 7:35 43.68
00617> 009:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
SAVE HYD 01:P3P3VF 249.13 4.058 No\_date 7:35 43.68
00618> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.009
remark:HEC-RAS Inflow Node 2054 / Station 44751
00620> 009:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS STANDHYD01:P2 23.14 1.688 No\_date 6:10 45.75
00622> [XIMP= 47:TIMP= 59]
00623> [LOSS= 2 :CN= 80.51]
00625> [Pervious area: IAper= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00626> [Impervious area: IAimp= 1.57:SLPI=.50:LGI=1400.:MNI=.013:SCI=.0]
00627> [IaRECimp= 2.00: IaRECper= 4.00]
00628> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00629> 009:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
COMPUTE DUALHYD 01:P2 23.14 1.688 No\_date 6:10 45.75
00630> Major System / 02:P2maj .00 .000 No\_date 0:00 .00
00631> Minor System \ 03:P2min 23.14 1.688 No\_date 6:10 45.75
00632> [MjSysSto=0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00633> 009:0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS NASHYD 04:SWM2 .99 .068 No\_date 6:05 36.39
00636> [CN= 90.0: N= 2.00]
00637> [Tp=.25:DT= 5.00]
00638> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00639> [InterEventTime= 12.00]
00640> 009:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 02:P2maj .00 .000 No\_date 0:00 .00
00642> + 03:P2min 23.14 1.688 No\_date 6:10 45.75
00643> + 04:SWM2 .99 .068 No\_date 6:05 36.39
00644> [DT= 5.00] SUM= 01:P2in 24.13 1.754 No\_date 6:10 45.36
00645> 009:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ROUTE RESERVOIR -> 01:P2in 24.13 1.754 No\_date 6:10 45.36
00647> [RDT= 5.00] out<- 02:P2out 24.13 .553 No\_date 7:15 45.36
00648> [MxStoUsed=.5773E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00649> 009:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 02:P2out 24.13 .553 No\_date 7:15 45.36
00650> + 03:P2P2VF .00 .000 No\_date 0:00 .00
00652> [DT= 5.00] SUM= 06:PND2 24.13 .553 No\_date 7:15 45.36
00653> 009:0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
SAVE HYD 06:PND2 24.13 .553 No\_date 7:15 45.36
00656> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.009
remark:POND2-outflow/overflow
00657> 009:0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS NASHYD 04:CRFP 24.18 .848 No\_date 6:30 30.76
00660> [CN= 82.0: N= 2.00]
00661> [Tp=.50:DT= 5.00]
00662> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00663> [InterEventTime= 12.00]
00664> 009:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS STANDHYD05:28 12.50 .716 No\_date 6:00 28.27
00666> [XIMP= 38:TIMP= 45]
00667> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00668> [Pervious area: IAper= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00669> [Impervious area: IAimp= 1.57:SLPI=1.00:LGI= 700.:MNI=.013:SCI=.0]
00670> [IaRECimp= 2.00: IaRECper= 4.00]
00671> 009:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 04:CRFP 24.18 .848 No\_date 6:30 30.76
00673> + 05:28 12.50 .716 No\_date 6:00 28.27
00674> + 06:PND2 24.13 .553 No\_date 7:15 45.36
00675> [DT= 5.00] SUM= 07:2065 60.81 1.679 No\_date 6:30 36.04

00676> 009:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
SAVE HYD 07:2065 60.81 1.679 No\_date 6:30 36.04
00677> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.009
remark:HEC-RAS Inflow Node 2065 / Station 44548
00679> 009:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS STANDHYD05:100-1 61.17 2.291 No\_date 6:05 28.27
00682> [XIMP= 38:TIMP= 45]
00683> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00684> [Pervious area: IAper= 4.67:SLPP= 80:LGI=1200.:MNP=.100:SCP=.0]
00685> [Impervious area: IAimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI=.0]
00686> [IaRECimp= 2.00: IaRECper= 4.00]
00687> 009:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS NASHYD 06:102-1 39.80 .700 No\_date 7:20 27.89
00689> [CN= 78.0: N= 2.00]
00690> [Tp= 1.10:DT= 5.00]
00691> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
00692> [InterEventTime= 12.00]
00694> 009:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 05:100-1 61.17 2.291 No\_date 6:05 28.27
00695> + 06:102-1 39.80 .700 No\_date 7:20 27.89
00696> [DT= 5.00] SUM= 10:3894 100.97 2.598 No\_date 6:10 28.12
00697> 009:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
SAVE HYD 10:3894 100.97 2.598 No\_date 6:10 28.12
00698> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.009
remark:HEC-RAS Inflow Node 3894 / Station 43966
00701> \*\* END OF RUN : 9
00702> \*\*\*\*\*
00703>
00704>
00705>
00706>
00707>
00708>
00709> RUN:COMMANDH
00710> 010:0001
00711> START
00712> [ZTREP= 2 .00 hrs on 0]
00713> [METOUT= 2 (1=imperial, 2=metric output)]
00714> [NSTORM= 1]
00715> [NRUN= 10]
00716> 010:0002
00717> READ STORM
00718> File name = storm.001
00719> Comment =
00720> [SDT=30.00:SDUR= 12.00:PTOT= 65.22]
00721> 010:0003
00722> DEFAULT VALUES
00723> File name = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
00724> ICASEVD= 1 (read and print data)
00725> File title = ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE -----
00726> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----]
00727> Horton's infiltration equation parameters:
00728> [Fmax= 3.20 mm/hr] [Fmin= 0.320 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00729> Parameters for Pervious surfaces in STANDHYD:
00730> [IAper= 4.67 mm] [LGP=40.00 m] [MNP=.250]
00731> Parameters for IMPervious surfaces in STANDHYD:
00732> [IAimp= 1.57 mm] [CLI= 1.50] [MNI=.013]
00733> [Ia= 4.67 mm] [N= 2.00]
00734>
00735> 010:0004
00736> COMPUTE API
00737> [APIin= 20.00: APIkdy= .9000: APIkdt= .9978]
00738> [Fmax= 82.54: API= 91.33: APImin= 20.94]
00739> 010:0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
READ HYD 09:101-3 69.53 1.944 No\_date 6:50 50.67
00740> File name = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.010
00741> Comment = GRANITE RIDGE AREA 101-3
00742> 010:0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS STANDHYD01:P1 77.13 7.405 No\_date 6:10 56.69
00745> [XIMP= 45:TIMP= 70]
00746> [LOSS= 2 :CN= 80.51]
00747> [Pervious area: IAper= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00748> [Impervious area: IAimp= 1.57:SLPI=.50:LGI=1400.:MNI=.013:SCI=.0]
00749> [IaRECimp= 2.00: IaRECper= 4.00]
00750> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00751> 010:0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
COMPUTE DUALHYD 01:P1 77.13 7.405 No\_date 6:10 56.69
00752> Major System / 02:P1maj .00 .000 No\_date 0:00 .00
00753> Minor System \ 03:P1min 77.13 7.405 No\_date 6:10 56.69
00754> [MjSysSto=0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00755> 010:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS NASHYD 04:SWM1 4.50 .385 No\_date 6:05 45.08
00757> [CN= 90.0: N= 2.00]
00758> [Tp=.25:DT= 5.00]
00759> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00760> [InterEventTime= 12.00]
00761> 010:0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 02:P1maj .00 .000 No\_date 0:00 .00
00763> + 03:P1min 77.13 7.405 No\_date 6:10 56.69
00765> + 04:SWM1 4.50 .385 No\_date 6:05 45.08
00766> + 09:101-3 69.53 1.944 No\_date 6:50 50.67
00767> [DT= 5.00] SUM= 01:P1in 151.16 9.295 No\_date 6:10 53.57
00768> 010:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ROUTE RESERVOIR -> 01:P1in 151.16 9.295 No\_date 6:10 53.57
00770> [RDT= 5.00] out<- 02:P1out 151.16 4.531 No\_date 7:05 53.57
00771> [MxStoUsed=.2981E+01]
00772> 010:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS NASHYD 03:CRTRIB 3.69 .262 No\_date 6:05 38.93
00774> [CN= 82.0: N= 2.00]
00775> [Tp=.25:DT= 5.00]
00776> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00777> [InterEventTime= 12.00]
00779> 010:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 01:P1in 151.16 9.295 No\_date 6:10 53.57
00780> + 03:CRTRIB 3.69 .262 No\_date 6:05 38.93
00781> [DT= 5.00] SUM= 09:1012NC 154.85 9.552 No\_date 6:10 53.22
00782> 010:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 02:P1out 151.16 4.531 No\_date 7:05 53.57
00783> + 03:CRTRIB 3.69 .262 No\_date 6:05 38.93
00784> [DT= 5.00] SUM= 09:101-2 154.85 4.636 No\_date 6:50 53.22
00786> 010:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
SAVE HYD 09:101-2 154.85 4.636 No\_date 6:50 53.22
00787> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.010
remark:Carp Tributary @ Carp River - XP2054
00789> 010:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS STANDHYD01:P3 91.68 7.415 No\_date 6:10 51.08
00792> [XIMP= 34:TIMP= 43]
00793> [LOSS= 2 :CN= 80.51]
00794> [Pervious area: IAper= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00795> [Impervious area: IAimp= 1.57:SLPI=.50:LGI=1400.:MNI=.013:SCI=.0]
00796> [IaRECimp= 2.00: IaRECper= 4.00]
00797> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00798> 010:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
COMPUTE DUALHYD 01:P3 91.68 7.415 No\_date 6:10 51.08
00800> Major System / 02:P3maj .00 .000 No\_date 0:00 .00
00801> Minor System \ 03:P3min 91.68 7.415 No\_date 6:10 51.08
00802> [MjSysSto=0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00803> 010:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
CONTINUOUS NASHYD 04:SWM3 2.60 .184 No\_date 6:05 38.93
00805> [CN= 82.0: N= 2.00]
00806> [Tp=.25:DT= 5.00]
00807> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00808> [InterEventTime= 12.00]
00809> 010:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
ADD HYD 02:P3maj .00 .000 No\_date 0:00 .00

00811> + 03:P3min 91.68 7.415 No\_date 6:10 51.08
00812> + 04:SWM2 2.60 .184 No\_date 6:05 38.93
00813> [DT= 5.00] SUM= 01:P2min 94.28 7.596 No\_date 6:10 50.75
00814> 010:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00815> ROUTE RESERVOIR -> 01:P3in 94.28 7.596 No\_date 6:10 50.75
00816> [RDT= 5.00] out<- 02:P3out 94.17 1.750 No\_date 7:30 50.75
00817> overflow <= 03:P3OVF .11 .181 No\_date 7:30 50.75
00818> [MxStoUsed=.2902E+01, TotOvfVol=.5421E-02, N-Ovf= 1, TotDurOvf= 0 hrs
00819> 010:0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00820> ADD HYD + 03:P3OVF 94.17 1.750 No\_date 7:30 50.75
00821> [IaRec= 4.00; SMIN= 12.00]-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00822> [DT= 5.00] SUM= 08:500 94.28 1.931 No\_date 7:30 50.75
00823> SAVE HYD + 03:P3OVF 94.28 1.931 No\_date 7:30 50.75
00824> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.010
00825> remark:South Pond @ Carp River
00826> 010:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00827> ADD HYD + 09:101-2 154.85 4.636 No\_date 6:50 53.22
00828> [IaRec= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00829> [DT= 5.00] SUM= 10:2054 249.13 6.303 No\_date 7:20 52.29
00830> 010:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00831> SAVE HYD + 03:P2min 24.13 2.140 No\_date 6:10 54.07
00832> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.010
00833> remark:HEC-RAS Inflow Node 2054 / Station 44751
00834> 010:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00835> CONTINUOUS STANDHYD01:P2 23.14 2.057 No\_date 6:10 54.46
00837> [XIMP= 47;TIMP=.59]
00838> [LOSS= 2 ;CN= 80.5]
00839> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 40.;MNP= 200;SCP= .0]
00840> [Impervious area: IAimp= 1.57;SLPI= .50;LGI=1400.;MNI=.013;SCI= .0]
00841> [IaRecCimp= 2.00; IaRecCper= 4.00]
00842> [SMIN= 26.32; SMAX=175.50; SK=1.000]
00843> 010:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00844> COMPUTE DUALHYD 01:P2 23.14 2.057 No\_date 6:10 54.46
00845> Major System / 02:P2maj .00 .000 No\_date 0:00 .00
00846> Minor System \ 03:P2min 23.14 2.057 No\_date 6:10 54.46
00847> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00848> CONTINUOUS NASHYD 04:SWM2 .99 .085 No\_date 6:05 45.08
00850> [CN= 90.0; N= 2.00]
00851> [Tp= .25;DT= 5.00]
00852> [IaRec= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
00853> [InterEventTime= 12.00]
00854> 010:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00855> ADD HYD + 02:P2maj .00 .000 No\_date 0:00 .00
00856> + 03:P2min 23.14 2.057 No\_date 6:10 54.46
00857> [DT= 5.00] SUM= 04:SWM2 24.13 2.140 No\_date 6:10 54.07
00858> 010:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00859> ROUTE RESERVOIR -> 01:P2in 24.13 2.140 No\_date 6:10 54.07
00860> [RDT= 5.00] out<- 02:P2out 24.12 .700 No\_date 7:10 54.07
00861> overflow <= 03:P2OVF .01 .014 No\_date 7:10 54.07
00862> [MxStoUsed=.6746E+00, TotOvfVol=.4142E-03, N-Ovf= 1, TotDurOvf= 0 hrs
00863> CONTINUOUS NASHYD 04:SWM2 .99 .085 No\_date 6:05 45.08
00864> 010:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00865> ADD HYD + 03:P2out 24.12 .700 No\_date 7:10 54.07
00866> + 03:P2OVF .01 .014 No\_date 7:10 54.07
00867> [DT= 5.00] SUM= 06:PND2 24.13 .714 No\_date 7:10 54.07
00868> CONTINUOUS NASHYD 04:CRFP 24.18 1.091 No\_date 6:30 38.93
00869> SAVE HYD + 06:PND2 24.13 1.091 No\_date 6:30 38.93
00870> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.010
00871> remark:POND2-outflow/overflow
00872> 010:0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00873> [CN= 82.0; N= 2.00]
00874> [Tp= .50;DT= 5.00]
00875> [IaRec= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00877> [InterEventTime= 12.00]
00878> 010:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00879> CONTINUOUS STANDHYD05:28 12.50 .955 No\_date 6:00 35.23
00880> [XIMP= 38;TIMP=.45]
00881> [Horton parameters: Fo= 76.20;Fc= 13.20;DCAY=4.00; F= .00]
00882> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 205.;MNP= 100;SCP= .0]
00883> [Impervious area: IAimp= 1.57;SLPI= .80;LGI=1700.;MNI=.013;SCI= .0]
00884> [IaRecCimp= 2.00; IaRecCper= 4.00]
00885> 010:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00886> ADD HYD + 04:CRFP 24.18 1.091 No\_date 6:30 38.93
00887> + 05:28 12.50 .955 No\_date 6:00 35.23
00888> [DT= 5.00] SUM= 06:PND2 24.13 .714 No\_date 7:10 54.07
00889> [DT= 5.00] SUM= 07:2065 60.81 2.181 No\_date 6:25 44.18
00890> 010:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00891> SAVE HYD 07:2065 60.81 2.181 No\_date 6:25 44.18
00892> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.010
00893> remark:HEC-RAS Inflow Node 2065 / Station 44548
00894> 010:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00895> CONTINUOUS STANDHYD05:100-1 61.17 2.769 No\_date 6:05 35.23
00896> [XIMP= 38;TIMP=.45]
00897> [Horton parameters: Fo= 76.20;Fc= 13.20;DCAY=4.00; F= .00]
00898> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 1200.;MNP= 100;SCP= .0]
00899> [Impervious area: IAimp= 1.57;SLPI= .80;LGI=1700.;MNI=.013;SCI= .0]
00900> [IaRecCimp= 2.00; IaRecCper= 4.00]
00901> 010:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00902> CONTINUOUS NASHYD 06:102-1 39.80 .907 No\_date 7:15 35.70
00903> [CN= 78.0; N= 2.00]
00904> [Tp= 1.10;DT= 5.00]
00905> [IaRec= 4.00; SMIN= 29.88; SMAX=199.22; SK=1.000]
00906> [InterEventTime= 12.00]
00907> 010:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00908> ADD HYD + 05:100-1 61.17 2.769 No\_date 6:05 35.23
00909> + 06:102-1 39.80 .907 No\_date 7:15 35.70
00910> [DT= 5.00] SUM= 10:3894 100.97 3.201 No\_date 6:10 35.41
00911> 010:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00912> SAVE HYD 10:3894 100.97 3.201 No\_date 6:10 35.41
00913> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.010
00914> remark:HEC-RAS Inflow Node 3894 / Station 43966
00915> \*\* END OF RUN \*\*
00916>
00917> \*\*\*\*\*
00918>
00919>
00920>
00921>
00922>
00923> RUN:COMMAND#
00924> 011:0001-----
00925> START
00926> [TZERO = .00 hrs on 0]
00927> [METOD= 1 (1=imperial, 2=metric output)]
00928> [NFORM = 1]
00929> [NTRIN = 11]
00930> 011:0002-----
00931> READ STORM
00932> Filename = storm.001
00933> Comment =
00934> [SDT=30.00;SDUR= 12.00;PTOT= 77.93]
00935> 011:0003-----
00936> DEFAULT VALUES
00937> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\Ottawa.def
00938> Comment = 1 (read prj data)
00939> FileTitle= ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
00940> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
00941> Horton's infiltration equation parameters:
00942> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00943> Parameters for PERVIOUS surfaces in STANDHYD:
00944> [IApers 4.67 mm] [LGP=40.00 mm] [MNP= 250]
00945> Parameters for IMPERVIOUS surfaces in STANDHYD:
00946> [IAimp= 1.57 mm] [CLL= 1.50] [MNI= .013]
00947> Parameters used in NASHYD:
00948> [IAimp= 1.57 mm] [CLL= 1.50] [MNI= .013]
00949> 011:0004-----
00950> COMPUTE API
00951> [APIini= 20.00; APIkdy= .9000; APIkdt= .9978]
00952> [APImax= 94.94; APIavg= 57.70; APImin= 21.13]
00953> 011:0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00954> READ HYD 09:101-3 69.53 2.449 No\_date 6:50 62.74
00955> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.011
00956> Comment = GRANITE RIDGE AREA 101-3
00957> 011:0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00958> CONTINUOUS STANDHYD01:P1 77.13 9.247 No\_date 6:10 69.19
00959> [XIMP= 45;TIMP=.70]
00960> [LOSS= 2 ;CN= 80.5]
00961> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 40.;MNP= 200;SCP= .0]
00962> [Impervious area: IAimp= 1.57;SLPI= .50;LGI=1400.;MNI=.013;SCI= .0]
00963> [SMIN= 26.32; SMAX=175.50; SK=1.000]
00964> 011:0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00965> COMPUTE DUALHYD 01:P1 77.13 9.247 No\_date 6:10 69.19
00966> Major System / 02:P1maj .00 .000 No\_date 0:00 .00
00967> Minor System \ 03:P1min 77.13 9.247 No\_date 6:00 69.81
00968> [MjSysSto=.1518E+04, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00969> CONTINUOUS NASHYD 04:SWM1 4.50 .490 No\_date 6:05 57.45
00970> [CN= 90.0; N= 2.00]
00971> [Tp= .25;DT= 5.00]
00972> [IaRec= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
00973> [InterEventTime= 12.00]
00974> 011:0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00975> ADD HYD 02:P1maj .00 .000 No\_date 0:00 .00
00976> + 03:CRTRIB 77.13 7.710 No\_date 6:00 69.81
00977> + 04:SWM1 4.50 .490 No\_date 6:05 57.45
00978> + 09:101-3 69.53 2.449 No\_date 6:50 62.74
00979> [DT= 5.00] SUM= 01:P1in 151.16 10.420 No\_date 6:35 66.19
00980> 011:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00981> [RDT= 5.00] out<- 02:P1out 151.16 10.420 No\_date 6:35 66.19
00982> [MxStoUsed=.3677E+01]
00983> 011:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00984> CONTINUOUS NASHYD 03:CRTRIB 3.69 .345 No\_date 6:05 50.73
00985> [CN= 82.0; N= 2.00]
00986> [Tp= .25;DT= 5.00]
00987> [IaRec= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00988> [InterEventTime= 12.00]
00989> 011:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00990> ADD HYD + 03:CRTRIB 151.16 10.420 No\_date 6:35 66.19
00991> + 04:SWM1 4.50 .490 No\_date 6:05 57.45
00992> [DT= 5.00] SUM= 09:1012NC 154.85 10.655 No\_date 6:30 65.82
00993> 011:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00994> ADD HYD 02:P1out 151.16 4.881 No\_date 7:10 66.19
00995> + 03:CRTRIB 3.69 .345 No\_date 6:05 50.73
00996> [RDT= 5.00] SUM= 09:101-2 154.85 4.992 No\_date 7:00 65.82
00997> 011:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00998> SAVE HYD 09:101-2 154.85 4.992 No\_date 7:00 65.82
00999> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.011
01000> remark:Carp Tributary @ Carp River
01001> 011:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01002> CONTINUOUS STANDHYD01:P3 91.68 9.832 No\_date 6:10 63.26
01003> [XIMP= 34;TIMP=.43]
01004> [LOSS= 2 ;CN= 80.5]
01005> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 40.;MNP= 200;SCP= .0]
01006> [Impervious area: IAimp= 1.57;SLPI= .50;LGI=1400.;MNI=.013;SCI= .0]
01007> [IaRecCimp= 2.00; IaRecCper= 4.00]
01008> [SMIN= 26.32; SMAX=175.50; SK=1.000]
01009> 011:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01010> COMPUTE DUALHYD 01:P3 91.68 9.832 No\_date 6:10 63.26
01011> Major System / 02:P3maj .00 .000 No\_date 0:00 .00
01012> Minor System \ 03:P3min 91.68 9.170 No\_date 6:05 63.37
01013> [MjSysSto=.4302E+03, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01014> CONTINUOUS NASHYD 04:SWM3 2.60 .243 No\_date 6:05 50.73
01015> [CN= 82.0; N= 2.00]
01016> [Tp= .25;DT= 5.00]
01017> [IaRec= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
01018> [InterEventTime= 12.00]
01019> 011:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01020> ADD HYD + 03:P3in 91.68 9.170 No\_date 6:05 63.37
01021> + 04:SWM3 2.60 .243 No\_date 6:05 50.73
01022> [DT= 5.00] SUM= 01:P3in 94.28 9.413 No\_date 6:05 63.02
01023> 011:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01024> ROUTE RESERVOIR -> 01:P3in 94.28 9.413 No\_date 6:05 63.02
01025> [RDT= 5.00] out<- 02:P3out 81.81 1.750 No\_date 6:35 63.02
01026> overflow <= 03:P3OVF 12.47 4.181 No\_date 6:35 63.02
01027> [MxStoUsed=.2902E+01, TotOvfVol=.7858E+00, N-Ovf= 2, TotDurOvf= 1 hrs
01028> CONTINUOUS NASHYD 04:SWM2 .99 .085 No\_date 6:05 45.08
01029> 011:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01030> ADD HYD 02:P3out 81.81 1.750 No\_date 6:35 63.02
01031> + 03:P3OVF 12.47 4.181 No\_date 6:35 63.02
01032> [DT= 5.00] SUM= 08:500 94.28 6.931 No\_date 6:35 63.02
01033> 011:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01034> SAVE HYD 94.28 6.931 No\_date 6:35 63.02
01035> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.011
01036> remark:South Pond @ Carp River
01037> 011:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01038> ADD HYD 08:500 94.28 6.931 No\_date 6:35 63.02
01039> + 09:101-2 154.85 4.992 No\_date 7:00 65.82
01040> [DT= 5.00] SUM= 10:2054 249.13 11.809 No\_date 6:35 64.76
01041> 011:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01042> SAVE HYD 10:2054 249.13 11.809 No\_date 6:35 64.76
01043> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.011
01044> remark:HEC-RAS Inflow Node 2054 / Station 44751
01045> 011:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01046> CONTINUOUS STANDHYD01:P2 23.14 2.664 No\_date 6:10 66.81
01047> [XIMP= 47;TIMP=.59]
01048> [LOSS= 2 ;CN= 80.5]
01049> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 40.;MNP= 200;SCP= .0]
01050> [Impervious area: IAimp= 1.57;SLPI= .50;LGI=1400.;MNI=.013;SCI= .0]
01051> [IaRecCimp= 2.00; IaRecCper= 4.00]
01052> [SMIN= 26.32; SMAX=175.50; SK=1.000]
01053> 011:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01054> COMPUTE DUALHYD 01:P2 23.14 2.664 No\_date 6:10 66.81
01055> Major System / 02:P2maj .00 .000 No\_date 0:00 .00
01056> Minor System \ 03:P2min 23.14 2.310 No\_date 6:00 67.33
01057> [MjSysSto=.3043E+03, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01058> CONTINUOUS NASHYD 04:SWM2 .99 .108 No\_date 6:05 57.44
01059> [CN= 90.0; N= 2.00]
01060> [Tp= .25;DT= 5.00]
01061> [IaRec= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
01062> [InterEventTime= 12.00]
01063> 011:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01064> ADD HYD 02:P2maj .00 .000 No\_date 0:00 .00
01065> + 03:P2min 23.14 2.310 No\_date 6:00 67.33
01066> + 04:SWM2 .99 .108 No\_date 6:05 57.44
01067> [DT= 5.00] SUM= 01:P2in 24.13 2.418 No\_date 6:05 66.92
01068> 011:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01069> ROUTE RESERVOIR -> 01:P2in 24.13 2.418 No\_date 6:05 66.92
01070> [RDT= 5.00] out<- 02:P2out 21.11 .700 No\_date 6:30 66.92
01071> overflow <= 03:P2OVF 3.02 1.689 No\_date 6:30 66.92
01072> [MxStoUsed=.6729E+00, TotOvfVol=.2019E+00, N-Ovf= 2, TotDurOvf= 1 hrs
01073> CONTINUOUS NASHYD 04:SWM2 .99 .108 No\_date 6:05 57.44
01074> 011:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01075> ADD HYD 02:P2out 21.11 .700 No\_date 6:30 66.92
01076> + 03:P2OVF 3.02 1.689 No\_date 6:30 66.92
01077> [MxStoUsed=.6729E+00, TotOvfVol=.2019E+00, N-Ovf= 2, TotDurOvf= 1 hrs
01078> CONTINUOUS NASHYD 04:SWM2 .99 .108 No\_date 6:05 57.44
01079> 011:0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01080> ADD HYD + 03:P2OVF 3.02 1.689 No\_date 6:30 66.92

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01081> [DT= 5.00] SUM= 06:PND2 24.13 2.389 No_date 6:30 66.92
01082> SAVE HYD 04:CRFP 24.18 1.434 No_date 6:30 66.92
01083> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.011
01084> remark:POND2-outflow/overflow
01085>
01086> 0110031-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01087> CONTINUOUS NASHYD 04:CRFP 24.18 1.434 No_date 6:30 50.73
01088> [CN= 82.0: N= 2.00]
01089> [IAREC= 2.00: IARECper= 4.00]
01090> [IAREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01091> [InterEventTime= 12.00]
01092> 0110032-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01093> CONTINUOUS STANDHYD05:28 12.50 1.331 No_date 6:00 45.43
01094> [XIMP= 38:TIMP= 45]
01095> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01096> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 205. :MNP=100:SCP= .0]
01097> [Impervious area: IAIMP= 1.57:SLPI=1.00:LGI= 700. :MNI=.013:SCI= .0]
01098> [IARECimp= 2.00: IARECper= 4.00]
01099> 0110033-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01100> ADD HYD 04:CRFP 24.18 1.434 No_date 6:30 50.73
01101> + 05:28 12.50 1.331 No_date 6:00 45.43
01102> + 06:PND2 24.13 2.389 No_date 6:30 66.92
01103> [DT= 5.00] SUM= 07:2065 60.81 4.500 No_date 6:30 56.06
01104> 0110034-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01105> SAVE HYD 07:2065 60.81 4.500 No_date 6:30 56.06
01106> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.011
01107> remark:HEC-RAS Inflow Node 2065 / Station 44548
01108> 0110035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01109> CONTINUOUS STANDHYD05:100-1 61.17 3.498 No_date 6:05 45.43
01110> [XIMP= 38:TIMP= 45]
01111> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01112> [Pervious area: IAPER= 4.67:SLPP= .80:LGP=1200. :MNP=100:SCP= .0]
01113> [Impervious area: IAIMP= 1.57:SLPI= .80:LGI=1700. :MNI=.013:SCI= .0]
01114> [IARECimp= 2.00: IARECper= 4.00]
01115> 0110036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01116> CONTINUOUS NASHYD 06:102-1 39.80 1.210 No_date 7:15 47.07
01117> [CN= 78.0: N= 2.00]
01118> [IAREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01119> [InterEventTime= 12.00]
01120>
01121> 0110037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01122> ADD HYD 05:100-1 61.17 3.498 No_date 6:05 45.43
01123> + 06:PND2 24.13 2.389 No_date 6:30 66.92
01124> [DT= 5.00] SUM= 09:102-1 100.97 4.128 No_date 6:10 46.08
01125> 0110038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01126> SAVE HYD 10:3894 100.97 4.128 No_date 6:10 46.08
01127> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.011
01128> remark:HEC-RAS Inflow Node 3894 / Station 43966
01129> ** END OF RUN : 11
01130>
01131> *****
01132>
01133>
01134>
01135>
01136>
01137> RUN:COMMAND#
01138> 0120000-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01139> START
01140> [TZERO = .00 hrs on 0]
01141> [METOUT= 2 (1=imperial, 2=metric output)]
01142> [INSTORM= 1]
01143> [NRUN = 12]
01144> 0120002-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01145> READ STORM
01146> Filename = storm.001
01147> Comment =
01148> [Fo= 30.00:SDUR= 12.00:PTOT= 84.94]
01149> 0120003-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01150> DEFAULT VALUES
01151> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
01152> ICASDR= 1 (read and print data)
01153> FILETitle = ***** YOUR COMMENTS ON THIS LINE AND THE NEXT ONE *****
01154> ***** PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 ****
01155> Horton's infiltration equation parameters:
01156> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
01157> Parameters for Pervious surfaces in STANDHYD:
01158> [MjSysSto= 4.67 mm] [LGP=40.00 mm] [MNP= 250]
01159> Parameters for IMPERVIOUS surfaces in STANDHYD:
01160> [IAimp= 1.57 mm] [CLI= 1.50] [MNI= .013]
01161> Parameters used in NASHYD:
01162> [Ia= 4.67 mm] [N= 2.00]
01163> 0120004-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01164> COMPUTE API
01165> [APIini= 20.00: APIkdy= 9000: APIkdt= .9978]
01166> [APIini=101.76: APIavg= 61.20: APImin= 11.23]
01167> 0120005-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01168> READ HYD 09:53 2.721 No_date 6:50 69.46
01169> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.012
01170> Comment = GRANITE RIDGE AREA 101-3
01171> 0120006-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01172> CONTINUOUS STANDHYD01:P1 77.13 10.283 No_date 6:05 76.10
01173> [LOSS= 2 :CN= 80.5]
01174> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40. :MNP=200:SCP= .0]
01175> [Impervious area: IAIMP= 1.57:SLPI= .50:LGI=1400. :MNI=.013:SCI= .0]
01176> [IARECimp= 2.00: IARECper= 4.00]
01177> [SMIN= 26.32: SMAX=175.50: SK=1.000]
01178>
01179> 0120007-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01180> COMPUTE DUALHYD 01:P1 77.13 10.283 No_date 6:05 76.10
01181> Major System \ 02:P1maj .00 .000 No_date 0:00 .00
01182> Minor System \ 03:P1min 77.13 7.710 No_date 5:55 76.85
01183> [MjSysSto= .2990E+04: TotOvfVol= .0000E+00: N-Ovf= 0: TotDurOvf= 0 hrs]
01184> 0120008-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01185> CONTINUOUS NASHYD 04:SWM1 4.50 .547 No_date 6:05 64.29
01186> [CN= 90.0: N= 2.00]
01187> [Tp= .25:DT= 5.00]
01188> [IAREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01189> [InterEventTime= 12.00]
01190> 0120009-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01191> ADD HYD 02:P1maj .00 .000 No_date 0:00 .00
01192> + 03:P1min 77.13 7.710 No_date 5:55 76.85
01193> + 04:SWM1 4.50 .547 No_date 6:05 64.29
01194> + 09:101-3 69.53 2.721 No_date 6:50 69.46
01195> [DT= 5.00] SUM= 01:P1in 151.16 10.728 No_date 6:35 73.08
01196> 0120010-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01197> ROUTE RESERVOIR --> 01:P1in 151.16 10.728 No_date 6:35 73.08
01198> [RDT= 5.00] out<= 02:P1out 151.16 5.101 No_date 7:15 73.08
01199> [MxStoUsed= .4122E+01]
01200> 0120011-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01201> CONTINUOUS NASHYD 03:CRTRIB 3.69 .391 No_date 6:05 57.33
01202> [CN= 82.0: N= 2.00]
01203> [Tp= .25:DT= 5.00]
01204> [IAREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01205> [InterEventTime= 12.00]
01206> 0120012-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01207> ADD HYD 01:P1in 151.16 10.728 No_date 6:35 73.08
01208> + 03:CRTRIB 3.69 .391 No_date 6:05 57.33
01209> [DT= 5.00] SUM= 09:1012NC 154.85 10.996 No_date 6:30 72.70
01210> 0120013-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01211> ADD HYD 02:P1out 151.16 5.101 No_date 7:15 73.08
01212> + 03:CRTRIB 3.69 .391 No_date 6:05 57.33
01213> [DT= 5.00] SUM= 09:101-2 154.85 5.216 No_date 7:00 72.70
01214> 0120014-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01215> SAVE HYD 09:101-2 154.85 5.216 No_date 7:00 72.70

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01216> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.012
01217> remark:Carp Tributary @ Carp River - XP2054
01218> 0120015-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01219> CONTINUOUS STANDHYD01:P3 91.68 10.895 No_date 6:10 70.03
01220> [XIMP= 34:TIMP= 43]
01221> [LOSS= 2 :CN= 80.5]
01222> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40. :MNP=200:SCP= .0]
01223> [Impervious area: IAIMP= 1.57:SLPI= .50:LGI=1400. :MNI=.013:SCI= .0]
01224> [IARECimp= 2.00: IARECper= 4.00]
01225> [SMIN= 26.32: SMAX=175.50: SK=1.000]
01226> 0120016-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01227> COMPUTE DUALHYD 01:P3 91.68 10.895 No_date 6:10 70.03
01228> Major System \ 02:P2maj .00 .000 No_date 0:00 .00
01229> Minor System \ 03:P3min 91.68 9.170 No_date 6:00 70.64
01230> [MjSysSto= .1690E+04: TotOvfVol= .0000E+00: N-Ovf= 0: TotDurOvf= 0 hrs]
01231> 0120017-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01232> CONTINUOUS NASHYD 04:SWM3 2.60 .276 No_date 6:05 57.33
01233> [CN= 82.0: N= 2.00]
01234> [Tp= .25:DT= 5.00]
01235> [IAREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01236> [InterEventTime= 12.00]
01237> 0120018-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01238> ADD HYD 02:P3maj .00 .000 No_date 0:00 .00
01239> + 03:P3min 91.68 9.170 No_date 6:00 70.64
01240> + 04:SWM3 2.60 .276 No_date 6:05 57.33
01241> [DT= 5.00] SUM= 01:P3in 94.28 9.446 No_date 6:05 70.28
01242> 0120019-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01243> ROUTE RESERVOIR --> 02:P2maj 94.28 9.446 No_date 6:05 70.28
01244> [RDT= 5.00] out<= 02:P2out 75.62 1.750 No_date 6:30 70.27
01245> overflow <= 03:P3Ovf 18.66 7.628 No_date 6:30 70.28
01246> [MxStoUsed= .2905E+01: TotOvfVol= .1312E+01: N-Ovf= 3: TotDurOvf= 1 hrs]
01247> 0120020-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01248> ADD HYD 02:P3maj .00 .000 No_date 0:00 .00
01249> + 03:P3Ovf 18.66 7.628 No_date 6:30 70.28
01250> [DT= 5.00] SUM= 08:500 94.28 9.378 No_date 6:30 70.28
01251> 0120021-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01252> SAVE HYD 08:500 94.28 9.378 No_date 6:30 70.28
01253> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.012
01254> remark:South Pond @ Carp River
01255> 0120022-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01256> ADD HYD 08:500 94.28 9.378 No_date 6:30 70.28
01257> + 09:101-2 154.85 5.216 No_date 7:00 72.70
01258> [DT= 5.00] SUM= 02:P2maj 249.13 14.403 No_date 6:40 71.78
01259> 0120023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01260> SAVE HYD 10:2054 249.13 14.403 No_date 6:40 71.78
01261> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.012
01262> remark:HEC-RAS Inflow Node 2054 / Station 44751
01263> 0120024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01264> CONTINUOUS STANDHYD01:P2 23.14 2.973 No_date 6:05 73.65
01265> [XIMP= 47:TIMP= 59]
01266> [LOSS= 2 :CN= 80.5]
01267> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40. :MNP=200:SCP= .0]
01268> [Impervious area: IAIMP= 1.57:SLPI= .50:LGI=1400. :MNI=.013:SCI= .0]
01269> [IARECimp= 2.00: IARECper= 4.00]
01270> [SMIN= 26.32: SMAX=175.50: SK=1.000]
01271> 0120025-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01272> COMPUTE DUALHYD 01:P2 23.14 2.973 No_date 6:05 73.65
01273> Major System \ 02:P2maj .00 .000 No_date 0:00 .00
01274> Minor System \ 03:P2min 23.14 2.310 No_date 5:55 74.17
01275> [MjSysSto= .7113E+03: TotOvfVol= .0000E+00: N-Ovf= 0: TotDurOvf= 0 hrs]
01276> 0120026-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01277> CONTINUOUS NASHYD 04:SWM2 .99 .120 No_date 6:05 64.29
01278> [CN= 90.0: N= 2.00]
01279> [Tp= .25:DT= 5.00]
01280> [IAREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01281> [InterEventTime= 12.00]
01282> 0120027-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01283> ADD HYD 02:P2maj .00 .000 No_date 0:00 .00
01284> + 03:P2min 23.14 2.310 No_date 5:55 74.17
01285> + 04:SWM2 .99 .120 No_date 6:05 64.29
01286> [DT= 5.00] SUM= 01:P2in 24.13 2.430 No_date 6:05 73.76
01287> 0120028-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01288> ROUTE RESERVOIR --> 02:P2maj 24.13 2.430 No_date 6:05 73.76
01289> [RDT= 5.00] out<= 02:P2out 19.89 .700 No_date 6:25 73.76
01290> overflow <= 03:P2Ovf 4.24 1.706 No_date 6:25 73.76
01291> [MxStoUsed= .6738E+00: TotOvfVol= .3131E+00: N-Ovf= 2: TotDurOvf= 1 hrs]
01292> 0120029-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01293> ADD HYD 02:P2maj 19.89 .700 No_date 6:25 73.76
01294> + 03:P2Ovf 4.24 1.706 No_date 6:25 73.76
01295> [DT= 5.00] SUM= 06:PND2 24.13 2.406 No_date 6:25 73.76
01296> 0120030-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01297> SAVE HYD 06:PND2 24.13 2.406 No_date 6:25 73.76
01298> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.012
01299> remark:POND2-outflow/overflow
01300> 0120031-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01301> CONTINUOUS NASHYD 04:CRFP 24.18 1.623 No_date 6:30 57.33
01302> [CN= 82.0: N= 2.00]
01303> [Tp= .50:DT= 5.00]
01304> [IAREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01305> [InterEventTime= 12.00]
01306> 0120032-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01307> CONTINUOUS STANDHYD05:28 12.50 1.510 No_date 6:00 50.97
01308> [XIMP= 38:TIMP= 45]
01309> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01310> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 205. :MNP=100:SCP= .0]
01311> [Impervious area: IAIMP= 1.57:SLPI=1.00:LGI= 700. :MNI=.013:SCI= .0]
01312> [IARECimp= 2.00: IARECper= 4.00]
01313> 0120033-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01314> ADD HYD 04:CRFP 24.18 1.623 No_date 6:30 57.33
01315> + 05:28 12.50 1.510 No_date 6:00 50.97
01316> + 06:PND2 24.13 2.406 No_date 6:25 73.76
01317> [DT= 5.00] SUM= 07:2065 60.81 4.900 No_date 6:25 62.54
01318> 0120034-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01319> SAVE HYD 07:2065 60.81 4.900 No_date 6:25 62.54
01320> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.012
01321> remark:HEC-RAS Inflow Node 2065 / Station 44548
01322> 0120035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01323> CONTINUOUS STANDHYD05:100-1 61.17 4.021 No_date 6:05 50.97
01324> [XIMP= 38:TIMP= 45]
01325> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01326> [Pervious area: IAPER= 4.67:SLPP= .80:LGP=1200. :MNP=100:SCP= .0]
01327> [Impervious area: IAIMP= 1.57:SLPI= .80:LGI=1700. :MNI=.013:SCI= .0]
01328> [IARECimp= 2.00: IARECper= 4.00]
01329> 0120036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01330> CONTINUOUS NASHYD 06:102-1 39.80 1.380 No_date 7:15 53.48
01331> [CN= 78.0: N= 2.00]
01332> [Tp= 1.10:DT= 5.00]
01333> [IAREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01334> [InterEventTime= 12.00]
01335> 0120037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01336> ADD HYD 05:100-1 61.17 4.021 No_date 6:05 50.97
01337> + 06:102-1 39.80 1.380 No_date 7:15 53.48
01338> [DT= 5.00] SUM= 06:102-1 100.97 4.669 No_date 6:05 51.96
01339> 0120038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01340> SAVE HYD 10:3894 100.97 4.669 No_date 6:05 51.96
01341> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.012
01342> remark:HEC-RAS Inflow Node 3894 / Station 43966
01343> ** END OF RUN : 12
01344> *****
01345>
01346>
01347>
01348>
01349>
01350>

```

01351> RUN:COMMAND#
01352> 013 0001-----
01353> START
01354> [TZERO = .00 hrs on 0]
01355> [METOUT= 2 (1=imperial, 2=metric output)]
01356> [NSTORM= 1]
01357> [NRUN = 13]
01358>
01359> READ STORM
01360> Filename = storm.001
01361> Comment =
01362> [SDT=10.00:SDUR= 12.00:PTOT= 93.91]
01363>
01364> DEFAULT VALUES
01365> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
01366> ICASedv = 1 (read and print data)
01367> FileTitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ----
01368> PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
01369> Horton's infiltration equation parameters:
01370> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
01371> Parameters for PERVIOUS surfaces in STANDHYD:
01372> [Iaper= 4.67 mm] [LGP=40.00 m] [MNP= .250]
01373> Parameters for IMPERVIOUS surfaces in STANDHYD:
01374> [Iimp= 1.57 mm] [LGI= 1.50] [MNI= .013]
01375> Parameters used in NASHYD:
01376> [Ia= 4.67 mm] [N= 2.00]
01377>
01378> 013 0004-----
01379> COMPUTE API
01380> [APIini= 20.00: APIkdy= 9000: APIkdt= .9993]
01381> [APImax=110.44: APIavg= 66.21: APImin= 20.46]
01382>
01383> 013 0005-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01384> READ HYD 09:101-3 69.53 3.093 No\_date 6:45 78.11
01385> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.013
01386> Comment = GRANITE RIDGE AREA 101-3
01387>
01388> 013 0006-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01389> CONTINUOUS STANDHYD01:P1 77.13 11.641 No\_date 6:05 84.97
01390> [XIMP= 45:TIMP= 70]
01391> [LOSS= 2 :CN= 80.5]
01392> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01393> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01394> [IaRECimp= 2.00: IaRECper= 4.00]
01395> [SMIN= 26.32: SMAX=175.50: SK=1.000]
01396>
01397> 013 0007-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01398> COMPUTE DUALHYD 01:P1 77.13 11.641 No\_date 6:05 84.97
01399> Major System / 02:P1maj 1.75 2.669 No\_date 6:15 84.97
01400> Minor System \ 03:P1min 75.38 7.710 No\_date 5:55 86.57
01401> [MjSysStor=.3857E+04, TotOvfVol=.1485E+04, N-Ovf= 1, TotDurOvf= 0 hrs
01402> [CN= 82.0: N= 2.00]
01403> [Tpe=.25:DT= 5.00]
01404> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01405> [InterEventTime= 12.00]
01406>
01407> 013 0009-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01408> ADD HYD 02:P1maj 1.75 2.669 No\_date 6:15 84.97
01409> + 03:P1min 75.38 7.710 No\_date 5:55 86.57
01410> + 04:SWM1 4.50 .619 No\_date 6:05 73.10
01411> [DT= 5.00] SUM= 01:P1lin 151.16 13.658 No\_date 6:15 82.26
01412>
01413> 013 0010-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01414> ROUTE RESERVOIR -> 01:P1lin 151.16 13.658 No\_date 6:15 82.26
01415> \* [RDT= 5.00] out<- 02:P1out 151.16 5.442 No\_date 7:15 82.26
01416> [MxStoUsed=.4772E+01]
01417>
01418> 013 0011-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01419> CONTINUOUS NASHYD 03:CRTRIB 3.69 .450 No\_date 6:05 65.86
01420> [CN= 82.0: N= 2.00]
01421> [Tpe=.25:DT= 5.00]
01422> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01423> [InterEventTime= 12.00]
01424>
01425> 013 0012-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01426> ADD HYD 01:P1lin 151.16 13.658 No\_date 6:15 82.26
01427> + 03:CRTRIB 3.69 .450 No\_date 6:05 65.86
01428> [DT= 5.00] SUM= 01:CRTRIB 154.85 14.069 No\_date 6:15 81.87
01429>
01430> 013 0013-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01431> ADD HYD 02:P1out 151.16 5.442 No\_date 7:15 82.26
01432> + 03:CRTRIB 3.69 .450 No\_date 6:05 65.86
01433> [DT= 5.00] SUM= 09:101-2 154.85 5.563 No\_date 7:05 81.87
01434>
01435> 013 0015-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01436> CONTINUOUS STANDHYD01:P3 91.68 12.428 No\_date 6:05 78.73
01437> [XIMP= 34:TIMP= 43]
01438> [LOSS= 2 :CN= 80.5]
01439> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01440> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01441> [IaRECimp= 2.00: IaRECper= 4.00]
01442> [SMIN= 26.32: SMAX=175.50: SK=1.000]
01443>
01444> 013 0016-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01445> COMPUTE DUALHYD 01:P3 91.68 12.428 No\_date 6:05 78.73
01446> Major System / 02:P3maj .00 .000 No\_date 0:00 .00
01447> Minor System \ 03:P3min 91.68 9.170 No\_date 5:55 79.33
01448> [MjSysStor=.4136E+04, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01449> [CN= 82.0: N= 2.00]
01450> [Tpe=.25:DT= 5.00]
01451> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01452> [InterEventTime= 12.00]
01453>
01454> 013 0018-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01455> ADD HYD 02:P3maj .00 .000 No\_date 0:00 .00
01456> + 03:P3min 91.68 9.170 No\_date 5:55 79.33
01457> + 04:SWM3 2.60 .317 No\_date 6:05 65.86
01458> [DT= 5.00] SUM= 01:P3lin 94.28 9.487 No\_date 6:05 78.96
01459>
01460> 013 0019-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01461> ROUTE RESERVOIR -> 01:P3lin 94.28 9.487 No\_date 6:05 78.96
01462> [RDT= 5.00] out<- 02:P3out 94.28 1.750 No\_date 6:25 78.96
01463> overflow <= 03:P3OVF 24.75 7.677 No\_date 6:25 78.96
01464> [MxStoUsed=.2904E+01, TotOvfVol=.1954E+01, N-Ovf= 3, TotDurOvf= 1 hrs
01465> [CN= 82.0: N= 2.00]
01466> [Tpe=.25:DT= 5.00]
01467> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01468> [InterEventTime= 12.00]
01469>
01470> 013 0022-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01471> ADD HYD 08:500 94.28 9.427 No\_date 6:25 78.96
01472> + 09:101-2 154.85 5.563 No\_date 7:05 81.87
01473> [DT= 5.00] SUM= 10:2054 249.13 14.759 No\_date 6:55 80.76
01474>
01475> 013 0023-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01476> SAVE HYD 10:2054 249.13 14.759 No\_date 6:55 80.76
01477>
01478> 013 0024-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01479> remark:HEC-RAS Inflow Node 2054 / Station 44751
01480>
01481> 013 0025-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01482> CONTINUOUS STANDHYD01:P2 23.14 3.377 No\_date 6:05 82.45
01483> [XIMP= 47:TIMP= 59]
01484> [LOSS= 2 :CN= 80.5]
01485> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01486> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01487> [IaRECimp= 2.00: IaRECper= 4.00]
01488> [SMIN= 26.32: SMAX=175.50: SK=1.000]
01489>

01486> COMPUTE DUALHYD 01:P2 23.14 3.377 No\_date 6:05 82.45
01487> Major System / 02:P2maj .28 .408 No\_date 6:20 82.45
01488> Minor System \ 03:P2min 22.86 2.310 No\_date 5:55 82.67
01489> [MjSysStor=.1157E+04, TotOvfVol=.2311E+03, N-Ovf= 1, TotDurOvf= 0 hrs
01490> [CN= 90.0: N= 2.00]
01491> [Tpe=.25:DT= 5.00]
01492> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01493> [InterEventTime= 12.00]
01494>
01495> 013 0027-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01496> ADD HYD 02:P2maj .28 .408 No\_date 6:20 82.45
01497> + 03:P2min 22.86 2.310 No\_date 5:55 82.67
01498> + 04:SWM2 .99 .136 No\_date 6:05 73.10
01499> [DT= 5.00] SUM= 01:P2in 24.13 2.831 No\_date 6:20 82.28
01500>
01501> 013 0028-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01502> ROUTE RESERVOIR -> 01:P2in 24.13 2.831 No\_date 6:20 82.28
01503> [RDT= 5.00] out<- 02:P2out 18.58 .700 No\_date 6:20 82.28
01504> overflow <= 03:P2OVF 5.55 2.065 No\_date 6:20 82.28
01505> [MxStoUsed=.6739E+00, TotOvfVol=.4564E+00, N-Ovf= 1, TotDurOvf= 1 hrs
01506> [CN= 82.0: N= 2.00]
01507> [Tpe=.25:DT= 5.00]
01508> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01509> [InterEventTime= 12.00]
01510>
01511> 013 0030-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01512> SAVE HYD 06:PND2 24.13 2.765 No\_date 6:20 82.28
01513>
01514> 013 0031-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01515> remark:HEC-RAS Inflow Node 2065 / Station 44548
01516>
01517> 013 0033-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01518> ADD HYD 04:CRFP 24.13 1.865 No\_date 6:30 65.86
01519> + 05:28 12.50 1.740 No\_date 6:00 57.94
01520> [DT= 5.00] SUM= 06:PND2 24.13 2.765 No\_date 6:20 82.28
01521>
01522> 013 0034-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01523> SAVE HYD 07:2065 60.81 5.780 No\_date 6:20 70.75
01524> [MxStoUsed=.0720E+01, TotOvfVol=.0720E+01, N-Ovf= 0, TotDurOvf= 0 hrs
01525> [CN= 82.0: N= 2.00]
01526> [Tpe=.25:DT= 5.00]
01527> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01528> [InterEventTime= 12.00]
01529>
01530> 013 0035-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01531> CONTINUOUS STANDHYD05:100-1 61.17 4.569 No\_date 6:05 57.94
01532> [XIMP= 38:TIMP= 45]
01533> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01534> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 205.:MNP=.100:SCP= .0]
01535> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1700.:MNI=.013:SCI= .0]
01536> [IaRECimp= 2.00: IaRECper= 4.00]
01537>
01538> 013 0036-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01539> CONTINUOUS NASHYD 06:102-1 39.80 1.601 No\_date 7:10 61.80
01540> [CN= 78.0: N= 2.00]
01541> [Tpe= 1.10:DT= 5.00]
01542> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01543> [InterEventTime= 12.00]
01544>
01545> 013 0037-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01546> ADD HYD 05:100-1 61.17 4.569 No\_date 6:05 57.94
01547> + 06:102-1 39.80 1.601 No\_date 7:10 61.80
01548> [DT= 5.00] SUM= 10:3894 100.97 5.351 No\_date 6:05 59.46
01549>
01550> 013 0038-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01551> SAVE HYD 10:3894 100.97 5.780 No\_date 6:20 70.75
01552>
01553> 013 0002-----ID-NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01554> filename:M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.013
01555> remark:HEC-RAS Inflow Node 3894 / Station 43966
01556>
01557> 013 0002-----FINISH-----
01558>
01559> \*\*\*\*\*
01560> WARNINGS / ERRORS / NOTES
01561>
01562> 013 0002-----ROUTE RESERVOIR-----
01563> \*\*\* WARNING: STORAGE-Q values were extrapolated.
01564> Increase curve or use overflow option.
01565> Simulation ended on 2017-07-14 at 10:13:49
01566>
01567>
01568>

```

00001> 2
00002> *%-----
00003> *% ##### INPUT FILE FOR CARP RIVER, CITY OF KANATA #####
00004> *% ##### FERNBANK CDP: POST-DEVELOPMENT CONDITIONS - MAY 2009 #####
00005> *% ##### INCLUDES BEST MANAGEMENT PRACTICES #####
00006> *% ##### EVENT BASED MODELING (5 MINUTE TIMESTEP) #####
00007> *% ##### REFERENCE DRAINAGE AREA PLANS:
00011> *% -----
00012> *% FIGURE 8.1
00013> *% -----
00014> *% EVENT BASED SIMULATION
00015> *%-----
00016> START TZERO=0], METOUT=[2], NSTORM=[1], NRUN=[1]
00017> C25mm-3.stm
00018> *%-----
00019> READ STORM STORM_FILENAME=["storm.001"]
00020> *%-----
00021> DEFAULT VALUES ICASEDef=[1], read and print values
00022> DEFVAL_FILENAME=["ottawa.def"]
00023> *%-----
00024> COMPUTE API API=[20], APIK=[0.9]/day
00025> *%-----
00026> *% LANDS UPSTREAM OF FERNBANK COMMUNITY (GRANITE RIDGE)
00027> *%-----
00028> READ HYD ID=[9], NHYD=["101-3"],
00029> HYD_FILENAME=["H-101-3"]
00030> *%-----
00031> *% FERNBANK COMMUNITY LANDS TO CARP RIVER TRIBUTARY
00032> *% (GLEN CAIRN SWMP OUTLET CHANNEL)
00033> *%-----
00034> *% HEADWATER P1
00035> *%-----
00036> CONTINUOUS STANDHYD ID=[1], NHYD=["P1"], DT=[5](min), AREA=[77.13](ha),
00037> XIMP=[0.45], TIMP=[0.70], DWF=[0](cms), LOSS=[2],
00038> SCS curve number CN=[78],
00039> Pervious surfaces: Iaper=[5.2](mm), SLPP=[1.0](%),
00040> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00041> Impervious surfaces: IAimp=[1.57](mm), SLP=[0.5](%),
00042> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00043> Continuous simulation parameters:
00044> IaRCper=[4](hrs), IaRCimp=[2](hrs),
00045> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00046> InterEventTime=[12](hrs), END=-1
00047> *%-----
00048> *ROUTING OF PERFORATED PIPES
00049> *%-----
00050> DIVERT HYD IDin=[1], NIDout=[2]max five,
00051> outflow hydrographs (ID, NHYD)=[2,"P1BMP1"/3,"P1STM1"]
00052> flow distribution table: (modify as necessary)
00053> Note: all flows are in (cms)
00054> *%-----
00055> [ 0.000 + 0.000 = 0.00 ]
00056> [ 0.048 + 0.203 = 0.25 ]
00057> [ 0.095 + 0.405 = 0.50 ]
00058> [ 0.143 + 0.608 = 0.75 ]
00059> [ 0.190 + 0.810 = 1.00 ]
00060> [ 0.285 + 1.215 = 1.50 ]
00061> [ 0.380 + 1.620 = 2.00 ]
00062> [ 0.475 + 2.025 = 2.50 ]
00063> [ 0.570 + 2.430 = 3.00 ]
00064> [ 0.760 + 3.240 = 4.00 ]
00065> [ 0.950 + 4.050 = 5.00 ]
00066> [ 1.140 + 4.860 = 6.00 ]
00067> [ 1.330 + 5.670 = 7.00 ] end
00068> *%-----
00069> DIVERT HYD IDin=[2], NIDout=[2]max five,
00070> outflow hydrographs (ID, NHYD)=[4,"P1BMP2"/5,"P1STM2"]
00071> flow distribution table: (modify as necessary)
00072> Note: all flows are in (cms)
00073> *%-----
00074> [ 0.000 + 0.000 = 0.00 ]
00075> [ 0.016 + 0.032 = 0.05 ]
00076> [ 0.031 + 0.064 = 0.10 ]
00077> [ 0.047 + 0.095 = 0.14 ]
00078> [ 0.063 + 0.127 = 0.19 ]
00079> [ 0.094 + 0.191 = 0.29 ]
00080> [ 0.126 + 0.254 = 0.38 ]
00081> [ 0.157 + 0.318 = 0.48 ]
00082> [ 0.189 + 0.381 = 0.57 ]
00083> [ 0.252 + 0.508 = 0.76 ]
00084> [ 0.315 + 0.635 = 0.95 ]
00085> [ 0.378 + 0.762 = 1.14 ]
00086> [ 0.441 + 0.889 = 1.33 ] end
00087> *%-----
00088> ROUTE RESERVOIR IDout=[7], NHYD=["P1BMP3"], IDin=[4],
00089> RDT=[5](min),
00090> TABLE of ( OUTFLOW-STORAGE ) values
00091> (cms) - (ha-m)
00092> [ 0.0, 0.0 ]
00093> [ 0.005, 0.006 ]
00094> [ 0.007, 0.017 ]
00095> [ 0.008, 0.0258 ]
00096> [ 0.009, 0.0344 ]
00097> [ 0.0108, 0.0430 ]
00098> [ -1, -1 ] (max twenty pts)
00099> IDovf=[8], NHYDovf=["P1STM3"]
00100> *%-----
00101> COMPUTE DUALHYD IDin=[3], CINLET=[7.71](cms), NINLET=[1],
00102> MAJID=[1], MAJNHYD=["P1maj"],
00103> MINID=[2], MINNHYD=["P1min"],
00104> TMJSTO=[3857](cu-m)
00105> *%-----
00106> CONTINUOUS NASHYD ID=[7], NHYD=["SWM1"] DT=[5]min, AREA=[4.50](ha),
00107> DWF=0 CN=90 IA=9.8 N=2 TP=0.25
00108> Continuous simulation parameters:
00109> IaRCper=[4](hrs),
00110> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00111> InterEventTime=[12](hrs)
00112> Baseflow simulation parameters:
00113> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00114> VHydCond=[10](mm/hr), END=-1
00115> *%-----
00116> ADD HYD IDsum=[10], NHYD=["P1in"], IDs to add=[1,2,5,7,8,9]
00117> *%-----
00118> ROUTE RESERVOIR IDout=[2], NHYD=["P1SWM"], IDin=[10],
00119> RDT=[5](min),
00120> TABLE of ( OUTFLOW-STORAGE ) values
00121> (cms) - (ha-m)
00122> [ 0.000, 0.000 ]
00123> [ 0.050, 0.499 ]
00124> [ 1.500, 2.030 ]
00125> [ 2.500, 2.810 ]
00126> [ 4.500, 2.920 ]
00127> [ 4.800, 3.500 ]
00128> [ 5.000, 3.930 ]
00129> [ 5.300, 4.500 ]
00130> [ -1, -1 ](max twenty pts)
00131> *%-----
00132> CONTINUOUS NASHYD ID=[3], NHYD=["CRTRIB"] DT=[5]min, AREA=[3.69](ha),
00133> DWF=0 CN=82 IA=9.8 N=2 TP=0.25
00134> Continuous simulation parameters:

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00135> IaRCper=[4](hrs),
00136> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00137> InterEventTime=[12](hrs)
00138> Baseflow simulation parameters:
00139> BaseFlowOption=[1],
00140> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00141> VHydCond=[10](mm/hr), END=-1
00142> *%-----
00143> CARP RIVER TRIBUTARY AT CARP RIVER
00144> *%-----
00145> ADD HYD IDsum=[9], NHYD=["B101-2"], IDs to add=[2,3]
00146> *%-----
00147> SAVE HYD ID=[9], # OF PCYCLES=[1], ICASEsh=[1]
00148> HYD_COMMENT=["Carp Tributary @ Carp River - XP2054"]
00149> *%-----
00150> FERNBANK COMMUNITY LANDS TO SOUTH TRIBUTARY
00151> (CHANNEL FLOWING NORTH ADJACENT TO GLEN CAIRN POND)
00152> *%-----
00153> SOUTH POND P3
00154> *%-----
00155> 10yr control
00156> *%-----
00157> CONTINUOUS STANDHYD ID=[1], NHYD=["P3"], DT=[5](min), AREA=[91.68](ha),
00158> XIMP=[0.34], TIMP=[0.43], DWF=[0](cms), LOSS=[2],
00159> SCS curve number CN=[78],
00160> Pervious surfaces: Iaper=[5.2](mm), SLPP=[1.0](%),
00161> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00162> Impervious surfaces: IAimp=[1.57](mm), SLP=[0.5](%),
00163> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00164> Continuous simulation parameters:
00165> IaRCper=[4](hrs), IaRCimp=[2](hrs),
00166> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00167> InterEventTime=[12](hrs), END=-1
00168> *%-----
00169> *ROUTING OF PERFORATED PIPES
00170> *%-----
00171> DIVERT HYD IDin=[1], NIDout=[2]max five,
00172> outflow hydrographs (ID, NHYD)=[2,"P3BMP1"/3,"P3STM1"]
00173> flow distribution table: (modify as necessary)
00174> Note: all flows are in (cms)
00175> *%-----
00176> QIDI + QIDII = QTOTAL
00177> [ 0.000 + 0.000 = 0.00 ]
00178> [ 0.065 + 0.194 = 0.25 ]
00179> [ 0.130 + 0.387 = 0.50 ]
00180> [ 0.195 + 0.581 = 0.75 ]
00181> [ 0.260 + 0.774 = 1.00 ]
00182> [ 0.390 + 1.161 = 1.50 ]
00183> [ 0.520 + 1.548 = 2.00 ]
00184> [ 0.650 + 1.935 = 2.50 ]
00185> [ 0.780 + 2.322 = 3.00 ]
00186> [ 1.040 + 3.096 = 4.00 ]
00187> [ 1.300 + 3.870 = 5.00 ]
00188> [ 1.560 + 4.644 = 6.00 ]
00189> [ 1.820 + 5.418 = 7.00 ] end
00190> DIVERT HYD IDin=[2], NIDout=[2]max five,
00191> outflow hydrographs (ID, NHYD)=[4,"P3BMP2"/5,"P3STM2"]
00192> flow distribution table: (modify as necessary)
00193> Note: all flows are in (cms)
00194> *%-----
00195> QIDI + QIDII = QTOTAL
00196> [ 0.000 + 0.000 = 0.00 ]
00197> [ 0.022 + 0.043 = 0.07 ]
00198> [ 0.043 + 0.087 = 0.13 ]
00199> [ 0.065 + 0.130 = 0.19 ]
00200> [ 0.086 + 0.174 = 0.26 ]
00201> [ 0.129 + 0.261 = 0.39 ]
00202> [ 0.172 + 0.348 = 0.52 ]
00203> [ 0.215 + 0.435 = 0.65 ]
00204> [ 0.259 + 0.521 = 0.78 ]
00205> [ 0.345 + 0.695 = 1.04 ]
00206> [ 0.431 + 0.869 = 1.30 ]
00207> [ 0.517 + 1.043 = 1.56 ]
00208> [ 0.603 + 1.217 = 1.82 ] end
00209> *%-----
00210> ROUTE RESERVOIR IDout=[7], NHYD=["P3BMP3"], IDin=[4],
00211> RDT=[5](min),
00212> TABLE of ( OUTFLOW-STORAGE ) values
00213> (cms) - (ha-m)
00214> [ 0.000, 0.000 ]
00215> [ 0.0054, 0.0093 ]
00216> [ 0.0070, 0.0186 ]
00217> [ 0.0085, 0.0280 ]
00218> [ 0.0101, 0.0373 ]
00219> [ 0.0117, 0.0466 ]
00220> [ -1, -1 ]
00221> IDovf=[8], NHYDovf=["P3STM3"]
00222> *%-----
00223> COMPUTE DUALHYD IDin=[3], CINLET=[5.20](cms), NINLET=[1],
00224> MAJID=[1], MAJNHYD=["P3maj"],
00225> MINID=[2], MINNHYD=["P3min"],
00226> TMJSTO=[4250](cu-m)
00227> *%-----
00228> CONTINUOUS NASHYD ID=[7], NHYD=["SWM3"] DT=[5]min, AREA=[2.60](ha),
00229> DWF=0 CN=82 IA=9.8 N=2 TP=0.25
00230> Continuous simulation parameters:
00231> IaRCper=[4](hrs),
00232> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00233> InterEventTime=[12](hrs)
00234> Baseflow simulation parameters:
00235> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00236> VHydCond=[10](mm/hr), END=-1
00237> *%-----
00238> ADD HYD IDsum=[10], NHYD=["P3in"], IDs to add=[1,2,5,7,8]
00239> *%-----
00240> ROUTE RESERVOIR IDout=[2], NHYD=["P3SWM"], IDin=[10],
00241> RDT=[5](min),
00242> TABLE of ( OUTFLOW-STORAGE ) values
00243> (cms) - (ha-m)
00244> [ 0.000, 0.000 ]
00245> [ 0.050, 0.427 ]
00246> [ 0.300, 1.568 ]
00247> [ 0.800, 2.120 ]
00248> [ 1.750, 2.305 ]
00249> [ -1, -1 ] (max twenty pts)
00250> IDovf=[3], NHYDovf=["P3OVF"]
00251> *%-----
00252> SOUTH POND (P3) AT CARP RIVER
00253> *%-----
00254> ADD HYD IDsum=[8], NHYD=["B500"], IDs to add=[2,3]
00255> *%-----
00256> SAVE HYD ID=[8], # OF PCYCLES=[1], ICASEsh=[1]
00257> HYD_COMMENT=["South Pond @ Carp River"]
00258> *%-----
00259> *% HEC-RAS inflow hydrograph @ 44751
00260> *%-----
00261> *%-----
00262> ADD HYD IDsum=[10], NHYD=["B2054"], IDs to add=[8,9]
00263> *%-----
00264> SAVE HYD ID=[10], # OF PCYCLES=[1], ICASEsh=[1]
00265> HYD_COMMENT=["HEC-RAS inflow Node 2054 / Station 44751"]
00266> *%-----
00267> *% LAND DRAINING TO CARP RIVER @ HAZELDEAN RD (Section 44548)
00268> *% (28/35/36)
00269> *%-----
00270> *% NORTH POND P2

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00271> * 10yr control
00272> *****
00273> CONTINUOUS STANDHYD ID=[1], NHYD=['P2*'], DT=[5](min), AREA=[23.14](ha),
XIMP=[0.47], TIMP=[0.59], DWF=[0](cms), LOSS=[2],
00274> SCS curve number CN=[78],
00275> Pervious surfaces: IAPER=[5.2](mm), SLPP=[1.0](%),
00276> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00277> Impervious surfaces: IAIMP=[1.57](mm), SLPI=[0.5](%),
00278> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00279>
00280> Continuous simulation parameters:
00281> IARECper=[4](hrs), IARECimp=[2](hrs),
00282> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00283> InterEventTime=[12](hrs), END=-1
00284> *
00285> DIVERT HYD IDin=[1], NIDout=[2]max five,
00286> outflow hydrographs (ID, NHYD)=[2,"P2BMP1"/3,"P2STM1"]
00287> flow distribution table: (modify as necessary)
00288> Note: all flows are in (cms)
00289>
00290> QID1 + QID2 = QTOTAL
00291> [ 0.000 + 0.000 = 0.00 ]
00292> [ 0.048 + 0.203 = 0.25 ]
00293> [ 0.095 + 0.405 = 0.50 ]
00294> [ 0.143 + 0.608 = 0.75 ]
00295> [ 0.190 + 0.810 = 1.00 ]
00296> [ 0.285 + 1.215 = 1.50 ]
00297> [ 0.380 + 1.620 = 2.00 ]
00298> [ 0.475 + 2.025 = 2.50 ]
00299> [ 0.570 + 2.430 = 3.00 ]
00300> [ 0.760 + 3.240 = 4.00 ]
00301> [ 0.950 + 4.050 = 5.00 ]
00302> [ 1.140 + 4.860 = 6.00 ]
00303> [ 1.330 + 5.670 = 7.00 ] end
00304> *
00304> DIVERT HYD IDin=[2], NIDout=[2]max five,
00305> outflow hydrographs (ID, NHYD)=[4,"P2BMP2"/5,"P2STM2"]
00306> flow distribution table: (modify as necessary)
00307> Note: all flows are in (cms)
00308>
00309> QID1 + QID2 = QTOTAL
00310> [ 0.000 + 0.000 = 0.00 ]
00311> [ 0.016 + 0.032 = 0.05 ]
00312> [ 0.031 + 0.064 = 0.10 ]
00313> [ 0.047 + 0.095 = 0.14 ]
00314> [ 0.063 + 0.127 = 0.19 ]
00315> [ 0.094 + 0.191 = 0.29 ]
00316> [ 0.126 + 0.254 = 0.38 ]
00317> [ 0.157 + 0.318 = 0.48 ]
00318> [ 0.189 + 0.381 = 0.57 ]
00319> [ 0.252 + 0.508 = 0.76 ]
00320> [ 0.315 + 0.635 = 0.95 ]
00321> [ 0.378 + 0.762 = 1.14 ]
00322> [ 0.441 + 0.889 = 1.33 ] end
00323> *
00323> ROUTE RESERVOIR IDout=[7], NHYD=['P2BMP3'], IDin=[4],
00324> RDT=[5](min)
00325> TABLE of ( OUTFLOW-STORAGE ) values
00326> (cms) - (ha-m)
00327> [ 0.000 , 0.000 ]
00328> [ 0.0015 , 0.0025 ]
00329> [ 0.0019 , 0.0051 ]
00330> [ 0.0023 , 0.0076 ]
00331> [ 0.0027 , 0.0101 ]
00332> [ 0.0032 , 0.0127 ]
00333> [ -1 , -1 ]
00334> IDovf=[8], NHYDovf=['P2STM3']
00335> *
00336> COMPUTE DUALHYD IDin=[3], CINLET=[1.79](cms), NINLET=[1],
00337> MAJID=[1], MAJNHYD=['P2ma*'],
00338> MINID=[2], MINNHYD=['P2min*'],
00339> TMJSTO=[1157](cu-m)
00340> *
00341> CONTINUOUS NASHYD ID=[7], NHYD=['SWM2'] DT=[5](min), AREA=[0.99](ha),
00342> DWF=0 CN=90 IA=9.8 N=2 TP=0.25
00343> Continuous simulation parameters:
00344> IARECper=[4](hrs),
00345> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00346> InterEventTime=[12](hrs)
00347> Baseflow simulation parameters:
00348> BaseFlowOption=[1],
00349> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00350> VHydCond=[10](mm/hr), END=-1
00351> *
00352> ADD HYD IDsum=[10], NHYD=['P2in*'], IDs to add=[1,2,5,7,8]
00353> *
00354> ROUTE RESERVOIR IDout=[2], NHYD=['P2out*'], IDin=[10],
00355> RDT=[5](min)
00356> TABLE of ( OUTFLOW-STORAGE ) values
00357> (cms) - (ha-m)
00358> [ 0.000 , 0.000 ]
00359> [ 0.030 , 0.130 ]
00360> [ 0.150 , 0.277 ]
00361> [ 0.350 , 0.441 ]
00362> [ 0.700 , 0.675 ]
00363> [ -1 , -1 ] (max twenty pts)
00364> IDovf=[3], NHYDovf=['P2OV*']
00365> *
00366> ADD HYD IDsum=[6], NHYD=['PND2*'], IDs to add=[2,3]
00367> *
00369> CONTINUOUS NASHYD ID=[4], NHYD=['CRFP'] DT=[5](min), AREA=[24.18](ha),
00370> DWF=0 CN=82 IA=9.8 N=2 TP=0.50
00371> Continuous simulation parameters:
00372> IARECper=[4](hrs),
00373> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00374> InterEventTime=[12](hrs)
00375> Baseflow simulation parameters:
00376> BaseFlowOption=[1],
00377> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00378> VHydCond=[10](mm/hr), END=-1
00379> *
00380> CONTINUOUS STANDHYD ID=[5], NHYD=['28*'], DT=[5](min), AREA=[12.5](ha),
00381> XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
00382> Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
00383> DCAY=[4]/(hr), F=[0](mm),
00384> Pervious surfaces: IAPER=[4.67](mm), SLPP=[1.0](%),
00385> LGP=[205](m), MNP=[0.10], SCP=[0](min),
00386> Impervious surfaces: IAIMP=[1.57](mm), SLPI=[1.0](%),
00387> LGI=[700](m), MNI=[0.013], SCI=[0](min),
00388> Continuous simulation parameters:
00389> IARECper=[4](hrs), IARECimp=[2](hrs),
00390> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00391> InterEventTime=[12](hrs), END=-1
00392> *
00393> * NORTH POND (P2) AT CARP RIVER
00394> * HEC-RAS inflow hydrograph @ 44548
00395> * NODE 2065
00396> * (INCLUDES 24.18 HA OF CARP RIVER FLOODPLAIN)
00397> * (INCLUDES 12.50 HA OF WEST CREEK MEADOWS)
00398> *
00399> ADD HYD IDsum=[7], NHYD=['B2065*'], IDs to add=[4,5,6]
00400> *
00401> SAVE HYD ID=[7], # OF PCYCLES=[1], ICASEsh=[1]
00402> HYD_COMMENT=['HEC-RAS Inflow Node 2065 / Station 44548*']
00403> *
00404> * LANDS UPSTREAM OF HAZELDEAN ROAD TRIBUTARY TO HAZELDEAN CREEK
00405> * (INCLUDES NORTHWEST CORNER OF FERNBANK CDP LANDS)

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00406> *
00407> CONTINUOUS STANDHYD ID=[5], NHYD=['100-1*'], DT=[5](min), AREA=[61.17](ha),
00408> XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
00409> Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
00410> DCAY=[4]/(hr), F=[0](mm),
00411> Pervious surfaces: IAPER=[4.67](mm), SLPP=[0.8](%),
00412> LGP=[1200](m), MNP=[0.10], SCP=[0](min),
00413> Impervious surfaces: IAIMP=[1.57](mm), SLPI=[0.8](%),
00414> LGI=[1700](m), MNI=[0.013], SCI=[0](min)
00415> Continuous simulation parameters:
00416> IARECper=[4](hrs), IARECimp=[2](hrs),
00417> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00418> InterEventTime=[12](hrs), END=-1
00419> *
00420> * LANDS NORTH OF HAZELDEAN ROAD - TO HAZELDEAN CREEK
00421> * (USED IN MODEL CALIBRATION)
00422> *
00423> CONTINUOUS NASHYD ID=[6], NHYD=['102-1*'], DT=[5](min), AREA=[39.8](ha),
00424> DWF=[0](cms), CN/C=[78], IA=[9.8](mm),
00425> N=[2], TP=[1.10]hrs
00426> Continuous simulation parameters:
00427> IARECper=[4](hrs),
00428> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00429> InterEventTime=[12](hrs)
00430> Baseflow simulation parameters:
00431> BaseFlowOption=[1],
00432> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00433> VHydCond=[10](mm/hr), END=-1
00434> *
00435> * HEC-RAS inflow hydrograph @ 43966
00436> * (Hazeldean Creek @ Carp River)
00437> *
00438> ADD HYD IDsum=[10], NHYD=['B3894*'], IDs to add=[5,6]
00439> *
00440> SAVE HYD ID=[10], # OF PCYCLES=[1], ICASEsh=[1]
00441> HYD_COMMENT=['HEC-RAS Inflow Node 3894 / Station 43966*']
00442> *
00443> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[2]
00444> S2-24.stm
00445> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[3]
00446> S5-24.stm
00447> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[4]
00448> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[5]
00449> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[6]
00450> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[7]
00451> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[8]
00452> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[9]
00453> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[10]
00454> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[11]
00455> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[12]
00456> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[13]
00457> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[14]
00458> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[15]
00459> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[16]
00460> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[17]
00461> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[18]
00462> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[19]
00463> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00464> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00465> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00466> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00467> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00468> *
00469> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[14]
00470> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[15]
00471> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[16]
00472> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[17]
00473> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[18]
00474> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[19]
00475> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[17]
00476> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[18]
00477> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[19]
00478> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00479> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00480> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
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00482> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00483> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
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00485> FINISH
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00001> =====
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00003> SSSSS W W M M H H Y Y M M O O 999 999
00004> S W W M M M H H Y Y M M M O O 9 9 9 9
00005> SSSSS W W M M M H H H Y Y M M M O O ## 9 9 9 9 Ver 4.05
00006> S W W M M H H H Y Y M M O O 9999 9999 Sept 2011
00007> SSSSS W W M M H H Y Y M M O O 9 9 9 9
00008> # 5320763
00009> StormWater Management Hydrologic Model 999 999
00010>
00011> \*\*\*\*\*
00012> \*\*\*\*\* SWMHYMO Ver/4.05 \*\*\*\*\*
00013> \*\*\*\*\* A single event and continuous hydrologic simulation model \*\*\*\*\*
00014> \*\*\*\*\* based on the principles of HYMO and its successors \*\*\*\*\*
00015> \*\*\*\*\* OTTHYMO-83 and OTTHYMO-89. \*\*\*\*\*
00016> \*\*\*\*\*
00017> \*\*\*\*\* Distributed by: J.F. Sabourin and Associates Inc. \*\*\*\*\*
00018> \*\*\*\*\* Ottawa, Ontario: (613) 836-3884 \*\*\*\*\*
00019> \*\*\*\*\* Gatineau, Quebec: (819) 243-6858 \*\*\*\*\*
00020> \*\*\*\*\* E-Mail: swmhyo@jfsa.com \*\*\*\*\*
00021> \*\*\*\*\*
00022> \*\*\*\*\*
00023> \*\*\*\*\*
00024> \*\*\*\*\* Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD \*\*\*\*\*
00025> \*\*\*\*\* Nepean SERIAL#5320763 \*\*\*\*\*
00026> \*\*\*\*\*
00027> \*\*\*\*\*
00028> \*\*\*\*\*
00029> \*\*\*\*\* PROGRAM ARRAY DIMENSIONS \*\*\*\*\*
00030> \*\*\*\*\* Maximum value for ID numbers : 10 \*\*\*\*\*
00031> \*\*\*\*\* Max. number of rainfall points: 105408 \*\*\*\*\*
00032> \*\*\*\*\* Max. number of flow points : 105408 \*\*\*\*\*
00033> \*\*\*\*\*
00034> \*\*\*\*\*
00035> \*\*\*\*\* DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) \*\*\*\*\*
00036> \*\*\*\*\*
00037> \*\*\*\*\* ID: Hydrograph Identification numbers, (1-10). \*\*\*\*\*
00038> \*\*\*\*\* NHD: Hydrograph reference numbers, (6 digits or characters). \*\*\*\*\*
00039> \*\*\*\*\* AREA: Drainage area associated with hydrograph, (ac.) or (ha.). \*\*\*\*\*
00040> \*\*\*\*\* PEAK: Peak flow of simulated hydrograph, (ft<sup>3</sup>/s) or (m<sup>3</sup>/s). \*\*\*\*\*
00041> \*\*\*\*\* TpeakDate\_hh:mm is the date and time of the peak flow. \*\*\*\*\*
00042> \*\*\*\*\* R.V.: Runoff Volume of simulated hydrograph, (in) or (mm). \*\*\*\*\*
00043> \*\*\*\*\* R.C.: Runoff Coefficient of simulated hydrograph, (ratio). \*\*\*\*\*
00044> \*\*\*\*\* \*: see WARNING or NOTE message printed at end of run. \*\*\*\*\*
00045> \*\*\*\*\* \*\*: see ERROR message printed at end of run. \*\*\*\*\*
00046> \*\*\*\*\*
00047> \*\*\*\*\*
00048> \*\*\*\*\*
00049> \*\*\*\*\*
00050> \*\*\*\*\*
00051> \*\*\*\*\*
00052> \*\*\*\*\*
00053> \*\*\*\*\* SUMMARY OUTPUT \*\*\*\*\*
00054> \*\*\*\*\*
00055> \* DATE: 2017-07-14 TIME: 11:39:06 RUN COUNTER: 000744 \*
00056> \*\*\*\*\*
00057> \* Input filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-BMPE5.dat\*
00058> \* Output filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-BMPE5.out\*
00059> \* Summary filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-BMPE5.sum\*
00060> \* User comments:
00061> \* 1:
00062> \* 2:
00063> \* 3:
00064> \*\*\*\*\*
00065> \*\*\*\*\*
00066> \*\*\*\*\*
00067> RUN:COMMAND#
00068> \*\*\*\*\*
00069> START
00070> [TZERO = .00 hrs on 0]
00071> [METOUT= 2 (1=imperial, 2=metric output)]
00072> [NSTORM= 1]
00073> [ENR = 1]
00074> 001-0002-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00075> READ STORM
00076> Filename = storm.001
00077> Comment =
00078> [SDT=10.0] [SDUR= 3.00] [PTOT= 25.00]
00079> 001-0003-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00080> \*\*\*\*\*
00081> \*\*\*\*\* DEFAULT VALUES \*\*\*\*\*
00082> \*\*\*\*\* FileTitle = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def \*\*\*\*\*
00083> \*\*\*\*\* ICASrdr = 1 (read and print data) \*\*\*\*\*
00084> \*\*\*\*\* FileTitle = (read and print data) \*\*\*\*\*
00085> \*\*\*\*\* FileTitle = (read and print data) \*\*\*\*\*
00086> \*\*\*\*\* FileTitle = (read and print data) \*\*\*\*\*
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00134> \*\*\*\*\* FileTitle = (read and print data) \*\*\*\*\*
00135> \*\*\*\*\* FileTitle = (read and print data) \*\*\*\*\*

00136> \*\*\*\*\* + 05:P1STM2 9.73 .378 No\_date 1:30 17.57
00137> \*\*\*\*\* + 07:SWM1 4.50 .079 No\_date 1:35 8.24
00138> \*\*\*\*\* + 132:PISTM3 1.71 .132 No\_date 1:35 17.57
00139> \*\*\*\*\* + 09:101-3 69.53 .605 No\_date 2:30 14.68
00140> \*\*\*\*\* [DT= 5.00] SUM= 10:P1in 147.95 3.262 No\_date 1:35 15.93
00141> \*\*\*\*\* [ID:NHYD]-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00142> \*\*\*\*\* ROUTE RESERVOIR -> 10:P1in 147.95 3.262 No\_date 1:35 15.93
00143> \*\*\*\*\* [RDT= 5.00] out<= 02:P1SWM 147.95 .819 No\_date 3:30 15.93
00144> \*\*\*\*\* [MxStoUsed=.131E+01]
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00271> [IaREClmp= 2.00; IaRECPer= 4.00]
00272> 001:0038-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00273> ADD HYD + 05:28 24.18 .196 No\_date 2:00 5.92
00274> + 05:28 12.50 .519 No\_date 1:15 10.12
00275> + 06:PND2 23.08 .145 No\_date 3:15 15.96
00276> [DT= 5.00] SUM= 07:B2065 59.76 .563 No\_date 1:15 10.68
00277> 001:0039-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00278> SAVE HYD 07:B2065 59.76 .563 No\_date 1:15 10.68
00279> filename:M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\H-B2065.001
00280> remark:HEC-RAS Inflow Node 2065 / Station 44548
00281> 001:0040-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00282> CONTINUOUS STANDHYD05:100-1 61.17 1.610 No\_date 1:25 10.12
00283> [XIMP= 38;TIMP= 45]
00284> [Horton parameters: F0= 76.20;F0= 13.20;DCAV=4.00; F= .00]
00285> [Previous area: IAper= 4.67;SLPP=.80;LGP=1200.;MNP=.100;SCP=.0]
00286> [Impervious area: IAimp= 1.57;SLPI=.80;LGI=1700.;MNI=.013;SCI=.0]
00287> [IaREClmp= 2.00; IaRECPer= 4.00]
00288> 001:0041-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00289> CONTINUOUS NASHYD 06:102-1 39.80 .165 No\_date 3:00 5.00
00290> [CN= 78.0; N= 2.00]
00291> [Tp= 1.10;DT= 5.00]
00292> [IaREC= 4.00; SMIN= 29.88; SMAX=199.22; SK=1.000]
00293> [InterEventTime= 12.00]
00294> 001:0042-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00295> ADD HYD + 05:100-1 61.17 1.610 No\_date 1:25 10.12
00296> + 06:102-1 39.80 .165 No\_date 3:00 5.00
00297> [DT= 5.00] SUM= 10:B3894 100.97 1.631 No\_date 1:25 8.10
00298> 001:0043-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00299> SAVE HYD 10:B3894 100.97 1.631 No\_date 1:25 8.10
00300> filename:M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\H-B3894.001
00301> remark:HEC-RAS Inflow Node 3894 / Station 43966
00302> \*\*\* END OF RUN : 7
00303>
00304> \*\*\*\*\*
00305>
00306>
00307>
00308>
00309>
00310> RUN:COMMAND#
00311> 008:0001-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00312> START
00313> [TZERO = 0.00 hrs on 0]
00314> [METOUT= 2 (1=imperial, 2=metric output)]
00315> [NSTORM= 1]
00316> [NRUN = 8]
00317> 008:0002-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00318> READ STORM
00319> Filename = storm.001
00320> Comment =
00321> [SDT=30.00;SDUR= 12.00;PTOT= 42.34]
00322> 008:0003-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00323> DEFUNCT VALUES
00324> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\ottawa.def
00325> [ICASEdv = 1 (read and print data)]
00326> [FileTitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---]
00327> [PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 ---]
00328> Horton's infiltration parameters:
00329> [F0= 76.20 mm/hr] [F0= 12.20 mm/hr] [DCAV= 1.66 /hr] [F= .00 mm]
00330> Parameters for PERVIOUS surfaces in STANDHYD:
00331> [IAper = 4.67 mm] [LGP=40.00 m] [MNP = .250]
00332> Parameters for IMPERVIOUS surfaces in STANDHYD:
00333> [IAimp = 1.57 mm] [LGI= 1.50] [MNI = .013]
00334> Parameters used in NASHYD:
00335> [Ia = 4.67 mm] [N= 2.00]
00336> 008:0004-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00337> COMPUTE API
00338> [APIax= 20.00; APIkdy= 9000; APIkdt= 9978]
00339> [APIax= 60.24; APIavg= 39.87; APImin= 20.59]
00340> 008:0005-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00341> READ HYD 09:101-3 69.53 1.068 No\_date 7:05 29.55
00342> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\H-101-3.008
00343> [MINN= GRANTIER BASSE AREA 101-3]
00344> 008:0006-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00345> CONTINUOUS STANDHYD01:P1 77.13 3.895 No\_date 6:15 33.72
00346> [XIMP= 45;TIMP= 70]
00347> [LOSS= 2 ;CN= 78.0]
00348> [Impervious area: IAper= 5.20;SLPP=1.00;LGP= 40.;MNP=.200;SCP=.0]
00349> [Impervious area: IAimp= 1.57;SLPI=.50;LGI=1400.;MNI=.013;SCI=.0]
00350> [IaREClmp= 2.00; IaRECPer= 4.00]
00351> [SMIN= 29.88; SMAX=199.22; SK=1.000]
00352> 008:0007-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00353> DIVERT HYD -> 02:P1 77.13 3.895 No\_date 6:15 33.72
00354> diverted <= 02:P1BMP1 14.68 .740 No\_date 6:15 33.72
00355> diverted <= 03:P1STM1 62.50 3.155 No\_date 6:15 33.72
00356> 008:0008-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00357> DIVERT HYD -> 02:P1BMP1 14.68 .740 No\_date 6:15 33.72
00358> diverted <= 04:P1BMP2 4.79 .245 No\_date 6:15 33.72
00359> diverted <= 05:P1STM2 9.68 .495 No\_date 6:15 33.72
00360> 008:0009-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00361> ROUTE RESERVOIR -> 04:P1BMP2 4.79 .245 No\_date 6:15 33.72
00362> [RDT= 5.00] out<= 07:P1BMP3 2.18 .011 No\_date 6:15 33.72
00363> [MxStoUsed= 4299E-01; TotOvfVol= 2.61 .233 No\_date 6:20 33.72]
00364> [MxStoUsed= 4299E-01; TotOvfVol= .881E-01; N-Ovf= 3; TotDurOvf= 6.8hrs]
00365> 008:0010-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00366> COMPUTE DUALHYD 03:P1STM1 62.50 3.155 No\_date 6:15 33.72
00367> [Major System / 01:P1maj] .00 .000 No\_date 0:00 .00
00368> [Minor System / 02:P1min] 62.50 3.155 No\_date 6:15 33.72
00369> [MjSysStor= 0000E+00; TotOvfVol= 0.000E+00; N-Ovf= 0; TotDurOvf= 0.8hrs]
00370> 008:0011-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00371> CONTINUOUS NASHYD 07:SWM1 4.50 .186 No\_date 6:10 23.33
00372> [CN= 90.0; N= 2.00]
00373> [Tp= 25;DT= 5.00]
00374> [IaREC= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
00375> [InterEventTime= 12.00]
00376> 008:0012-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00377> ADD HYD 01:P1maj .00 .000 No\_date 0:00 .00
00378> + 02:P1min 62.50 3.155 No\_date 6:15 33.72
00379> + 05:P1STM2 9.68 .495 No\_date 6:15 33.72
00380> + 07:SWM1 4.50 .186 No\_date 6:10 23.33
00381> + 08:P1STM3 2.61 .233 No\_date 6:20 33.72
00382> [DT= 5.00] SUM= 09:101-3 69.53 1.068 No\_date 7:05 29.55
00383> 008:0013-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00384> ROUTE RESERVOIR -> 10:P1in 148.83 4.847 No\_date 6:15 31.46
00385> [RDT= 5.00] out<= 02:P1SWM 148.83 4.847 No\_date 6:15 31.46
00386> [MxStoUsed= 2056E+01]
00387> 008:0014-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00388> CONTINUOUS NASHYD 03:CRTRIB 3.69 .115 No\_date 6:10 18.79
00389> [CN= 82.0; N= 2.00]
00390> [Tp= .25;DT= 5.00]
00391> [IaREC= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00392> [InterEventTime= 12.00]
00393> 008:0015-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00394> ADD HYD 02:P1SWM 148.83 4.847 No\_date 6:15 31.46
00395> + 03:CRTRIB 3.69 .115 No\_date 6:10 18.79
00396> [DT= 5.00] SUM= 09:B101-2 152.52 1.552 No\_date 8:10 31.15
00397> 008:0016-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00398> CONTINUOUS STANDHYD01:P3 91.68 3.720 No\_date 6:15 28.71
00399> [XIMP= 34;TIMP= 43]
00400> [LOSS= 2 ;CN= 78.0]
00401> [Impervious area: IAper= 5.20;SLPP=1.00;LGP= 40.;MNP=.200;SCP=.0]
00402> [Impervious area: IAimp= 1.57;SLPI=.50;LGI=1400.;MNI=.013;SCI=.0]
00403> [IaREClmp= 2.00; IaRECPer= 4.00]
00404> [SMIN= 29.88; SMAX=199.22; SK=1.000]
00405>

00406> 008:0017-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00407> DIVERT HYD -> 01:P3 91.68 3.720 No\_date 6:15 28.71
00408> diverted <= 02:P2BMP1 23.84 .967 No\_date 6:15 28.71
00409> diverted <= 03:P3STM1 70.99 2.879 No\_date 6:15 28.71
00410> 008:0018-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00411> DIVERT HYD -> 02:P3BMP1 23.84 .967 No\_date 6:15 28.71
00412> diverted <= 04:P3BMP2 7.82 .321 No\_date 6:15 28.71
00413> diverted <= 05:P3STM2 15.69 .646 No\_date 6:15 28.71
00414> 008:0019-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00415> ROUTE RESERVOIR -> 04:P3BMP2 7.82 .321 No\_date 6:15 28.71
00416> [RDT= 5.00] out<= 07:P3BMP3 2.82 .012 No\_date 6:10 28.71
00417> overflow <= 08:P3STM3 5.00 .309 No\_date 6:20 28.71
00418> [MxStoUsed= 4658E-01; TotOvfVol= 1436E+01; N-Ovf= 3; TotDurOvf= 6.8hrs]
00419> 008:0020-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00420> COMPUTE DUALHYD 03:P3STM1 70.99 2.879 No\_date 6:15 28.71
00421> [Major System / 01:P3maj] .00 .000 No\_date 0:00 .00
00422> [Minor System / 02:P3min] 70.99 2.879 No\_date 6:15 28.71
00423> [MjSysStor= 0000E+00; TotOvfVol= 0.000E+00; N-Ovf= 0; TotDurOvf= 0.8hrs]
00424> 008:0021-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00425> CONTINUOUS NASHYD 07:SWM3 2.60 .081 No\_date 6:10 18.79
00426> [CN= 82.0; N= 2.00]
00427> [Tp= .25;DT= 5.00]
00428> [IaREC= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00429> [InterEventTime= 12.00]
00430> 008:0022-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00431> ADD HYD 01:P3maj .00 .000 No\_date 0:00 .00
00432> + 02:P3min 70.99 2.879 No\_date 6:15 28.71
00433> + 07:SWM3 2.60 .081 No\_date 6:10 18.79
00434> + 08:P3STM3 5.00 .309 No\_date 6:20 28.71
00435> [DT= 5.00] SUM= 10:P3in 94.28 3.907 No\_date 6:15 28.44
00436> 008:0023-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00437> ROUTE RESERVOIR -> 02:P3SWM 94.28 3.907 No\_date 6:15 28.44
00438> [RDT= 5.00] out<= 02:P3SWM 94.28 .562 No\_date 8:45 28.44
00439> overflow <= 03:P3OVF .00 .000 No\_date 0:00 .00
00440> [MxStoUsed= 1858E+01; TotOvfVol= 0.000E+00; N-Ovf= 0; TotDurOvf= 0.8hrs]
00441> 008:0024-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00442> ADD HYD 03:P3OVF 94.28 .562 No\_date 8:45 28.44
00443> + 03:P3OVF .00 .000 No\_date 0:00 .00
00444> [DT= 5.00] SUM= 08:B500 94.28 .562 No\_date 8:45 28.44
00445> 008:0025-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00446> ADD HYD 08:B500 94.28 .562 No\_date 8:45 28.44
00447> [DT= 5.00] SUM= 10:B2054 246.81 2.105 No\_date 8:20 30.12
00448> 008:0026-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00449> SAVE HYD 10:B2054 246.81 2.105 No\_date 8:20 30.12
00450> filename:M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\H-B2054.008
00451> remark:HEC-RAS Inflow Node 2054 / Station 44511
00452> 008:0027-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00453> CONTINUOUS STANDHYD01:P2 23.14 1.088 No\_date 6:15 31.82
00454> [XIMP= 47;TIMP= 59]
00455> [LOSS= 2 ;CN= 78.0]
00456> [Impervious area: IAper= 5.20;SLPP=1.00;LGP= 40.;MNP=.200;SCP=.0]
00457> [Impervious area: IAimp= 1.57;SLPI=.50;LGI=1400.;MNI=.013;SCI=.0]
00458> [IaREClmp= 2.00; IaRECPer= 4.00]
00459> [SMIN= 29.88; SMAX=199.22; SK=1.000]
00460> 008:0028-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00461> DIVERT HYD -> 02:P2BMP1 23.14 1.088 No\_date 6:15 31.82
00462> diverted <= 02:P2BMP2 4.42 .207 No\_date 6:15 31.82
00463> diverted <= 03:P2STM1 18.76 .881 No\_date 6:15 31.82
00464> 008:0029-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00465> DIVERT HYD -> 02:P2BMP1 4.42 .207 No\_date 6:15 31.82
00466> diverted <= 02:P2BMP2 1.43 .068 No\_date 6:15 31.82
00467> diverted <= 05:P2STM2 2.89 .138 No\_date 6:15 31.82
00468> 008:0030-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00469> ROUTE RESERVOIR -> 04:P2BMP2 1.43 .068 No\_date 6:15 31.82
00470> [RDT= 5.00] out<= 07:P2BMP3 .68 .003 No\_date 6:15 31.82
00471> overflow <= 08:P2STM3 .75 .064 No\_date 6:20 31.82
00472> [MxStoUsed= 1270E-01; TotOvfVol= 2382E-01; N-Ovf= 4; TotDurOvf= 6.8hrs]
00473> 008:0031-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00474> COMPUTE DUALHYD 03:P2STM1 18.76 .881 No\_date 6:15 31.82
00475> [Major System / 01:P2maj] .00 .000 No\_date 0:00 .00
00476> [Minor System / 02:P2min] 18.76 .881 No\_date 6:15 31.82
00477> [MjSysStor= 0000E+00; TotOvfVol= 0.000E+00; N-Ovf= 0; TotDurOvf= 0.8hrs]
00478> 008:0032-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00479> CONTINUOUS NASHYD 07:SWM2 .99 .041 No\_date 6:10 23.33
00480> [CN= 90.0; N= 2.00]
00481> [Tp= 25;DT= 5.00]
00482> [IaREC= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
00483> [InterEventTime= 12.00]
00484> 008:0033-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00485> ADD HYD 01:P2maj .00 .000 No\_date 0:00 .00
00486> + 05:P2STM2 2.89 .138 No\_date 6:15 31.82
00487> + 07:SWM2 .99 .041 No\_date 6:10 23.33
00488> + 08:P2STM3 .75 .064 No\_date 6:20 31.82
00489> [DT= 5.00] SUM= 10:P2in 23.39 1.123 No\_date 6:15 31.46
00490> 008:0034-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00491> ROUTE RESERVOIR -> 10:P2in 23.39 1.123 No\_date 6:15 31.46
00492> [RDT= 5.00] out<= 02:P2out 23.39 .310 No\_date 7:30 31.46
00493> overflow <= 03:P2OVF .00 .000 No\_date 0:00 .00
00494> [MxStoUsed= 4080E+00; TotOvfVol= 0.000E+00; N-Ovf= 0; TotDurOvf= 0.8hrs]
00495> 008:0035-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00496> ADD HYD 02:P2out 23.39 .310 No\_date 7:30 31.46
00497> + 03:P2OVF .00 .000 No\_date 0:00 .00
00498> [DT= 5.00] SUM= 06:PND2 23.39 .310 No\_date 7:30 31.46
00499> 008:0036-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00500> CONTINUOUS NASHYD 04:CRFP 24.18 .494 No\_date 6:35 18.79
00501> [CN= 82.0; N= 2.00]
00502> [Tp= .50;DT= 5.00]
00503> [IaREC= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00504> [InterEventTime= 12.00]
00505> 008:0037-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00506> CONTINUOUS STANDHYD05:28 12.50 .445 No\_date 6:00 18.26
00507> [XIMP= 38;TIMP= 45]
00508> [Horton parameters: F0= 76.20;F0= 13.20;DCAV=4.00; F= .00]
00509> [Previous area: IAper= 4.67;SLPP=1.00;LGP= 205.;MNP=.100;SCP=.0]
00510> [Impervious area: IAimp= 1.57;SLPI=.50;LGI=1700.;MNI=.013;SCI=.0]
00511> [IaREClmp= 2.00; IaRECPer= 4.00]
00512> 008:0038-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00513> ADD HYD 04:CRFP 24.18 .494 No\_date 6:35 18.79
00514> + 05:28 12.50 .445 No\_date 6:00 18.26
00515> + 06:PND2 23.39 .310 No\_date 7:30 31.46
00516> [DT= 5.00] SUM= 07:B2065 60.07 .888 No\_date 6:35 23.62
00517> 008:0039-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00518> SAVE HYD 07:B2065 60.07 .888 No\_date 6:35 23.62
00519> filename:M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\H-B2065.008
00520> remark:HEC-RAS Inflow Node 2065 / Station 44548
00521> 008:0040-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00522> CONTINUOUS STANDHYD05:100-1 61.17 1.647 No\_date 6:10 18.26
00523> [XIMP= 38;TIMP= 45]
00524> [Horton parameters: F0= 76.20;F0= 13.20;DCAV=4.00; F= .00]
00525> [Previous area: IAper= 4.67;SLPP=1.00;LGP= 205.;MNP=.100;SCP=.0]
00526> [Impervious area: IAimp= 1.57;SLPI=.50;LGI=1700.;MNI=.013;SCI=.0]
00527> [IaREClmp= 2.00; IaRECPer= 4.00]
00528> [SMIN= 29.88; SMAX=199.22; SK=1.000]
00529> [InterEventTime= 12.00]
00530> 008:0041-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00531> CONTINUOUS NASHYD 06:102-1 39.80 .404 No\_date 7:25 16.64
00532> [CN= 82.0; N= 2.00]
00533> [Tp= 1.10;DT= 5.00]
00534> [IaREC= 4.00; SMIN= 29.88; SMAX=199.22; SK=1.000]
00535> [InterEventTime= 12.00]
00536> 008:0042-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
00537> ADD HYD 06:102-1 39.80 .404 No\_date 7:25 16.64
00538> + 06:102-1 39.80 .404 No\_date 7:25 16.64
00539> [DT= 5.00] SUM= 10:B3894 100.97 1.794 No\_date 6:10 17.62
00540>

00541> 008:0043-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00542> SAVE HYD 10:B3894 100.97 1.794 No\_date 6:10 17.62
00543> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B3894.008
00544> remark:HEC-RAS Inflow Node 3894 / Station 43966
00545> \*\* END OF RUN : 8
00546>
00547> \*\*\*\*\*
00548>
00549>
00550>
00551>
00552>
00553> RUN:COMMAND#
00554> 009:0001-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00555> START
00556> [TZERO = .00 hrs on 0]
00557> [METOUT= 2 (1=imperial, 2=metric output)]
00558> [NSTORE= 1]
00559> [NRUN = 9]
00560> 009:0002-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00561> READ STORM
00562> filename = storm.001
00563> Comment =
00564> [SDT=30.00:SDUR= 12.00:PTOT= 56.18]
00565> 009:0003-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00566> DEFAULT VALUES
00567> filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
00568> [ICSEdV = 1 (read only data)]
00569> FILENAME= ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
00570> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
00571> Horton's infiltration equation parameters:
00572> [Fo= 76.20 mm/hr] [Foc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00573> Parameters for PREVIOUS surfaces in STANDHYD:
00574> [Iaper= 4.67 mm] [LGP=40.00 m] [MNP= .250]
00575> Parameters for IMPERVIOUS surfaces in STANDHYD:
00576> [Iaimp= 1.57 mm] [CLI= 1.50] [MNI= .013]
00577> Parameters used in NASHYD:
00578> [Iaimp= 4.67 mm] [M= 2.00]
00579> 009:0004-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00580> COMPUTE API
00581> [APIini= 20.00: APIkdy= 9000: APIkdt= .9978]
00582> [APImax= 73.73: APIavg= 46.81: APImin= 20.80]
00583> 009:0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00584> READ HYD 09:101-3 69.53 1.597 No\_date 6:55 42.20
00585> filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.009
00586> Comment = GRANITE RIDGE AREA 101-3
00587> 009:0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00588> CONTINUOUS STANDHYD01:P3 77.13 5.835 No\_date 6:10 47.05
00589> [XIMP= 45:TIMP= 70]
00590> [LOSS= 2 :CN= 78.0]
00591> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
00592> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00593> [IaRECimp= 2.00: IaRECper= 4.00]
00594> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00595> 009:0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00596> DIVERT HYD -> 01:P1 77.13 5.835 No\_date 6:10 47.05
00597> diverted <= 02:P1BMP1 14.68 1.109 No\_date 6:10 47.05
00598> diverted <= 03:P2STM2 4.50 .308 No\_date 6:05 36.39
00599> 009:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06000> DIVERT HYD -> 02:P1BMP1 14.68 1.109 No\_date 6:10 47.05
06001> diverted <= 04:P1BMP2 4.80 .368 No\_date 6:10 47.05
06002> diverted <= 05:P1STM2 9.71 .741 No\_date 6:10 47.05
06003> 009:0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06004> ROUTE RESERVOIR -> 04:P1BMP2 4.80 .368 No\_date 6:10 47.05
06005> [RDT= 5.00] out<- 02:P1BMP3 1.61 .011 No\_date 6:00 47.05
06006> overflow <= 08:P1STM3 3.19 .354 No\_date 6:15 47.05
06007> [MxStoUsed=.4299E+01, TotOvfVol=.1503E+00, N-Ovf= 3, TotDurOvf= 6 hrs]
06008> [IaRECimp= 2.00: IaRECper= 4.00]
06009> COMPUTE DUALHYD 03:P1STM1 62.50 4.727 No\_date 6:10 47.05
06010> Major System / 01:P1maj .00 .000 No\_date 0:00 .00
06011> Minor System \ 02:P1min 62.50 4.727 No\_date 6:10 47.05
06012> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
06013> [IaRECimp= 2.00: IaRECper= 4.00]
06014> 009:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06015> CONTINUOUS NASHYD 07:SWM1 4.50 .308 No\_date 6:05 36.39
06016> [CN= 90.0: N= 2.00]
06017> [Tp= .25:DT= 5.00]
06018> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
06019> [InterEventTime= 12.00]
06020> 009:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06021> ADD HYD 01:P1maj .00 .000 No\_date 0:00 .00
06022> + 02:P1min 62.50 4.727 No\_date 6:10 47.05
06023> + 05:P1STM2 9.71 .741 No\_date 6:10 47.05
06024> + 01:SWM1 4.50 .308 No\_date 6:05 36.39
06025> + 08:P1STM3 3.19 .354 No\_date 6:15 47.05
06026> + 09:101-3 69.53 1.597 No\_date 6:55 42.20
06027> [DT= 5.00] SUM= 10:P1in 149.43 7.329 No\_date 6:15 44.47
06028> 009:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06029> ROUTE RESERVOIR -> 10:P2in 149.43 7.329 No\_date 6:15 44.47
06030> [RDT= 5.00] out<- 02:P1SWM 149.43 2.466 No\_date 7:50 44.47
06031> [MxStoUsed=.2784E+01]
06032> 009:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06033> CONTINUOUS NASHYD 03:CRTRIB 3.69 .202 No\_date 6:05 30.76
06034> [CN= 82.0: N= 2.00]
06035> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
06036> [InterEventTime= 12.00]
06037> 009:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06038> ADD HYD 02:P1SWM 149.43 2.466 No\_date 7:50 44.47
06039> + 03:CRTRIB 3.69 .202 No\_date 6:05 30.76
06040> [DT= 5.00] SUM= 09:B101-2 153.12 2.502 No\_date 7:45 44.14
06041> 009:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06042> CONTINUOUS STANDHYD01:P3 91.68 5.804 No\_date 6:15 41.32
06043> [XIMP= 34:TIMP= 45]
06044> [LOSS= 2 :CN= 78.0]
06045> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
06046> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
06047> [IaRECimp= 2.00: IaRECper= 4.00]
06048> [SMIN= 29.88: SMAX=199.22: SK=1.000]
06049> 009:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06050> DIVERT HYD -> 01:P3 91.68 5.804 No\_date 6:15 41.32
06051> diverted <= 02:P3BMP1 23.84 1.509 No\_date 6:15 41.32
06052> diverted <= 03:P3STM1 70.98 4.492 No\_date 6:15 41.32
06053> 009:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06054> DIVERT HYD -> 02:P3BMP2 23.84 1.509 No\_date 6:15 41.32
06055> diverted <= 04:P3BMP2 7.84 .500 No\_date 6:15 41.32
06056> diverted <= 05:P3STM2 15.77 1.009 No\_date 6:15 41.32
06057> 009:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06058> ROUTE RESERVOIR -> 04:P3BMP2 7.84 .500 No\_date 6:15 41.32
06059> [RDT= 5.00] out<- 07:P3BMP3 2.01 .012 No\_date 6:00 41.32
06060> overflow <= 08:P3STM3 5.83 .488 No\_date 6:15 41.32
06061> [MxStoUsed=.4655E-01, TotOvfVol=.2410E+00, N-Ovf= 1, TotDurOvf= 7 hrs]
06062> [IaRECimp= 2.00: IaRECper= 4.00]
06063> COMPUTE DUALHYD 01:P3maj 70.98 4.492 No\_date 6:15 41.32
06064> Major System / 01:P3maj .00 .000 No\_date 0:00 .00
06065> Minor System \ 02:P3min 70.98 4.492 No\_date 6:15 41.32
06066> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
06067> [IaRECimp= 2.00: IaRECper= 4.00]
06068> 009:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06069> CONTINUOUS NASHYD 07:SWM3 2.60 .142 No\_date 6:05 30.76
06070> [CN= 82.0: N= 2.00]
06071> [Tp= .25:DT= 5.00]
06072> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
06073> [InterEventTime= 12.00]
06074> 009:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
06075> ADD HYD 01:P3maj .00 .000 No\_date 0:00 .00
06076> + 02:P3min 70.98 4.492 No\_date 6:15 41.32

00676> + 05:P3STM2 15.77 1.009 No\_date 6:15 41.32
00677> + 07:SWM3 2.60 .142 No\_date 6:05 30.76
00678> + 08:P3STM3 5.83 .488 No\_date 6:15 41.32
00679> [DT= 5.00] SUM= 10:P3in 95.18 6.124 No\_date 6:15 41.03
00680> 009:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00681> ROUTE RESERVOIR -> 10:P3in 95.18 6.124 No\_date 6:15 41.03
00682> [RDT= 5.00] out<- 02:P3SWM 95.18 1.227 No\_date 7:50 41.03
00683> overflow <= 03:P3OVF .00 .000 No\_date 0:00 .00
00684> [MxStoUsed=.2473E+01, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00685> 009:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00686> ADD HYD 02:P3SWM 95.18 1.227 No\_date 7:50 41.03
00687> + 03:P3OVF .00 .000 No\_date 0:00 .00
00688> [DT= 5.00] SUM= 03:P3OVF 95.18 1.227 No\_date 7:50 41.03
00689> 009:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00690> ADD HYD 08:B500 95.18 1.227 No\_date 7:50 41.03
00691> + 09:B101-2 153.12 2.502 No\_date 7:45 44.14
00692> [DT= 5.00] SUM= 10:B2054 248.31 3.729 No\_date 7:45 42.95
00693> 009:0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00694> SAVE HYD 10:B2054 248.31 3.729 No\_date 7:45 42.95
00695> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2054.009
00696> remark:HEC-RAS Inflow Node 2054 / Station 44751
00697> 009:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00698> CONTINUOUS STANDHYD01:P2 23.14 1.650 No\_date 6:10 44.82
00699> [XIMP= 47:TIMP= 59]
00700> [LOSS= 2 :CN= 78.0]
00701> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
00702> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00703> [IaRECimp= 2.00: IaRECper= 4.00]
00704> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00705> 009:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00706> DIVERT HYD -> 01:P2 23.14 1.650 No\_date 6:10 44.82
00707> diverted <= 02:P2BMP1 4.41 .314 No\_date 6:10 44.82
00708> diverted <= 03:P2STM1 18.76 1.337 No\_date 6:10 44.82
00709> 009:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00710> DIVERT HYD -> 02:P2BMP1 4.41 .314 No\_date 6:10 44.82
00711> diverted <= 04:P2BMP2 1.43 .102 No\_date 6:10 44.82
00712> diverted <= 05:P2STM2 2.88 .207 No\_date 6:10 44.82
00713> 009:0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00714> ROUTE RESERVOIR -> 04:P2BMP2 1.43 .102 No\_date 6:10 44.82
00715> [RDT= 5.00] out<- 07:P2BMP3 1.50 .003 No\_date 6:00 44.82
00716> overflow <= 08:P2STM3 .93 .098 No\_date 6:15 44.82
00717> [MxStoUsed=.1270E-01, TotOvfVol=.4165E-01, N-Ovf= 3, TotDurOvf= 6 hrs]
00718> [IaRECimp= 2.00: IaRECper= 4.00]
00719> COMPUTE DUALHYD 03:P2STM1 18.76 1.337 No\_date 6:10 44.82
00720> Major System / 01:P2maj .00 .000 No\_date 0:00 .00
00721> Minor System \ 02:P2min 18.76 1.337 No\_date 6:10 44.82
00722> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00723> [IaRECimp= 2.00: IaRECper= 4.00]
00724> CONTINUOUS NASHYD 07:SWM2 .99 .068 No\_date 6:05 36.39
00725> [CN= 90.0: N= 2.00]
00726> [Tp= .25:DT= 5.00]
00727> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00728> [InterEventTime= 12.00]
00729> 009:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00730> ADD HYD 01:P2maj .00 .000 No\_date 0:00 .00
00731> + 02:P2min 18.76 1.337 No\_date 6:10 44.82
00732> + 05:P2STM2 2.88 .207 No\_date 6:10 44.82
00733> + 07:SWM2 .99 .068 No\_date 6:05 36.39
00734> + 08:P2STM3 .93 .098 No\_date 6:15 44.82
00735> [DT= 5.00] SUM= 10:P2in 23.57 1.708 No\_date 6:10 44.47
00736> 009:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00737> ROUTE RESERVOIR -> 10:P2in 23.57 1.708 No\_date 6:10 44.47
00738> [RDT= 5.00] out<- 03:P2OVF 1.00 .000 No\_date 0:00 .00
00739> overflow <= 07:P2OVF 1.00 .000 No\_date 0:00 .00
00740> [MxStoUsed=.5570E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00741> [IaRECimp= 2.00: IaRECper= 4.00]
00742> ADD HYD 02:P2out 23.57 .523 No\_date 7:15 44.47
00743> + 03:P2OVF .00 .000 No\_date 0:00 .00
00744> [DT= 5.00] SUM= 06:PND2 23.57 .523 No\_date 7:15 44.47
00745> 009:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00746> CONTINUOUS NASHYD 04:CRFP 24.18 .848 No\_date 6:30 30.76
00747> [CN= 82.0: N= 2.00]
00748> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00749> [InterEventTime= 12.00]
00750> 009:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00751> CONTINUOUS STANDHYD05:28 12.50 .716 No\_date 6:00 28.27
00752> [XIMP= 38:TIMP= 45]
00753> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00754> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 205.:MNP=.100:SCP= .0]
00755> [Impervious area: Iaimp= 1.57:SLPI=1.00:LGI= 700.:MNI=.013:SCI= .0]
00756> [IaRECimp= 2.00: IaRECper= 4.00]
00757> 009:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00758> ADD HYD 04:CRFP 24.18 .848 No\_date 6:30 30.76
00759> + 05:28 12.50 .716 No\_date 6:00 28.27
00760> + 06:PND2 23.57 .523 No\_date 7:15 44.47
00761> [DT= 5.00] SUM= 07:B2065 60.25 1.646 No\_date 6:30 35.60
00762> 009:0039-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00763> SAVE HYD 07:B2065 60.25 1.646 No\_date 6:30 35.60
00764> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2065.009
00765> remark:HEC-RAS Inflow Node 2065 / Station 44548
00766> 009:0040-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00767> CONTINUOUS STANDHYD05:100-1 61.17 2.291 No\_date 6:05 28.27
00768> [XIMP= 38:TIMP= 45]
00769> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00770> [Pervious area: Iaper= 4.67:SLPP= .80:LGP=1200.:MNP=.100:SCP= .0]
00771> [Impervious area: Iaimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI= .0]
00772> [IaRECimp= 2.00: IaRECper= 4.00]
00773> 009:0041-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00774> CONTINUOUS NASHYD 06:102-1 39.80 .700 No\_date 7:20 27.89
00775> [CN= 78.0: N= 2.00]
00776> [Tp= 1.10:DT= 5.00]
00777> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
00778> [InterEventTime= 12.00]
00779> 009:0042-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00780> ADD HYD 05:100-1 61.17 2.291 No\_date 6:05 28.27
00781> + 06:102-1 39.80 .700 No\_date 7:20 27.89
00782> [DT= 5.00] SUM= 10:B3894 100.97 2.598 No\_date 6:10 28.12
00783> 009:0043-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00784> SAVE HYD 10:B3894 100.97 2.598 No\_date 6:10 28.12
00785> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B3894.009
00786> remark:HEC-RAS Inflow Node 3894 / Station 43966
00787> \*\* END OF RUN : 9
00788>
00789> \*\*\*\*\*
00790>
00791>
00792>
00793>
00794>
00795>
00796>
00797> RUN:COMMAND#
00798> START
00799> [TZERO = .00 hrs on 0]
00800> [METOUT= 2 (1=imperial, 2=metric output)]
00801> [NSTORE= 1]
00802> [NRUN = 10]
00803> 010:0002-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00804> READ STORM
00805> filename = storm.001
00806> Comment =
00807> [SDT=30.00:SDUR= 12.00:PTOT= 65.22]
00808> 010:0003-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00809> DEFAULT VALUES
00810> filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def

00811> ICASEdV = 1 (read and print data)
00812> FileTitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE -----
00813> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
00814> Horton's infiltration equation parameters:
00815> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00816> Parameters for PERVIOUS surfaces in STANDHYD:
00817> [Iaper= 4.67 mm] [LGP=40.00 m] [MNP= .250]
00818> Parameters for IMPERVIOUS surfaces in STANDHYD:
00819> [Iaimp= 1.57 mm] [LGI= 1.50] [MNI= .013]
00820> Parameters used in NASHYD:
00821> [Ia= 4.67 mm] [N= 2.00]
00822> 010:0004-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00823> COMPUTE API [APIInl= 20.00: APIkdy= 9000: APIkdt= .9978]
00825> [APImax= 82.54: APIavg= 51.33: APImin= 20.94]
00826> 010:0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00827> READ HYD 09:101-3 69.53 1.944 No\_date 6:50 50.67
00828> \* Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.010
00829> Comment = GRANITE RIDGE AREA 101-3
00830> 010:0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00831> CONTINUOUS STANDHYD01:P1 77.13 7.297 No\_date 6:10 55.85
00832> [XIMP= 45:TIMP= 70]
00833> [LOSS= 2 :CN= 78.0]
00834> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
00835> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=.0]
00836> [IaRECimp= 2.00: IaRECper= 4.00]
00837> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00838> 010:0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00839> \* DIVERT HYD -> 01:P3maj 77.13 7.297 No\_date 6:10 55.85
00840> diverted <= 02:P3BMP1 14.67 1.386 No\_date 6:10 55.85
00841> diverted <= 03:P3STM1 62.49 5.910 No\_date 6:10 55.85
00842> 010:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00843> \* DIVERT HYD -> 02:P3BMP3 14.67 1.386 No\_date 6:10 55.85
00844> diverted <= 04:P3BMP2 4.81 4.60 No\_date 6:10 55.85
00845> diverted <= 05:P3STM2 9.73 9.27 No\_date 6:10 55.85
00846> 010:0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00847> ROUTE RESERVOIR -> 04:P3BMP2 4.81 4.60 No\_date 6:10 55.85
00848> [RDT= 5.00] out<= 02:P3SWM3 1.38 1.01 No\_date 5:55 55.85
00849> overflow <= 08:P3STM3 3.44 444 No\_date 6:10 55.85
00850> {MxStoUsed=.4298E-01, TotOVVol=.1919E+00, N-Ovf= 2, TotDurOvf= 6 hrs
00851> 010:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00852> COMPUTE DUALHYD 03:P3STM1 62.49 5.910 No\_date 6:10 55.85
00853> Major System / 02:P3maj 1.38 1.01 No\_date 5:55 55.85
00854> Minor System \ 02:P3min 62.49 5.910 No\_date 6:10 55.85
00855> {MjSysSto=.0000E+00, TotOVVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00856> 010:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00857> CONTINUOUS NASHYD 07:SWM1 4.50 3.85 No\_date 6:05 45.08
00858> [CN= 82.0: N= 2.00]
00859> [Tp= 25:DT= 5.00]
00860> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00861> [InterEventTime= 12.00]
00862> 010:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00863> ADD HYD 01:P3maj 91.50 7.198 No\_date 6:10 55.85
00864> + 02:P3min 62.49 5.910 No\_date 6:10 55.85
00865> + 05:P3STM2 9.73 9.27 No\_date 6:10 55.85
00866> + 07:SWM1 4.50 3.85 No\_date 6:05 45.08
00867> + 08:P3STM3 3.44 444 No\_date 6:10 55.85
00868> + 09:R101-2 153.37 4.617 No\_date 6:15 52.77
00869> [DT= 5.00] SUM= 10:P3in 149.68 9.171 No\_date 6:10 53.12
00870> 010:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00871> ROUTE RESERVOIR -> 10:P3in 149.68 9.171 No\_date 6:10 53.12
00872> [RDT= 5.00] out<= 02:P3SWM 149.68 4.513 No\_date 7:05 53.12
00873> {MxStoUsed=.2947E+01}
00874> 010:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00875> CONTINUOUS NASHYD 03:CRTRIB 3.69 2.62 No\_date 6:05 38.93
00876> [CN= 82.0: N= 2.00]
00877> [Tp= 25:DT= 5.00]
00878> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00879> [InterEventTime= 12.00]
00880> 010:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00881> ADD HYD 02:P3SWM 149.68 4.513 No\_date 7:05 53.12
00882> + 03:CRTRIB 3.69 2.62 No\_date 6:05 38.93
00883> [DT= 5.00] SUM= 06:102-1 153.37 4.617 No\_date 6:15 52.77
00884> 010:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00885> CONTINUOUS STANDHYD01:P3 91.68 7.198 No\_date 6:10 49.77
00886> [XIMP= 34:TIMP= 43]
00887> [LOSS= 2 :CN= 78.0]
00888> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
00889> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=.0]
00890> [IaRECimp= 2.00: IaRECper= 4.00]
00891> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00892> 010:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00893> \* DIVERT HYD -> 02:P3BMP1 23.84 1.871 No\_date 6:10 49.77
00894> diverted <= 03:P3STM1 70.98 5.571 No\_date 6:10 49.77
00895> diverted <= 04:P3BMP2 23.84 1.871 No\_date 6:10 49.77
00896> 010:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00897> \* DIVERT HYD -> 02:P3BMP1 23.84 1.871 No\_date 6:10 49.77
00898> diverted <= 03:P3STM1 70.98 5.571 No\_date 6:10 49.77
00899> diverted <= 05:P3STM2 15.81 1.251 No\_date 6:10 49.77
00900> 010:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00901> ROUTE RESERVOIR -> 04:P3BMP2 7.85 6.20 No\_date 6:10 49.77
00902> [RDT= 5.00] out<= 07:P3BMP2 1.70 0.12 No\_date 5:50 49.77
00903> overflow <= 04:P3BMP2 6.16 6.07 No\_date 6:15 49.77
00904> {MxStoUsed=.4657E-01, TotOVVol=.3065E+00, N-Ovf= 3, TotDurOvf= 7 hrs
00905> 010:0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00906> COMPUTE DUALHYD 03:P3STM1 70.98 5.571 No\_date 6:10 49.77
00907> Major System / 01:P3maj 1.00 0.00 No\_date 0:00 0.00
00908> Minor System \ 02:P3min 70.98 5.200 No\_date 6:05 49.86
00909> {MjSysSto=.2582E+03, TotOVVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00910> 010:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00911> CONTINUOUS NASHYD 07:SWM3 2.60 1.84 No\_date 6:05 38.93
00912> [CN= 82.0: N= 2.00]
00913> [Tp= 25:DT= 5.00]
00914> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00915> [InterEventTime= 12.00]
00916> 010:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00917> ADD HYD 01:P3maj 91.50 7.198 No\_date 6:10 49.77
00918> + 02:P3min 70.98 5.200 No\_date 6:05 49.86
00919> + 05:P3STM2 15.81 1.251 No\_date 6:10 49.77
00920> + 07:SWM3 2.60 1.84 No\_date 6:05 38.93
00921> + 08:P3STM3 6.16 6.07 No\_date 6:15 49.77
00922> [DT= 5.00] SUM= 10:P3in 95.54 7.226 No\_date 6:15 49.54
00923> 010:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00924> ROUTE RESERVOIR -> 10:P3in 95.54 7.226 No\_date 6:15 49.54
00925> [RDT= 5.00] out<= 02:P3SWM 95.54 1.724 No\_date 7:35 49.54
00926> overflow <= 03:P3OVF .00 0.00 No\_date 0:00 0.00
00927> {MxStoUsed=.2883E+01, TotOVVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00928> 010:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00929> ADD HYD 02:P3SWM 95.54 1.724 No\_date 7:35 49.54
00930> + 03:P3OVF .00 0.00 No\_date 0:00 0.00
00931> [DT= 5.00] SUM= 08:B500 95.54 1.724 No\_date 7:35 49.54
00932> 010:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00933> ADD HYD 01:P3maj 91.50 7.198 No\_date 6:10 49.77
00934> + 09:R101-2 153.37 4.617 No\_date 6:55 52.77
00935> [DT= 5.00] SUM= 10:B2054 248.92 6.248 No\_date 7:15 51.53
00936> 010:0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00937> SAVE HYD 10:B2054 248.92 6.248 No\_date 7:15 51.53
00938> {MxStoUsed=.108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2054.010
00939> remark:HEC-RAS Inflow Node 2054 / Station 44751
00940> 010:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00941> CONTINUOUS STANDHYD01:P2 23.14 2.016 No\_date 6:10 53.46
00942> [XIMP= 47:TIMP= 59]
00943> [LOSS= 2 :CN= 80]
00944> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
00945> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=.0]

00946> [IaRECimp= 2.00: IaRECper= 4.00]
00947> [SMIN= 29.88: SMAX=199.22: SK=1.000]
010:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00948> DIVERT HYD -> 01:P2 23.14 2.016 No\_date 6:10 53.46
00949> diverted <= 02:P2BMP1 4.41 3.83 No\_date 6:10 53.46
00950> diverted <= 03:P2STM1 18.76 1.633 No\_date 6:10 53.46
00951>
00952> 010:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00953> DIVERT HYD -> 02:P2BMP1 4.41 3.83 No\_date 6:10 53.46
00954> diverted <= 04:P2BMP2 1.43 1.27 No\_date 6:10 53.46
00955> diverted <= 05:P2STM2 2.89 2.56 No\_date 6:10 53.46
00956> 010:0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00957> ROUTE RESERVOIR -> 04:P2BMP2 1.43 1.27 No\_date 6:10 53.46
00958> [RDT= 5.00] out<= 02:P2BMP1 1.00 0.00 No\_date 0:00 53.46
00959> overflow <= 08:P2STM3 1.01 1.22 No\_date 6:15 53.46
00960> {MxStoUsed=.1270E-01, TotOVVol=.5386E-01, N-Ovf= 2, TotDurOvf= 6 hrs
00961> 010:0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00962> COMPUTE DUALHYD 03:P2STM1 18.76 1.633 No\_date 6:10 53.46
00963> Major System / 01:P2maj 1.00 0.00 No\_date 0:00 53.46
00964> Minor System \ 02:P2min 18.76 1.633 No\_date 6:10 53.46
00965> {MjSysSto=.0000E+00, TotOVVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00966> 010:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00967> CONTINUOUS NASHYD 07:SWM2 .99 0.85 No\_date 6:05 45.08
00968> [CN= 90.0: N= 2.00]
00969> [Tp= 25:DT= 5.00]
00970> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00971> [InterEventTime= 12.00]
00972> 010:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00973> ADD HYD 01:P2maj 18.76 1.633 No\_date 6:10 53.46
00974> + 02:P2min 18.76 1.633 No\_date 6:10 53.46
00975> + 05:P2STM2 2.89 2.56 No\_date 6:10 53.46
00976> + 07:SWM2 .99 0.85 No\_date 6:05 45.08
00977> + 08:P2STM3 1.01 1.22 No\_date 6:15 53.46
00978> [DT= 5.00] SUM= 02:P2in 12.65 2.093 No\_date 6:10 53.11
00979> 010:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00980> ROUTE RESERVOIR -> 10:P2in 23.65 2.093 No\_date 6:10 53.11
00981> [RDT= 5.00] out<= 02:P2out 23.65 6.69 No\_date 7:10 53.11
00982> overflow <= 03:P2OVF .00 0.00 No\_date 0:00 .00
00983> {MxStoUsed=.6545E-00, TotOVVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00984> 010:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00985> ADD HYD 02:P2out 23.65 6.69 No\_date 7:10 53.11
00986> + 03:P2OVF .00 0.00 No\_date 0:00 .00
00987> [DT= 5.00] SUM= 06:PND2 23.65 6.69 No\_date 7:10 53.11
00988> 010:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00989> CONTINUOUS NASHYD 04:CRPP 24.18 1.091 No\_date 6:30 38.93
00990> [CN= 82.0: N= 2.00]
00991> [Tp= 50:DT= 5.00]
00992> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00993> [InterEventTime= 12.00]
00994> 010:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
00995> CONTINUOUS STANDHYD05:28 12.50 9.55 No\_date 6:00 35.23
00996> [XIMP= 38:TIMP= 45]
00997> {Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00998> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 205.:MNP= 100:SCP= .0]
00999> [Impervious area: Iaimp= 1.57:SLPI= 1.00:LGI= 700.:MNI=.013:SCI=.0]
01000> [IaRECimp= 2.00: IaRECper= 4.00]
01001> 010:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01002> ADD HYD 04:CRPP 24.18 1.091 No\_date 6:30 38.93
01003> SAVE HYD + 06:PND2 23.65 6.69 No\_date 7:10 53.11
01004> + 06:PND2 23.65 6.69 No\_date 7:10 53.11
01005> [DT= 5.00] SUM= 07:B2065 60.33 2.148 No\_date 6:25 43.72
01006> 010:0039-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01007> SAVE HYD 07:B2065 60.33 2.148 No\_date 6:25 43.72
01008> {MxStoUsed=.108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2065.010
01009> remark:HEC-RAS Inflow Node 2065 / Station 44548
01010> 010:0040-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01011> CONTINUOUS STANDHYD05:100-1 61.17 2.769 No\_date 6:05 35.23
01012> [XIMP= 38:TIMP= 45]
01013> {Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01014> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 1200.:MNP= 100:SCP= .0]
01015> [Impervious area: Iaimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI=.0]
01016> [IaRECimp= 2.00: IaRECper= 4.00]
01017> 010:0041-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01018> CONTINUOUS NASHYD 06:102-1 39.80 9.07 No\_date 7:15 35.70
01019> [CN= 78.0: N= 2.00]
01020> [Tp= 1.10:DT= 5.00]
01021> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01022> [InterEventTime= 12.00]
01023> 010:0042-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01024> ADD HYD 05:100-1 61.17 2.769 No\_date 6:05 35.23
01025> + 06:102-1 39.80 9.07 No\_date 7:15 35.70
01026> [DT= 5.00] SUM= 10:B3894 100.97 3.201 No\_date 6:10 35.41
01027> 010:0043-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01028> SAVE HYD 100.97 3.201 No\_date 5:50 35.41
01029> \* Name M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B3894.010
01030> remark:HEC-RAS Inflow Node 3894 / Station 43966
01031> \*\* END OF RUN : 10
01032> \*\*\*\*\*
01033>
01034>
01035>
01036>
01037>
01038>
01039>
01040> RUN:COMMANDH
01041> 011:0001-----
01042> START
01043> [TZERO= 0 :0 hrs on 0]
01044> [METOD= 2 (1=imperial, 2=metric output)]
01045> [NFORM= 1]
01046> [NRUN = 11]
01047> 011:0002-----
01048> READ STORM
01049> Comment = storm.001
01050> [SDT=30.00:SDUR= 12.00:PTOT= 77.93]
01051> 011:0003-----
01052> DEFAULT VALUES
01053> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
01054> ICASEdV = 1 (read and print data)
01055> FileTitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE -----
01056> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
01057> Horton's infiltration equation parameters:
01058> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
01059> Parameters for PERVIOUS surfaces in STANDHYD:
01060> [Iaper= 4.67 mm] [LGP=40.00 m] [MNP= .250]
01061> Parameters for IMPERVIOUS surfaces in STANDHYD:
01062> [Iaimp= 1.57 mm] [LGI= 1.50] [MNI= .013]
01063> Parameters used in NASHYD:
01064> [Ia= 4.67 mm] [N= 2.00]
01065> 011:0004-----
01066> COMPUTE API
01067> [APIInl= 20.00: APIkdy= 9000: APIkdt= .9978]
01068> [APImax= 94.94: APIavg= 57.70: APImin= 21.13]
01069> 011:0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01070> READ HYD 09:101-3 69.53 2.449 No\_date 6:50 62.74
01071> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.011
01072> Comment = GRANITE RIDGE AREA 101-3
01073> 011:0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.V.-
01074> CONTINUOUS STANDHYD01:P1 77.13 9.137 No\_date 6:10 68.30
01075> [XIMP= 45:TIMP= 70]
01076> [LOSS= 2 :CN= 78.0]
01077> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01078> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=.0]
01079> [IaRECimp= 2.00: IaRECper= 4.00]
01080> [SMIN= 29.88: SMAX=199.22: SK=1.000]

01081> 011:0007-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01082> \* DIVERT HYD -> 01:P1 77.13 9.137 No.date 6:10 68.30
01083> diverted <= 02:P1BMP1 14.67 1.736 No.date 6:10 68.30
01084> diverted <= 03:P1STM1 62.49 7.401 No.date 6:10 68.30
01085> 011:0008-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01086> \* DIVERT HYD -> 02:P1BMP1 14.67 1.736 No.date 6:10 68.30
01087> diverted <= 04:P1BMP2 4.82 .576 No.date 6:10 68.30
01088> diverted <= 05:P1STM2 9.73 1.160 No.date 6:10 68.30
01089> 011:0009-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01090> ROUTE RESERVOIR -> 04:P1BMP2 4.82 .576 No.date 6:10 68.30
01091> [RDT= 5.00] out<= 07:P1BMP3 1.15 .011 No.date 5:45 68.30
01092> overflow <= 08:P1STM3 3.67 .560 No.date 6:10 68.30
01093> {MxStoUsed= .4298E-01, TotOvfVol= .2507E+00, N-Ovf= 2, TotDurOvf= 7 hrs
011001> 011:0010-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01095> COMPUTE DUALHYD 03:P1STM1 62.49 7.401 No.date 6:10 68.30
01096> Major System / 01:P1maj .00 .000 No.date 0:00 .00
01097> Minor System \ 02:P1min 62.49 7.401 No.date 6:10 68.30
01098> [MjSysSto= .0000E+00, TotOvfVol= .0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01099> 011:0011-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01100> CONTINUOUS NASHYD 07:SWM1 4.50 .490 No.date 6:05 57.45
01101> [CN= 90.0: N= 2.00]
01102> [Tp= .25:DT= 5.00]
01103> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01104> [InterEventTime= 12.00]
01105> 011:0012-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01106> ADD HYD 01:P1maj .00 .000 No.date 0:00 .00
01107> + 02:P1min 62.49 7.401 No.date 6:10 68.30
01108> + 05:P1STM2 9.73 1.160 No.date 6:10 68.30
01109> [IaREC= 2.00: IaRCP= 4.00]
01110> + 07:SWM1 4.50 .490 No.date 6:05 57.45
01111> + 08:P1STM3 3.67 .560 No.date 6:10 68.30
01112> + 09:B101-3 69.53 2.449 No.date 6:50 62.74
01113> [DT= 5.00] SUM= 10:P1in 149.92 11.540 No.date 6:10 65.40
01114> 011:0013-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01115> ROUTE RESERVOIR -> 10:P1in 149.92 11.540 No.date 6:10 65.40
01116> [RDT= 5.00] out<= 02:P1SWM 149.92 4.810 No.date 7:15 65.40
01117> {MxStoUsed= .3523E+01}
01118> 011:0014-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01119> CONTINUOUS NASHYD 01:CRTRIB 3.69 .345 No.date 6:05 50.73
01120> [CN= 82.0: N= 2.00]
01121> [Tp= .25:DT= 5.00]
01122> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01123> [InterEventTime= 12.00]
01124> 011:0015-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01125> ADD HYD 02:P1SWM 149.92 4.810 No.date 7:15 65.40
01126> + 03:CRTRIB 3.69 .345 No.date 6:05 50.73
01127> [DT= 5.00] SUM= 09:B101-2 153.61 4.918 No.date 7:00 65.05
01128> 011:0016-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01129> CONTINUOUS NASHYD 01:P3 91.68 9.594 No.date 6:10 61.83
01130> [LOSS= 2 :CN= 78.0]
01131> [Previous area: Iaper= 5.20:SLPP=1.00:LGP= 40 :MNP= 200:SCP= .0]
01132> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400 :MNI= .013:SCI= .7]
01133> [IaREC= 2.00: IaRCP= 4.00]
01134> [SMIN= 29.88: SMAX=199.22: SK=1.000]
01135> 011:0017-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01136> \* DIVERT HYD -> 01:P3 91.68 9.594 No.date 6:10 61.83
01137> diverted <= 02:P3BMP1 23.84 2.494 No.date 6:10 61.83
01138> diverted <= 03:P3BMP2 70.87 7.426 No.date 6:10 61.83
01139> 011:0018-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01140> \* DIVERT HYD -> 02:P3BMP1 23.84 2.494 No.date 6:10 61.83
01141> diverted <= 04:P3BMP2 7.86 .826 No.date 6:10 61.83
01142> diverted <= 05:P3STM2 15.84 1.668 No.date 6:10 61.83
01143> 011:0019-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01144> ROUTE RESERVOIR -> 04:P3BMP2 7.86 .826 No.date 6:10 61.83
01145> [RDT= 5.00] out<= 07:P3BMP3 1.39 .012 No.date 5:40 61.83
01146> overflow <= 08:P3STM3 6.48 .804 No.date 6:15 61.83
01147> {MxStoUsed= .4656E-01, TotOvfVol= .4005E+00, N-Ovf= 2, TotDurOvf= 7 hrs
01148> [Impervious area: Iaper= 5.20:SLPP=1.00:LGP= 40 :MNP= 200:SCP= .0]
01149> COMPUTE DUALHYD 03:P3STM1 70.97 7.426 No.date 6:10 61.83
01150> Major System / 01:P3maj .00 .000 No.date 0:00 .00
01151> Minor System \ 02:P3min 70.97 7.426 No.date 5:55 62.28
01152> [MjSysSto= .3052E+04, TotOvfVol= .0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01153> 011:0020-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01154> CONTINUOUS NASHYD 07:SWM3 2.60 .243 No.date 6:05 50.73
01155> [CN= 82.0: N= 2.00]
01156> [Tp= .25:DT= 5.00]
01157> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01158> [InterEventTime= 12.00]
01159> 011:0022-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01160> ADD HYD 01:P3maj .00 .000 No.date 0:00 .00
01161> + 02:P3min 70.97 7.426 No.date 5:55 62.28
01162> + 05:P3STM2 15.84 1.668 No.date 6:10 61.83
01163> + 06:P3SWM1 82.38 1.750 No.date 6:45 61.86
01164> + 08:P3STM3 6.48 .804 No.date 6:15 61.83
01165> [DT= 5.00] SUM= 10:P3in 95.89 7.908 No.date 6:10 61.86
01166> 011:0023-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01167> ROUTE RESERVOIR -> 10:P3in 95.89 7.908 No.date 6:10 61.86
01168> [RDT= 5.00] out<= 02:P3BMP1 82.38 1.750 No.date 6:45 61.86
01169> overflow <= 03:P3OVF 13.51 5.003 No.date 6:45 61.86
01170> {MxStoUsed= .2903E+01, TotOvfVol= .8360E+00, N-Ovf= 2, TotDurOvf= 1 hrs
01171> 011:0024-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01172> ADD HYD 02:P3SWM 82.38 1.750 No.date 6:45 61.86
01173> + 07:P3OVF 13.51 5.003 No.date 6:45 61.86
01174> [DT= 5.00] SUM= 08:B500 95.89 6.753 No.date 6:45 61.86
01175> 011:0025-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01176> ADD HYD 08:B500 95.89 6.753 No.date 6:45 61.86
01177> + 09:B101-2 153.61 4.918 No.date 7:00 65.05
01178> [DT= 5.00] SUM= 10:B2054 249.51 11.650 No.date 6:45 63.82
01179> 011:0026-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01180> SAVE HYD 10:B2054 249.51 11.650 No.date 6:45 63.82
01181> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2054.011
01182> remark:HEC-RAS Inflow Node 2054 / Station 44751
01183> 011:0027-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01184> CONTINUOUS STANDHYD01:P2 23.14 2.620 No.date 6:10 65.73
01185> [XIMP= 47:TIMP= 59]
01186> [LOSS= 2 :CN= 78.0]
01187> [Previous area: Iaper= 5.20:SLPP=1.00:LGP= 40 :MNP= 200:SCP= .0]
01188> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400 :MNI= .013:SCI= .7]
01189> [IaREC= 2.00: IaRCP= 4.00]
01190> [SMIN= 29.88: SMAX=199.22: SK=1.000]
01191> 011:0028-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01192> DIVERT HYD -> 01:P2 23.14 2.620 No.date 6:10 65.73
01193> diverted <= 02:P1BMP1 14.66 1.932 No.date 6:05 75.19
01194> diverted <= 03:P1STM1 62.49 8.236 No.date 6:05 75.19
01195> 011:0029-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01196> DIVERT HYD -> 02:P1BMP1 4.41 .498 No.date 6:10 65.73
01197> diverted <= 04:P1BMP2 4.82 .641 No.date 6:05 75.19
01198> diverted <= 05:P1STM2 9.74 1.291 No.date 6:05 75.19
01199> 011:0030-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
02000> ROUTE RESERVOIR -> 04:P1BMP2 4.82 .641 No.date 6:05 75.19
02001> [RDT= 5.00] out<= 07:P1BMP3 1.05 .011 No.date 5:40 75.19
02002> overflow <= 08:P1STM3 3.77 .625 No.date 6:10 75.19
02003> {MxStoUsed= .4296E-01, TotOvfVol= .2832E+00, N-Ovf= 2, TotDurOvf= 7 hrs
02004> 011:0031-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
02005> COMPUTE DUALHYD 03:P1STM1 62.49 8.236 No.date 6:05 75.19
02006> Major System / 01:P1maj .00 .000 No.date 0:00 .00
02007> Minor System \ 02:P1min 62.49 7.710 No.date 6:00 75.30
02008> [MjSysSto= .2999E+03, TotOvfVol= .0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
02009> 011:0032-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
02100> CONTINUOUS NASHYD 07:SWM2 .99 .108 No.date 6:05 57.44
02101> [CN= 90.0: N= 2.00]
02102> [Tp= .25:DT= 5.00]
02103> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
02104> [InterEventTime= 12.00]
02105> 011:0033-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-

021216> ADD HYD 01:P2maj .00 .000 No.date 0:00 .00
021217> + 02:P2min 18.76 1.790 No.date 6:00 66.56
021218> + 05:P2STM2 2.89 .330 No.date 6:10 65.73
021219> + 07:SWM2 .99 .108 No.date 6:05 57.44
021220> + 08:P2STM3 1.08 .159 No.date 6:10 65.73
021221> [DT= 5.00] SUM= 10:P2in 23.72 2.383 No.date 6:10 66.04
021222> 011:0034-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021223> ROUTE RESERVOIR -> 10:P2in 23.72 2.383 No.date 6:10 66.04
021224> [RDT= 5.00] out<= 02:P2out 21.06 .700 No.date 6:30 66.04
021225> overflow <= 03:P2OVF 2.66 1.534 No.date 6:30 66.04
021226> {MxStoUsed= .6741E+00, TotOvfVol= .1758E+00, N-Ovf= 3, TotDurOvf= 1 hrs
021227> 011:0035-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021228> ADD HYD 01:P2min 18.76 1.790 No.date 6:00 66.04
021229> + 03:P2OVF 2.66 1.534 No.date 6:30 66.04
021230> [DT= 5.00] SUM= 06:PND2 23.72 2.234 No.date 6:30 66.04
021231> 011:0036-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021232> CONTINUOUS NASHYD 04:CRFP 24.18 1.434 No.date 6:30 50.73
021233> [CN= 82.0: N= 2.00]
021234> [Tp= .50:DT= 5.00]
021235> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
021236> [InterEventTime= 12.00]
021237> 011:0037-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021238> CONTINUOUS STANDHYD05:28 12.50 1.331 No.date 6:00 45.43
021239> [XIMP= 38:TIMP= 45]
021240> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
021241> [Previous area: Iaper= 4.67:SLPP=1.00:LGP= 205 :MNP= 100:SCP= .0]
021242> [Impervious area: IAimp= 1.57:SLPI= 1.00:LGI= 700 :MNI= .013:SCI= .0]
021243> [IaREC= 2.00: IaRCP= 4.00]
021244> 011:0038-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021245> ADD HYD 04:CRFP 24.18 1.434 No.date 6:30 50.73
021246> + 05:28 12.50 1.331 No.date 6:00 45.43
021247> [DT= 5.00] SUM= 06:PND2 23.72 2.234 No.date 6:30 66.04
021248> 011:0039-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021249> SAVE HYD 07:B2065 60.40 4.345 No.date 6:30 55.65
021250> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2065.011
021251> remark:HEC-RAS Inflow Node 2065 / Station 44548
021252> 011:0040-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021253> CONTINUOUS STANDHYD05:100-1 61.17 3.498 No.date 6:05 45.43
021254> [XIMP= 38:TIMP= 45]
021255> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
021256> [Previous area: Iaper= 4.67:SLPP= .80:LGP=1200 :MNP= 100:SCP= .0]
021257> [Impervious area: IAimp= 1.57:SLPI= .80:LGI=1700 :MNI= .013:SCI= .0]
021258> [IaREC= 2.00: IaRCP= 4.00]
021259> 011:0041-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021260> CONTINUOUS NASHYD 06:102-1 39.80 1.210 No.date 7:15 47.07
021261> [CN= 78.0: N= 2.00]
021262> [Tp= 1.10:DT= 5.00]
021263> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
021264> [InterEventTime= 12.00]
021265> 011:0042-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021266> ADD HYD 05:100-1 61.17 3.498 No.date 6:05 45.43
021267> + 03:102-1 39.80 1.210 No.date 7:15 47.07
021268> [DT= 5.00] SUM= 10:B3894 100.97 4.128 No.date 6:10 46.08
021269> 011:0043-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021270> SAVE HYD 10:B3894 100.97 4.128 No.date 6:10 46.08
021271> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B3894.011
021272> remark:HEC-RAS Inflow Node 3894 / Station 43966
021273> \*\* END OF RUN : 11
021274>
021275>
021276> \*\*\*\*\*
021277>
021278>
021279>
021280>
021281>
021282> RUN:COMMANDH
021283> 012:0001-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021284> START
021285> [TZERO = .00 hrs on 0]
021286> [METOUT= 2 (1=imperial, 2=metric output)]
021287> [INSTORM= 1 ]
021288> [ARUN = 12 ]
021289> 012:0002-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021290> READ STORM
021291> Filename = storm.001
021292> Comment =
021293> [SET=30:SDUR= 12.00:PTOT= 84.94]
021294> 012:0003-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
021295> DEFAULT VALUES
021296> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
021297> ICASEdv = 1 (read and print data)
021298> FileTitle=
021299> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 ----
03000> Horton's infiltration equation parameters:
03001> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
03002> Parameters for Pervious surfaces in STANDHYD:
03003> [Iaper= 4.67 mm] [LGP=40.00 m] [MNP= .250]
03004> Parameters for Impervious surfaces in STANDHYD:
03005> [IAimp= 1.57 mm] [CLI= 1.50] [MNI= .013]
03006> Parameters used in NASHYD:
03007> [Ia= 4.67 mm] [N= 2.00]
03008> 012:0004-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
03100> COMPUTE API
03101> [APIini= 20.00: APIkdy= .9000: APIkdt= .9978]
03102> [APImax=101.76: APIavg= 61.20: APImin= 21.23]
03103> 012:0005-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
03104> READ HYD 03:101-3 69.53 2.721 No.date 6:50 69.46
03105> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.012
03106> Comment = GRANITE RIDGE AREA 101-3
03107> 012:0006-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
03108> CONTINUOUS STANDHYD01:P1 77.13 10.168 No.date 6:05 75.19
03109> [XIMP= 45:TIMP= 70]
03110> [LOSS= 2 :CN= 78.0]
03111> [Previous area: Iaper= 5.20:SLPP=1.00:LGP= 40 :MNP= 200:SCP= .0]
03112> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400 :MNI= .013:SCI= .0]
03113> [IaREC= 2.00: IaRCP= 4.00]
03114> [SMIN= 29.88: SMAX=199.22: SK=1.000]
03115> 012:0007-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
03125> \* DIVERT HYD -> 01:P1 77.13 10.168 No.date 6:05 75.19
03126> diverted <= 02:P1BMP1 14.66 1.932 No.date 6:05 75.19
03127> diverted <= 03:P1STM1 62.49 8.236 No.date 6:05 75.19
03128> 012:0008-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
03129> \* DIVERT HYD -> 02:P1BMP1 4.41 .498 No.date 6:10 65.73
03130> diverted <= 04:P1BMP2 4.82 .641 No.date 6:05 75.19
03131> diverted <= 05:P1STM2 9.74 1.291 No.date 6:05 75.19
03132> 012:0009-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
03133> ROUTE RESERVOIR -> 04:P1BMP2 4.82 .641 No.date 6:05 75.19
03134> [RDT= 5.00] out<= 07:P1BMP3 1.05 .011 No.date 5:40 75.19
03135> overflow <= 08:P1STM3 3.77 .625 No.date 6:10 75.19
03136> {MxStoUsed= .4296E-01, TotOvfVol= .2832E+00, N-Ovf= 2, TotDurOvf= 7 hrs
03137> 012:0010-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
03138> COMPUTE DUALHYD 03:P1STM1 62.49 8.236 No.date 6:05 75.19
03139> Major System / 01:P1maj .00 .000 No.date 0:00 .00
03140> Minor System \ 02:P1min 62.49 7.710 No.date 6:00 75.30
03141> [MjSysSto= .2999E+03, TotOvfVol= .0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
03142> 012:0011-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
03143> CONTINUOUS NASHYD 07:SWM1 4.50 .547 No.date 6:05 64.29
03144> [CN= 90.0: N= 2.00]
03145> [Tp= .25:DT= 5.00]
03146> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
03147> [InterEventTime= 12.00]
03148> 012:0012-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
03149> ADD HYD 01:P1maj .00 .000 No.date 0:00 .00
03150> + 02:P1min 62.49 7.710 No.date 6:00 75.30

01351> + 05:P1STM2 9.74 1.291 No\_date 6:05 75.19
01352> + 07:SWM1 4.50 .547 No\_date 6:05 64.29
01353> + 08:P1STM3 3.77 .625 No\_date 6:10 75.19
01354> + 09:I01-3 69.53 2.721 No\_date 6:50 69.46
01355> [DT= 5.00] SUM= 10:P1in 150.02 12.316 No\_date 6:10 72.25
01356> 012:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01357> ROUTE RESERVOIR -> 10:P1in 150.02 12.316 No\_date 6:10 72.25
01358> [RDT= 5.00] out<- 02:P1SWM 150.02 4.999 No\_date 7:15 72.25
01359> {MxStoUsed= .3929E+01}
01360> 012:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01361> CONTINUOUS NASHYD 03:CRTRIB 3.69 .391 No\_date 6:05 57.33
01362> [CN= 82.0: N= 2.00]
01363> [TP= .25:DT= 5.00]
01364> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01365> [InterEventTime= 12.00]
01366> 012:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01367> ADD HYD + 02:P1SWM 150.02 4.999 No\_date 7:15 72.25
01368> + 03:CRTRIB 3.69 .391 No\_date 6:05 57.33
01369> [DT= 5.00] SUM= 09:I01-2 153.71 5.113 No\_date 7:00 71.89
01370> 012:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01371> CONTINUOUS STANDHYD01:P3 91.68 10.651 No\_date 6:10 68.54
01372> [XIMP= 34:TIMP= 43]
01373> [LOSS= 2 :CN= 78.0]
01374> [Previous area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01375> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01376> [IaRECimp= 2.00: IaRCper= 4.00]
01377> [SMIN= 29.88: SMAX=199.22: SK=1.000]
01378> 012:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01379> \* DIVERG HYD -> 01:P3 91.68 10.651 No\_date 6:10 68.54
01380> diverted <= 02:P3BMP1 23.84 2.769 No\_date 6:10 68.54
01381> diverted <= 03:P3STM1 70.97 8.244 No\_date 6:10 68.54
01382> 012:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01383> \* DIVERG HYD -> 04:P3BMP2 7.87 .917 No\_date 6:10 68.54
01384> diverted <= 04:P3BMP2 7.87 .917 No\_date 6:10 68.54
01385> diverted <= 05:P3STM2 15.85 1.852 No\_date 6:10 68.54
01386> 012:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01387> ROUTE RESERVOIR -> 04:P3BMP2 7.87 .917 No\_date 6:10 68.54
01388> [RDT= 5.00] out<- 02:P3BMP3 1.27 .012 No\_date 6:25 68.54
01389> overflow <= 08:P3STM3 6.60 .904 No\_date 6:10 68.54
01390> {MxStoUsed= .4658E-01, TotOfVol= .4255E+00, N-Ovf= 2, TotDurOvf= 7.hrs
01391> 012:0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01392> COMPUTE DUALHYD 03:P3STM1 70.97 8.244 No\_date 6:10 68.54
01393> Major System / 01:P2maj 1.81 1.174 No\_date 6:25 68.54
01394> Minor System \ 02:P3min 70.16 5.200 No\_date 5:55 69.10
01395> [MjSysSto= .4250E+04, TotOfVol= .5554E+03, N-Ovf= 1, TotDurOvf= 0.hrs
01396> 012:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01397> CONTINUOUS NASHYD 07:SWM1 2.60 .276 No\_date 6:05 57.33
01398> [CN= 82.0: N= 2.00]
01399> [TP= .25:DT= 5.00]
01400> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01401> [InterEventTime= 12.00]
01402> 012:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01403> ADD HYD + 01:P1 1.174 No\_date 6:25 68.54
01404> + 02:P3min 70.16 5.200 No\_date 5:55 69.10
01405> + 05:P3STM2 15.85 1.852 No\_date 6:10 68.54
01406> + 07:SWM3 2.60 .276 No\_date 6:05 57.33
01407> + 08:P3STM3 6.60 .904 No\_date 6:10 68.54
01408> [DT= 5.00] SUM= 08:P3STM3 6.60 .904 No\_date 6:10 68.54
01409> 012:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01410> ROUTE RESERVOIR -> 10:P3in 96.03 8.761 No\_date 6:25 68.65
01411> [RDT= 5.00] out<- 02:P3SWM 76.75 1.750 No\_date 6:35 68.65
01412> overflow <= 03:P3OVF 19.28 5.826 No\_date 6:35 68.65
01413> {MxStoUsed= .2904E+01, TotOfVol= .1333E+01, N-Ovf= 2, TotDurOvf= 1.hrs
01414> 012:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01415> ADD HYD + 02:P3SWM 76.75 1.750 No\_date 6:35 68.65
01416> + 03:P3OVF 19.28 5.826 No\_date 6:35 68.65
01417> [DT= 5.00] SUM= 08:B500 96.03 7.576 No\_date 6:35 68.65
01418> 012:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01419> ADD HYD + 08:B500 96.03 7.576 No\_date 6:35 68.65
01420> + 09:I01-2 153.71 5.113 No\_date 7:00 71.89
01421> [DT= 5.00] SUM= 10:B2054 249.74 12.629 No\_date 6:35 70.64
01422> 012:0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01423> SAVE HYD + 01:P2maj 1.81 1.174 No\_date 6:25 68.54
01424> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2054.012
01425> remark:HEC-RAS Inflow Node 2054 / Station 44751
01426> 012:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01427> CONTINUOUS STANDHYD01:P2 23.14 2.926 No\_date 6:05 72.54
01428> [XIMP= 47:TIMP= 50]
01429> [LOSS= 2 :CN= 78.0]
01430> [Previous area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01431> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01432> [IaRECimp= 2.00: IaRCper= 4.00]
01433> [SMIN= 29.88: SMAX=199.22: SK=1.000]
01434> 012:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01435> DIVERG HYD -> 01:P2 23.14 2.926 No\_date 6:05 72.54
01436> diverted <= 02:P1BMP1 4.41 .556 No\_date 6:05 72.54
01437> diverted <= 03:P2STM1 18.76 2.370 No\_date 6:05 72.54
01438> 012:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01439> DIVERG HYD -> 02:P2BMP1 4.41 .556 No\_date 6:05 72.54
01440> diverted <= 04:P2STM2 1.43 .184 No\_date 6:05 72.54
01441> diverted <= 05:P2STM2 2.89 .371 No\_date 6:05 72.54
01442> 012:0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01443> ROUTE RESERVOIR -> 04:P2BMP2 1.43 .184 No\_date 6:05 72.54
01444> [RDT= 5.00] out<- 07:P2BMP3 3.32 .003 No\_date 5:45 72.54
01445> overflow <= 08:P2STM3 1.11 .179 No\_date 6:10 72.54
01446> {MxStoUsed= .1270E-01, TotOfVol= .8066E-01, N-Ovf= 1, TotDurOvf= 7.hrs
01447> 012:0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01448> COMPUTE DUALHYD 03:P2STM1 18.76 2.370 No\_date 6:05 72.54
01449> Major System / 01:P2maj .00 .000 No\_date 0:00 .00
01450> Minor System \ 01:P2min 18.76 1.790 No\_date 5:55 73.43
01451> [MjSysSto= .6598E+03, TotOfVol= .0000E+00, N-Ovf= 0, TotDurOvf= 0.hrs
01452> 012:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01453> CONTINUOUS NASHYD 07:SWM2 .99 .120 No\_date 6:05 64.29
01454> [CN= 90.0: N= 2.00]
01455> [TP= .25:DT= 5.00]
01456> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01457> [InterEventTime= 12.00]
01458> 012:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01459> ADD HYD + 01:P2maj .00 .000 No\_date 0:00 .00
01460> + 02:P2min 18.76 1.790 No\_date 5:55 73.43
01461> + 05:P2STM2 2.89 .371 No\_date 6:05 72.54
01462> + 07:SWM2 .99 .120 No\_date 6:05 64.29
01463> + 08:P2STM3 1.11 1.179 No\_date 6:10 72.54
01464> [DT= 5.00] SUM= 10:P2in 23.75 2.457 No\_date 6:05 72.90
01465> 012:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01466> ROUTE RESERVOIR -> 10:P2in 23.75 2.457 No\_date 6:05 72.90
01467> [RDT= 5.00] out<- 02:P2out 19.82 .700 No\_date 6:25 72.90
01468> [RDT= 5.00] out<- 07:P2OVF 3.93 3.166 No\_date 6:25 72.90
01469> {MxStoUsed= .6745E+00, TotOfVol= .2866E+00, N-Ovf= 2, TotDurOvf= 1.hrs
01470> 012:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01471> ADD HYD + 02:P2out 19.82 .700 No\_date 6:25 72.90
01472> + 03:P2OVF 3.93 3.166 No\_date 6:25 72.90
01473> [DT= 5.00] SUM= 09:I01-2 23.75 2.457 No\_date 6:05 72.90
01474> 012:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01475> CONTINUOUS NASHYD 04:CRFP 24.18 1.623 No\_date 6:30 57.33
01476> [CN= 82.0: N= 2.00]
01477> [TP= .50:DT= 5.00]
01478> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01479> [InterEventTime= 12.00]
01480> 012:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01481> CONTINUOUS STANDHYD05:28 12.50 1.510 No\_date 6:00 50.97
01482> [XIMP= 38:TIMP= 45]
01483> [Horton parameters: F= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01484> [Previous area: Iaper= 4.67:SLPP=1.00:LGP= 205.:MNP= 100:SCP= .0]
01485> [Impervious area: IAimp= 1.57:SLPI= 1.00:LGI= 700.:MNI=.013:SCI= .0]

01486> [IaRECimp= 2.00: IaRCper= 4.00]
01487> 012:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01488> ADD HYD + 05:28 24.18 1.623 No\_date 6:30 57.33
01489> + 05:28 12.50 1.510 No\_date 6:00 50.97
01490> + 06:PND2 23.75 2.316 No\_date 6:25 72.90
01491> [DT= 5.00] SUM= 07:B2065 60.43 4.810 No\_date 6:25 62.13
01492> 012:0039-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01493> SAVE HYD 07:B2065 60.43 4.810 No\_date 6:25 62.13
01494> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2065.012
01495> remark:HEC-RAS Inflow Node 2065 / Station 44548
01496> 012:0040-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01497> CONTINUOUS STANDHYD05:100-1 61.17 4.021 No\_date 6:05 50.97
01498> [XIMP= 38:TIMP= 45]
01499> [Horton parameters: F= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01500> [Previous area: Iaper= 4.67:SLPP= .80:LGP=1200.:MNP=100:SCP= .0]
01501> [Impervious area: IAimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI= .0]
01502> [IaRECimp= 2.00: IaRCper= 4.00]
01503> 012:0041-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01504> CONTINUOUS NASHYD 06:102-1 39.80 1.380 No\_date 7:15 53.48
01505> [CN= 78.0: N= 2.00]
01506> [TP= 1.10:DT= 5.00]
01507> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01508> [InterEventTime= 12.00]
01509> 012:0042-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01510> ADD HYD + 05:100-1 61.17 4.021 No\_date 6:05 50.97
01511> + 06:102-1 39.80 1.380 No\_date 7:15 53.48
01512> [DT= 5.00] SUM= 10:B3894 100.97 4.669 No\_date 6:05 51.96
01513> 012:0043-----ID:NHYD-----AREA-----OPEAK-TpeakDate\_hh:mm-----R.-V.-
01514> SAVE HYD 10:B3894 100.97 4.669 No\_date 6:05 51.96
01515> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B3894.012
01516> remark:HEC-RAS Inflow Node 3894 / Station 43966
01517> \*\*\* END OF RUN : 12
01518> \*\*\*\*\*
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01618> \*\*\*\*\*
01619> \*\*\*\*\*
01620> \*\*\*\*\*



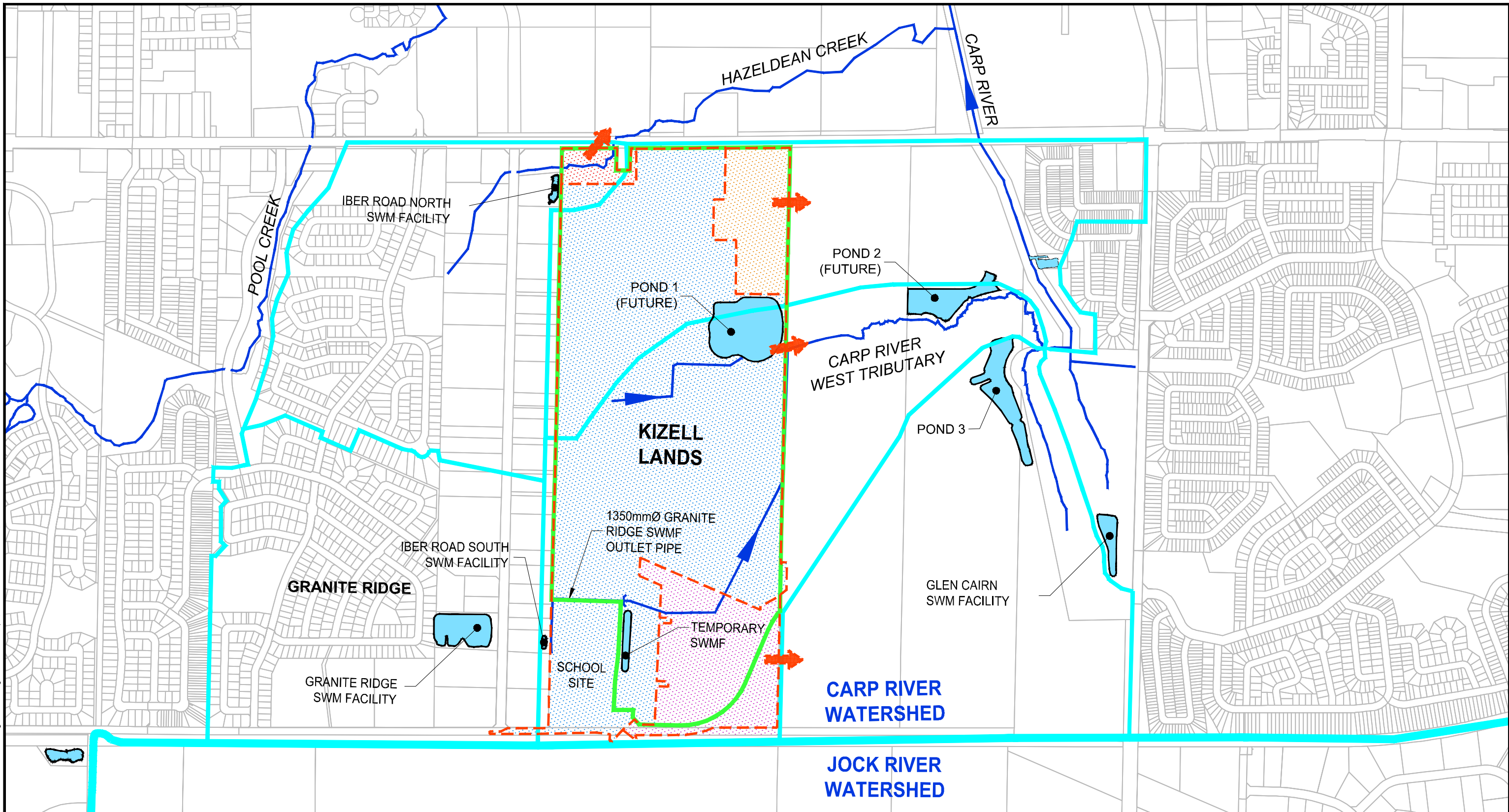
01621> 013:0017-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01622> \* DIVERT HYD -> 01:P3 91.68 12.170 No\_date 6:05 77.19
01623> diverted <= 02:P3BMP1 23.84 3.164 No\_date 6:05 77.19
01624> diverted <= 03:P3STM1 70.97 9.420 No\_date 6:05 77.19
01625> 013:0018-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01626> \* DIVERT HYD -> 02:P3BMP1 23.84 3.164 No\_date 6:05 77.19
01627> diverted <= 04:P3BMP2 7.87 1.048 No\_date 6:05 77.19
01628> diverted <= 05:P3STM2 15.87 2.116 No\_date 6:05 77.19
01629> 013:0019-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01630> ROUTE RESERVOIR -> 04:P3BMP2 7.87 1.048 No\_date 6:05 77.19
01631> [RDT= 5.00] out<- 07:P3BMP3 1.14 .012 No\_date 5:20 77.19
01632> overflow <= 08:P3STM3 6.73 1.037 No\_date 6:10 77.19
01633> [MxStoUsed=.4658E+01, TotOvVol=.5199E+00, N-Ovf= 1, TotDurOvf= 1 hrs
01634> 013:0020-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01635> COMPUTE DUALHYD 03:P3STM1 70.97 9.420 No\_date 6:05 77.19
01636> Major System / 01:P3maj 4.37 3.595 No\_date 6:15 77.19
01637> Minor System / 02:P3min 66.60 5.200 No\_date 5:50 77.97
01638> [MjSysStor=.4250E+04, TotOvVol=.3376E+04, N-Ovf= 1, TotDurOvf= 1 hrs
01639> 013:0021-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01640> CONTINUOUS NASHYD 07:SWM3 2.60 .317 No\_date 6:05 65.86
01641> [CN= 82.0: N= 2.00]
01642> [Tp= .25:DT= 5.00]
01643> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01644> [InterEventTime= 12.00]
01645> 013:0022-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01646> ADD HYD 01:P3maj 4.37 3.595 No\_date 6:15 77.19
01647> + 02:P3min 66.60 5.200 No\_date 5:50 77.97
01648> + 03:P3STM2 15.87 2.116 No\_date 6:05 77.19
01649> + 07:SWM3 2.60 .317 No\_date 6:05 65.86
01650> + 08:P3STM3 6.73 1.037 No\_date 6:10 77.19
01651> [DT= 5.00] SUM= 10:P3in 96.17 12.063 No\_date 6:15 77.42
01652> 013:0023-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01653> ROUTE RESERVOIR -> 02:P3SNW 96.17 12.063 No\_date 6:15 77.42
01654> [RDT= 5.00] out<- 02:P3SNW 70.69 1.750 No\_date 6:25 77.42
01655> overflow <= 03:P3OVF 25.48 8.724 No\_date 6:25 77.42
01656> [MxStoUsed=.2904E+01, TotOvVol=.1973E+01, N-Ovf= 2, TotDurOvf= 1 hrs
01657> 013:0024-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01658> ADD HYD 70.69 1.750 No\_date 6:25 77.42
01659> + 03:P3OVF 25.48 8.724 No\_date 6:25 77.42
01660> [DT= 5.00] SUM= 08:B500 96.17 10.474 No\_date 6:25 77.42
01661> 013:0025-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01662> ADD HYD 08:B500 96.17 10.474 No\_date 6:25 77.42
01663> + 02:P22 153.81 2 5.729 No\_date 6:05 81.29
01664> [DT= 5.00] SUM= 10:B2054 249.99 15.617 No\_date 6:25 79.43
01665> 013:0026-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01666> SAVE HYD 10:B2054 249.99 15.617 No\_date 6:25 79.43
01667> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWHYMO\H-B2054.013
01668> remark:HEC-RAS Inflow Node 2054 / Station 44543
01669> 013:0027-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01670> CONTINUOUS STANDHYD01:P2 23.14 3.329 No\_date 6:05 81.29
01671> [XIMP=.47:TIMP=.59]
01672> [LOSS= 2:CN= 78.0]
01673> [Pervious area: Iaper= 5.20:SLP=1.00:LGP=.40:.MNP=.200:SCP=.0]
01674> [Impervious area: Iaimp= 1.57:SLP=.50:LGI=1400:.MNI=.013:SCI=.0]
01675> [IaRECimp= 2.00: IaRECper= 4.00]
01676> [SMIN= 29.88: SMAX=199.22: SK=1.000]
01677> 013:0028-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01678> DIVERT HYD -> 01:P2 23.14 3.329 No\_date 6:05 81.29
01679> diverted <= 02:P2BMP1 4.41 .633 No\_date 6:05 81.29
01680> diverted <= 03:P2STM1 18.76 2.697 No\_date 6:05 81.29
01681> 013:0029-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01682> DIVERT HYD -> 02:P2BMP1 4.41 .633 No\_date 6:05 81.29
01683> diverted <= 04:P2BMP2 1.44 .210 No\_date 6:05 81.29
01684> diverted <= 05:P2STM2 2.90 .423 No\_date 6:05 81.29
01685> 013:0030-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01686> ROUTE RESERVOIR -> 04:P2BMP2 1.44 .210 No\_date 6:05 81.29
01687> [RDT= 5.00] out<- 07:P2BMP3 .29 .003 No\_date 5:35 81.29
01688> overflow <= 08:P2STM3 1.15 .205 No\_date 6:10 81.29
01689> [MxStoUsed=.1270E-01, TotOvVol=.9309E-01, N-Ovf= 2, TotDurOvf= 7 hrs
01690> 013:0031-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01691> COMPUTE DUALHYD 03:P2STM1 18.76 2.697 No\_date 6:05 81.29
01692> Major System / 01:P2maj .08 .132 No\_date 6:25 81.29
01693> Minor System / 02:P2min 18.67 1.790 No\_date 6:20 82.22
01694> [MjSysStor=.1157E+04, TotOvVol=.6610E+02, N-Ovf= 1, TotDurOvf= 0.8hrs
01695> 013:0032-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01696> CONTINUOUS NASHYD 07:SWM2 .99 .136 No\_date 6:05 73.10
01697> [CN= 90.0: N= 2.00]
01698> [Tp= .25:DT= 5.00]
01699> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01700> [InterEventTime= 12.00]
01701> 013:0033-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01702> ADD HYD 01:P2maj .08 .132 No\_date 6:25 81.29
01703> + 02:P2min 18.67 1.790 No\_date 6:20 82.22
01704> + 05:P2STM2 2.90 .423 No\_date 6:05 81.29
01705> + 07:SWM2 .99 .136 No\_date 6:05 73.10
01706> + 08:P2STM3 1.15 .205 No\_date 6:10 81.29
01707> [DT= 5.00] SUM= 10:P2in 23.79 2.550 No\_date 6:05 82.22
01708> 013:0034-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01709> ROUTE RESERVOIR -> 10:P2in 23.79 2.550 No\_date 6:05 82.22
01710> [RDT= 5.00] out<- 02:P2out 18.22 .700 No\_date 6:20 82.22
01711> overflow <= 03:P2OVF 5.57 1.793 No\_date 6:20 82.22
01712> [MxStoUsed=.6656E+00, TotOvVol=.4581E+00, N-Ovf= 1, TotDurOvf= 1 hrs
01713> 013:0035-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01714> ADD HYD 18.22 .700 No\_date 6:20 82.22
01715> + 03:P2OVF 5.57 1.793 No\_date 6:20 82.22
01716> [DT= 5.00] SUM= 06:PND2 23.79 2.493 No\_date 6:20 82.22
01717> 013:0036-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01718> CONTINUOUS NASHYD 04:CRFP 24.18 1.865 No\_date 6:30 65.86
01719> [CN= 82.0: N= 2.00]
01720> [Tp= .50:DT= 5.00]
01721> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01722> [InterEventTime= 12.00]
01723> 013:0037-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01724> CONTINUOUS STANDHYD05:28 12.50 1.740 No\_date 6:00 57.94
01725> [XIMP=.38:TIMP=.45]
01726> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F=.00]
01727> [Pervious area: Iaper= 4.67:SLP=1.00:LGP= 205:.MNP=.100:SCP=.0]
01728> [Impervious area: Iaimp= 1.57:SLP=.80:LGI=700:.MNI=.013:SCI=.0]
01729> [IaRECimp= 2.00: IaRECper= 4.00]
01730> 013:0038-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01731> ADD HYD 04:CRFP 24.18 1.865 No\_date 6:30 65.86
01732> + 05:28 12.50 1.740 No\_date 6:00 57.94
01733> + 06:PND2 23.79 2.493 No\_date 6:20 82.22
01734> [DT= 5.00] SUM= 07:B2065 60.47 5.508 No\_date 6:20 70.66
01735> 013:0039-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01736> SAVE HYD 07:B2065 60.47 5.508 No\_date 6:20 70.66
01737> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWHYMO\H-B2065.013
01738> remark:HEC-RAS Inflow Node 2065 / Station 44549
01739> 013:0040-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01740> CONTINUOUS STANDHYD05:100-1 61.17 4.569 No\_date 6:05 57.94
01741> [XIMP=.38:TIMP=.45]
01742> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F=.00]
01743> [Pervious area: Iaper= 4.67:SLP=.80:LGP=1200:.MNP=.100:SCP=.0]
01744> [Impervious area: Iaimp= 1.57:SLP=.80:LGI=1700:.MNI=.013:SCI=.0]
01745> [IaRECimp= 2.00: IaRECper= 4.00]
01746> 013:0041-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01747> CONTINUOUS NASHYD 06:102-1 39.80 1.601 No\_date 7:10 61.80
01748> [CN= 78.0: N= 2.00]
01749> [Tp= 1.10:DT= 5.00]
01750> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01751> [InterEventTime= 12.00]
01752> 013:0042-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01753> ADD HYD 05:102-1 61.17 4.569 No\_date 6:05 57.94
01754> + 06:102-1 39.80 1.601 No\_date 7:10 61.80
01755> [DT= 5.00] SUM= 10:B3894 100.97 5.351 No\_date 6:05 59.46

01756> 013:0043-----ID:NHYD-----AREA-----QPEAK-TpeakDate\_hh:mm-----R.V.-
01757> SAVE HYD 10:B3894 100.97 5.351 No\_date 6:05 59.46
01758> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWHYMO\H-B3894.013
01759> remark:HEC-RAS Inflow Node 3894 / Station 43966
01760> 013:0002-----
01761> FINISH
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**Appendix C: Drawings**

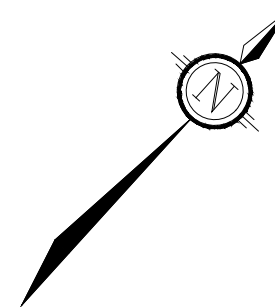
Drainage Areas	108195-DSK-7
Master Grading Plan	108195-GR
Water Distribution Plan	108195-WTR
Sanitary Drainage Area Plan	108195-SAN
Storm Drainage Area Plan	108195-STM
Pond 1 - Layout Plan	108195-SWM

M:\2008\108195\Subdivision\CADD\Design\Figures\DSK\DWG\DSK-7 Drainage Areas.dwg, 11x17 landscape, Dec 13, 2019 - 10:39am, twilson



**LEGEND**

- PRE DEVELOPMENT DRAINAGE AREA BOUNDARY
- - - POST DEVELOPMENT DRAINAGE AREA BOUNDARY
- SITE BOUNDARY
- ▶ EXISTING DRAINAGE PATH AND FLOW DIRECTION
- ▶ POST DEVELOPMENT FLOW DIRECTION
- DRAINAGE AREA TO POND 1
- DRAINAGE AREA TO POND 2
- DRAINAGE AREA TO POND 3
- DRAINAGE AREA TO HAZELDEAN CREEK



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 Website www.novatech-eng.com

CITY OF OTTAWA  
 FERNBANK COMMUNITY - KIZELL LANDS

**DRAINAGE AREAS**

SCALE 1 : 500

DATE 2019.12.13 JOB 108195 FIGURE DSK-7



**LEGEND**

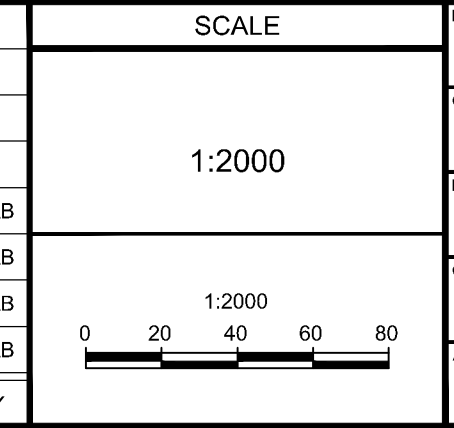
- ORIGINAL GROUND CONTOUR AND ELEVATION
- FINISHED GROUND ELEVATION ORIGINAL GROUND ELEVATION
- SLOPE AND DIRECTION OF FLOW
- MAJOR OVERLAND FLOW DIRECTION
- GRADE RAISE LIMIT BOUNDARY
- AREA 1 NO GRADE RAISE RESTRICTIONS
- AREA 2 GRADE RAISE LIMIT 1.5m to 2.0m
- AREA 3 GRADE RAISE LIMIT 1.2m to 1.5m



NOTE:  
 THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
1.	DRAFT PLAN APPLICATION	NOV 9/16	MAB
2.	REVISED PER CITY COMMENTS	JUL 2017	MAB
3.	DRAFT PLAN RESUBMISSION	FEB 23/18	MAB
4.	DRAFT PLAN RESUBMISSION	DEC 13/19	MAB

DESIGN	SCALE
LRW	1:2000
MAB	1:2000
DTD	1:2000
MAB	1:2000
JGR	1:2000



**FOR REVIEW ONLY**

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PROFESSIONAL ENGINEER  
 M.A. BISSETT  
 10160555  
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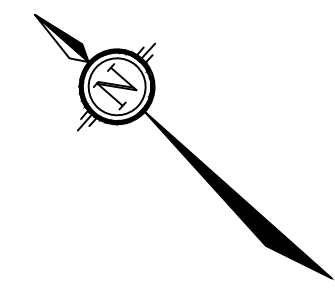
CITY OF OTTAWA  
 FERNBANK COMMUNITY - KIZELL LANDS

**MASTER GRADING PLAN**

PROJECT No. 108195-0  
 REV # 4  
 DRAWING No. 108195-GRD

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DOUBLE DECK LANDS

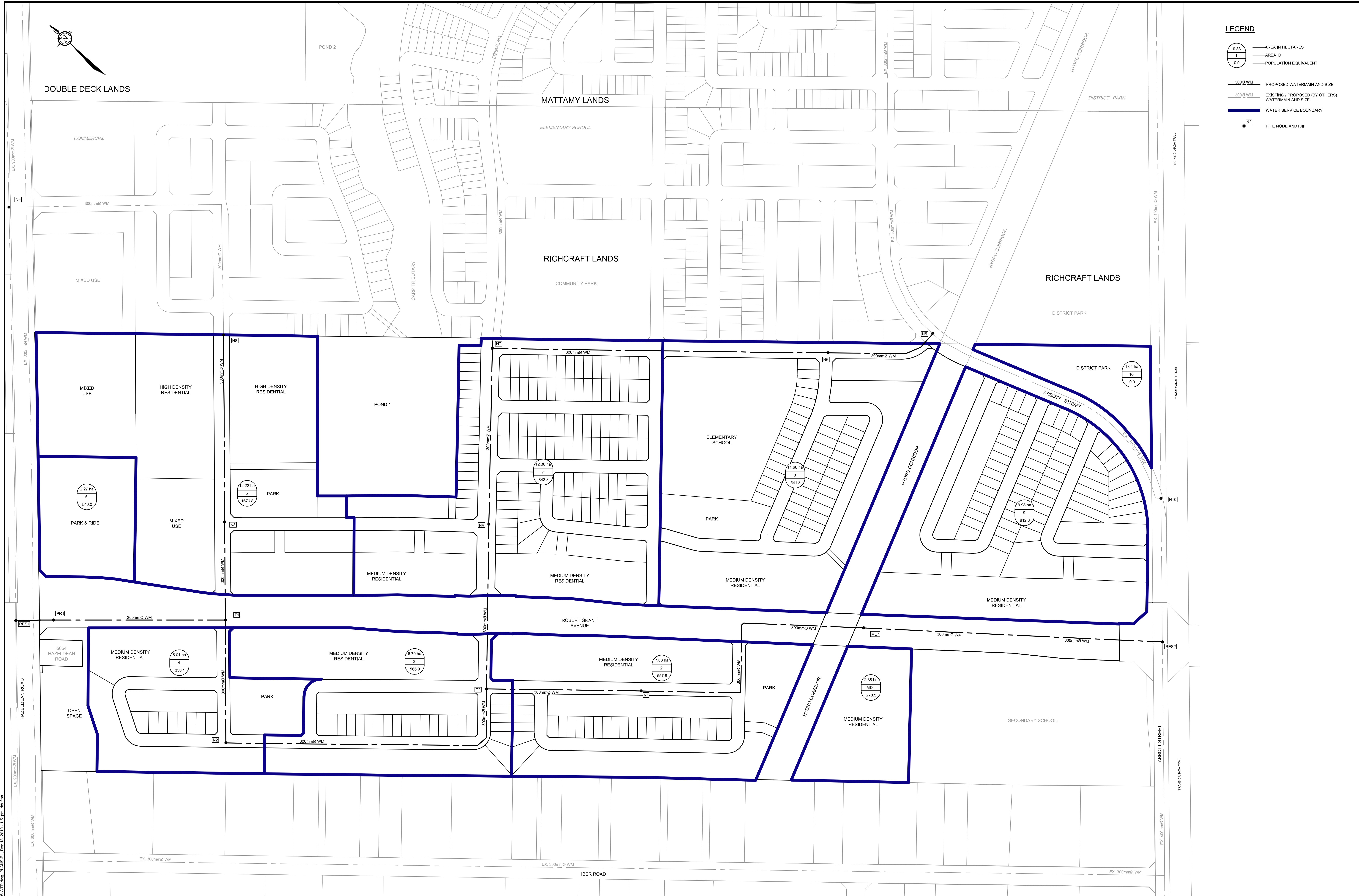
MATTAMY LANDS

RICHCRAFT LANDS

RICHCRAFT LANDS

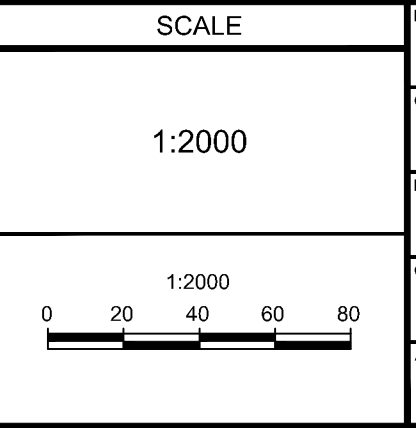
LEGEND

- 0.33 — AREA IN HECTARES
- 1 — AREA ID
- 0.0 — POPULATION EQUIVALENT
- 300mm WM — PROPOSED WATERMAIN AND SIZE
- 300mm WM — EXISTING / PROPOSED (BY OTHERS) WATERMAIN AND SIZE
- WATER SERVICE BOUNDARY
- N2 — PIPE NODE AND ID#



NOTE:  
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 WATERMANS, SEWERS AND OTHER  
 UNDERGROUND AND OVERGROUND UTILITIES AND  
 STRUCTURES IS NOT NECESSARILY SHOWN ON  
 THE CONTRACT DRAWINGS, AND WHERE SHOWN,  
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 STRUCTURES AND ASSUME ALL LIABILITY FOR  
 DAMAGE TO THEM.

No.	REVISION	DATE	BY
4.	DRAFT PLAN RESUBMISSION	DEC 13/19	MAB
3.	DRAFT PLAN RESUBMISSION	FEB 23/18	MAB
2.	REVISED PER CITY COMMENTS	JUL 2017	MAB
1.	DRAFT PLAN APPLICATION	NOV 9/16	MAB



FOR REVIEW ONLY

DESIGN: LRW  
 CHECKED: MAB  
 DRAWN: DTD  
 CHECKED: MAB  
 APPROVED: JGR

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CITY OF OTTAWA  
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PROJECT No.: 108195-0  
 REV: REV # 4  
 DRAWING No.: 108195-WTR

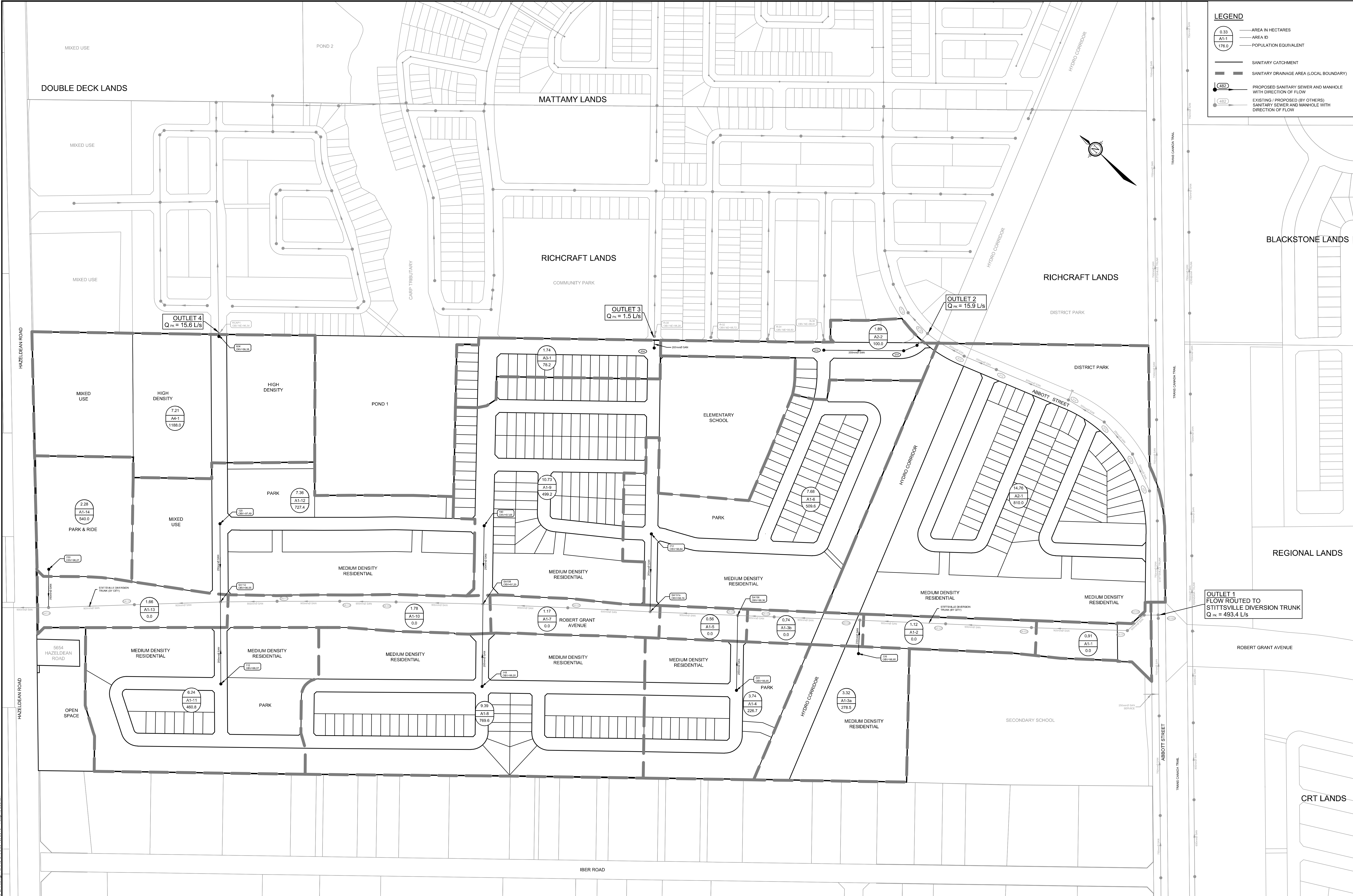
WATER DISTRIBUTION PLAN

C:\Users\jgr\Documents\CAD\Drawings\108195-WTR.dwg, P:\ANS-B1, Dec 13, 2019, 1:15pm, daulton



**LEGEND**

- 0.33 AREA IN HECTARES
- A1.1 AREA ID
- 176.0 POPULATION EQUIVALENT
- SANITARY CATCHMENT
- SANITARY DRAINAGE AREA (LOCAL BOUNDARY)
- PROPOSED SANITARY SEWER AND MANHOLE WITH DIRECTION OF FLOW
- EXISTING / PROPOSED (BY OTHERS) SANITARY SEWER AND MANHOLE WITH DIRECTION OF FLOW



NOTE:  
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 WATERMANS, SEWERS AND OTHER  
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 THE CONTRACT DRAWINGS, AND WHERE SHOWN,  
 THE ACCURACY OF THE POSITION OF SUCH  
 UTILITIES AND STRUCTURES IS NOT GUARANTEED.  
 BEFORE STARTING WORK, DETERMINE THE EXACT  
 LOCATION OF ALL SUCH UTILITIES AND  
 STRUCTURES AND ASSUME ALL LIABILITY FOR  
 DAMAGE TO THEM.

No.	REVISION	DATE	BY
4.	DRAFT PLAN RESUBMISSION	DEC 13/19	MAB
3.	DRAFT PLAN RESUBMISSION	FEB 23/18	MAB
2.	REVISED PER CITY COMMENTS	JUL 20/17	MAB
1.	DRAFT PLAN APPLICATION	NOV. 9/16	MAB

SCALE	DESIGN	CHECKED	DRAWN	CHECKED	APPROVED
1:2000	LRW	MAB	DTD	MAB	JGR

SCALE  
 1:2000  
 0 20 40 60 80

**FOR REVIEW ONLY**

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 34912.13  
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CITY OF OTTAWA  
 FERNBANK COMMUNITY - KIZELL LANDS

**SANITARY DRAINAGE AREA PLAN**

PROJECT No. 108195-0  
 REV 108195-0  
 REV # 4  
 DRAWING No. 108195-SAN

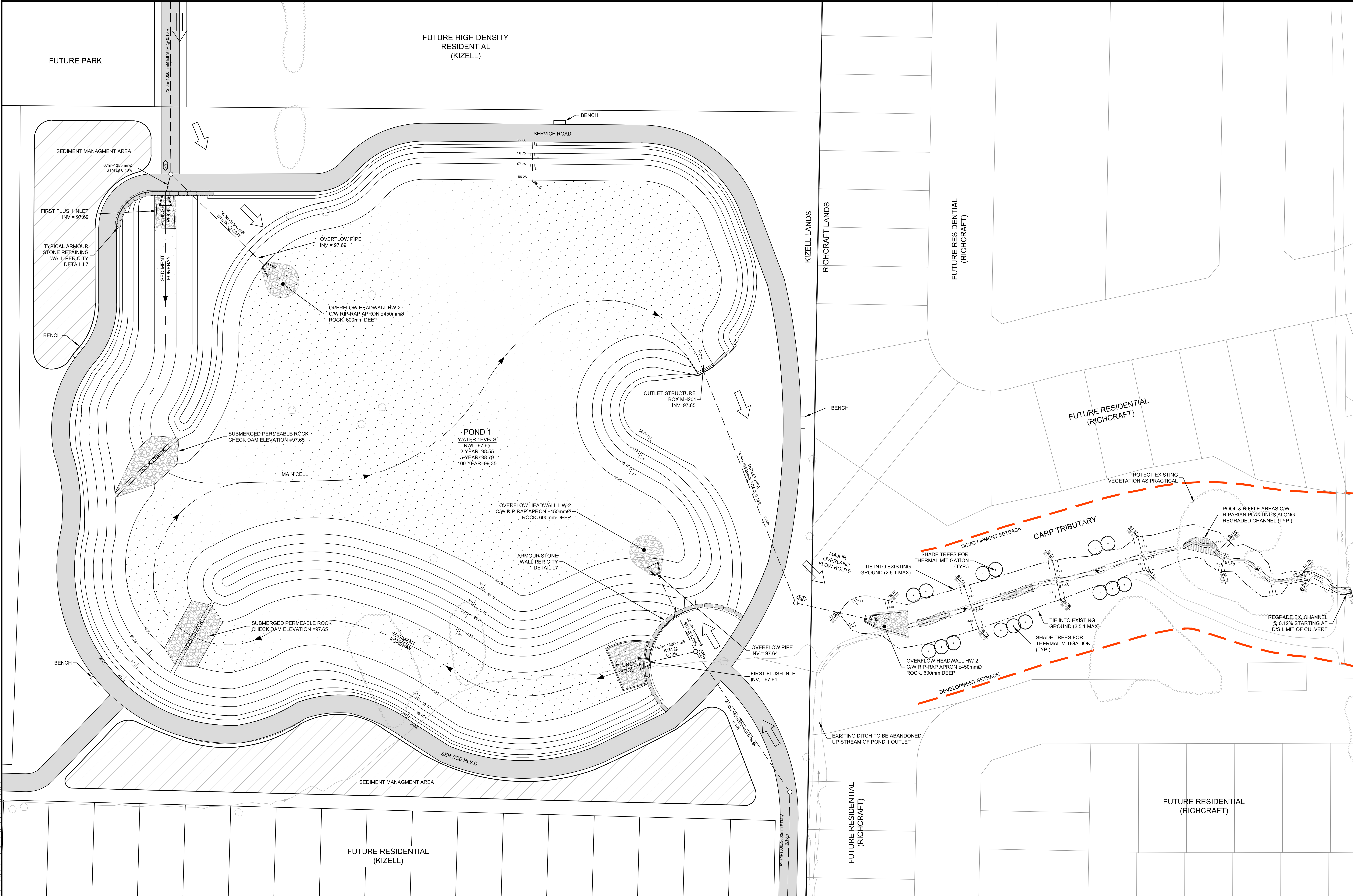
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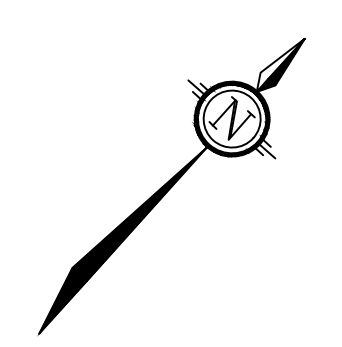


FUTURE HIGH DENSITY RESIDENTIAL (KIZELL)

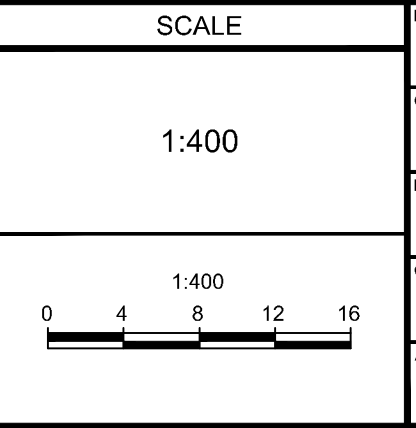


C:\Users\108195-SWM\Documents\CAD\Drawings\SWM\_POND1\108195-SWM.dwg, Pt. 1, Dec 13, 2018, 2:22pm, dca/rae

NOTE:  
 THE POSITION OF ALL POLE LINES, CONDUITS,  
 WATERMANS, SEWERS AND OTHER  
 UNDERGROUND AND OVERGROUND UTILITIES AND  
 STRUCTURES IS NOT NECESSARILY SHOWN ON  
 THE CONTRACT DRAWINGS, AND WHERE SHOWN,  
 THE ACCURACY OF THE POSITION OF SUCH  
 UTILITIES AND STRUCTURES IS NOT GUARANTEED.  
 BEFORE STARTING WORK, DETERMINE THE EXACT  
 LOCATION OF ALL SUCH UTILITIES AND  
 STRUCTURES AND ASSUME ALL LIABILITY FOR  
 DAMAGE TO THEM.



No.	REVISION	DATE	BY
4.	DRAFT PLAN RESUBMISSION	DEC 13/19	MAB
3.	DRAFT PLAN RESUBMISSION	FEB 23/18	MAB
2.	REVISED PER CITY COMMENTS	JUL 20/17	MAB
1.	DRAFT PLAN APPLICATION	NOV 09/16	MAB



DESIGN	MAB
CHECKED	MJP
DRAWN	DTD
CHECKED	MAB
APPROVED	JGR

**FOR REVIEW ONLY**

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CITY OF OTTAWA  
 FERNBANK COMMUNITY - KIZELL LANDS

**STORMWATER MANAGEMENT POND LAYOUT**

PROJECT No. 108195-0  
 REV 108195-0  
 REV # 4  
 DRAWING No. 108195-SWM