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# Fergus Golf Club
# Stormwater Management Report

**883890 Ontario Limited**
**c/o Fergus Development Inc.**
**3190 Steeles Ave. E. Suite 300**
**Markham, ON  L3R 1G9**

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# Stormwater Management Report

## 883890 Ontario Limited c/o Fergus Development Inc.
## 3190 Steeles Ave. E. Suite 300
## Markham, ON  L3R 1G9

**R.J. Burnside & Associates Limited**
**6990 Creditview Road, Unit 2**
**Mississauga ON  L5N 8R9 CANADA**

**January 2022**
**300052719.0000**

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| | | | |

## Record of Revisions

| Revision | Date | Description |
|---|---|---|
| 0 | January 2022 | OPA, DP, and ZBA submission |

**R.J. Burnside & Associates Limited**

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SR:cv

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## Disclaimer

# 1.0 Introduction

## 1.1 General

R.J. Burnside & Associates Limited (Burnside) has been retained by 883890 Ontario Limited c/o Fergus Development Inc. to prepare a Stormwater Management (SWM) Report for the proposed redevelopment of the Fergus Golf Club. This report has been prepared to accompany the application for Official Plan Amendment, Zoning By-law Amendment, Plan of Subdivision and Plan of Condominium applications and demonstrates that the subject lands can provide adequate stormwater management measures in accordance with applicable regulatory requirements and criteria. A Functional Servicing Report dated January 2022 has been prepared by Burnside, under a separate cover, and should be reviewed in conjunction with this report.

## 1.2 Site Description and Context

The Fergus Golf Club redevelopment is 82:20 ha in size and is located on the existing Fergus Golf Course in the Township of Centre Wellington, north of the Town of Fergus at Wellington Road 19 and Third Line. The existing golf course (the “Site”) consists of two parcels; the northwest parcel, which is 42.35 ha, situated on the north side of Wellington Road 19, and the southeast parcel, which is 39.85 ha, situated on the south side of Wellington Road 19. The proposed residential redevelopment is located on the southeast parcel (the “SE Site”) and the communal water and wastewater services are integrated into the existing Golf Course, which will remain, on the northwest parcel (the “NW Site”).

The SE Site is surrounded by Wellington Road 19 to the north, Third Line and a combination of existing residential development and farmland to the east, towards Lake Belwood, existing farmland to the south, and existing residential to the west.



KEY MAP OF ONTARIO

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**FERGUS DEVELOPMENT INC.**

Figure Title

**FERGUS GOLF COURSE**

SITE LOCATION PLAN

| Drawn | Checked | Date | Figure No. |
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| BF | DN | 22/01/21 | 1 |
| Scale | | Project No. | |
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## 1.3 Background

The development concepts contained in this report are an extension of and in accordance with the information contained in the following reports and engineering drawings:

- Functional Servicing Report – Fergus Golf Club, R.J. Burnside & Associates Limited, January 2022.

This report has been prepared in accordance with, and consideration of the information and recommendations provided in the following documents:

- Development Manual, Township Centre Wellington, March 2018.
- Stormwater Management Planning and Design Manual, previously Ministry of Environment (MOE), now Ministry of the Environment, Conservation and Parks (MECP), March 2003.
- Preliminary Geotechnical Investigation Report, Proposed Residential Development – Fergus Golf Club, Golder Associates Limited, January 2022.
- Hydrogeological Assessment, Proposed Residential Development – Fergus Golf Club, Golder Associates Limited, January 2022.
- Environmental Impact Study, Beacon Environmental, January 2022.

# 2.0 Existing Site Characteristics

## 2.1 Land Uses

The SE Site is currently occupied by the southeast parcel of the Fergus Golf Course – South Parcel. The Black Drain runs through the middle of the SE Site which is a drainage feature that conveys flows through the SE Site and connects to Irvine Creek southwest of the Site.

There are multiple wetlands located within the SE Site, some of which are proposed to be retained as part of the redevelopment plan per the Environmental Impact Study prepared by Beacon Environmental. The existing conditions are shown in Figure 2.

## 2.2 Soil Conditions

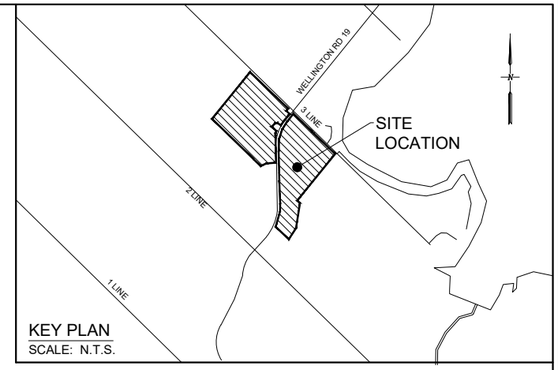
A geotechnical investigation for the Site was completed by Golder Associates Limited. Based upon the findings, the Site is covered by a topsoil layer, overlying silty sand to sand or clayey silt with sand containing varying amounts of gravel. These deposits are underlain by silty clay to clayey silt and silt and sand glacial till deposits.

## 2.3 Groundwater Conditions

Groundwater conditions were monitored as part of the geotechnical and hydrogeological assessments completed by Golder Associates Limited. It was found that the average groundwater depth was approximately 0.6 m below grade. The overall direction of the groundwater flows primarily to the south / south-west.

## 2.4 Environmental Features

A detailed description of the natural features and functions of the SE Site is presented in the Environmental Impact Study by Beacon Environmental, December 2021.


## LEGEND

PROPERTY BOUNDARY

BH — BOREHOLE

0 100 200 400 600

Metres

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**FERGUS DEVELOPMENT INC.**

Figure Title

**FERGUS GOLF COURSE**

EXISTING CONDITIONS

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| BF | DN | 22/01/21 | **2** |
| Scale | | Project No. | |
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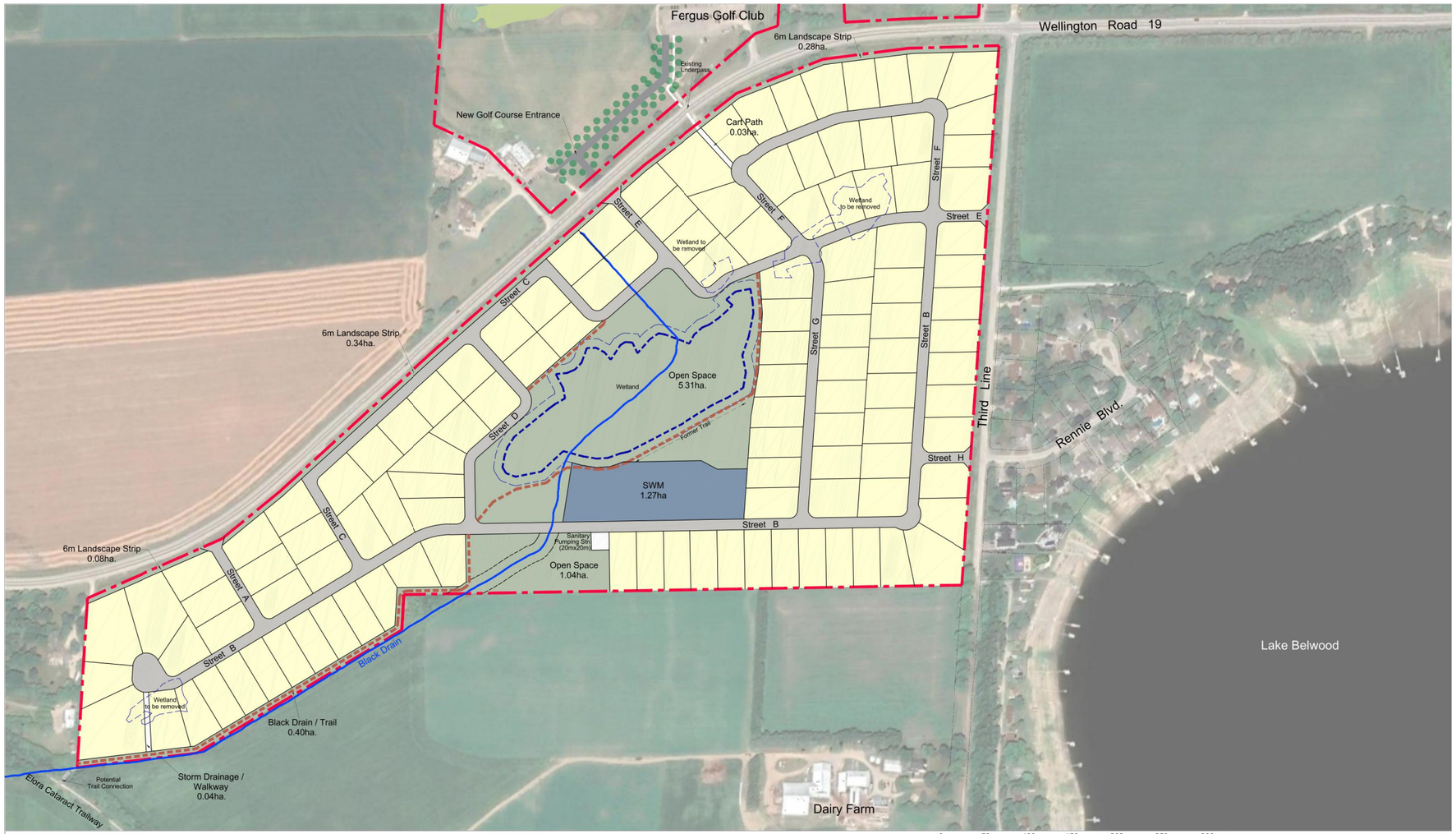
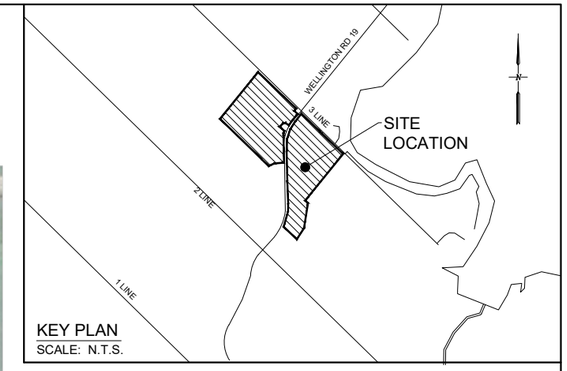
## 3.0 Proposed Land Use

The proposed Draft Plan of Subdivision was completed by GSP Group Incorporated. The proposed development will be on the 39.85 ha development site to the south of Wellington Road and will include 118 single family dwelling lots, two Open Space blocks totaling 6.35 ha, and a Stormwater Management block that is 1.27 ha in size.

The Concept Plan for the SE Site is depicted on Figure 3.




# DEVELOPMENT CONCEPT

## The Village At Fairview Greens

1/2 Acre Residential Lots
GRCA Wetland / OP Core Greenlands
10m Wetland Buffer
Potential Trails

Site Area: 39.85ha. (98.5ac.)
No. of Lots: 118
Area of wetlands to be removed: 7,076sq.m.

0 50 100 150 200 250 300
Metres

NOTE: This concept should be considered as a preliminary demonstration model that illustrates an 'order of magnitude' development scenario for the site. The number of lots are approximate and subject to more detailed design as well as municipal planning approvals.

Scale 1:4,000 | December 10, 2021 | Project No.: 21021 | Drawn By: SL

PROVIDED BY GSP GROUP
DATED: DECEMBER 10, 2021

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Figure Title

**FERGUS GOLF COURSE**

PROPOSED CONCEPT PLAN

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| BF | DN | 22/01/21 | 3 |
| Scale | | Project No. | |
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## 4.0 Grading and Storm Drainage

Refer to the Functional Servicing Report prepared by R.J. Burnside and Associates Limited dated January 2022 for details on the site grading. An overview of the storm drainage has been provided in this section.

# 5.0 Storm Drainage

## 5.1 Existing Storm Drainage

The existing topography for the SE Site generally drains to the existing drainage feature on the site, the Black Drain. The Black Drain is a municipal drainage channel that has a varying cross section that is generally flat bottomed with 3:1 side slope and a depth of approximately 1m.

Based on the Black Drainage Works Plan and Profile (Drawing D-GA-W-128) provided in Appendix A, the SE Site sits at the upstream end of the Black Drain drainage area. The entire SE Site drains to the Black Drain as shown on the drawing mentioned above and the Black Drain continues west eventually draining into Irvine Creek. Irvine Creek generally flows in a southwesterly direction connecting to the Grand River in Elora. Refer to Figure 4 for details on the existing storm drainage patterns.

To calculate runoff volumes and peak drainage flows in the existing condition, the site was divided into five drainage sub-catchments, ultimately all five sub-catchments drain to the Black Drain. Four nodes have been placed along the Black Drain to measure flows at selected locations along the Black Drain based on proposed post-development inlet locations to the Black Drain. The location of these nodes can be found on Figure 4. Catchment boundaries were delineated using topographic base mapping for the Site. The catchments are described in Table 1 and depicted in Figure 4.

**Table 1: Existing Catchments**

| Catchment ID | Area (ha) | Time to Peak (hrs) | Outlet Location |
|---|---|---|---|
| 101 | 1.58 | 0.31 | Node 2 |
| 102 | 16.14 | 0.81 | Node 3 |
| 103 | 7.09 | 0.26 | |
| 104 | 7.13 | 0.62 | |
| 105 | 7.91 | 0.31 | Node 4 |
| **Total** | **39.85** | - | |

Catchment 101 slopes south and is the small area within the SE Site that drains to Node 2 along the Black Drain. Catchment 102 is the large area on the east side of the SE Site that drains to a series of ponds and wetlands, ultimately connecting to the Black Drain before Node 3. Catchment 103 is located north of the Black Drain and slopes south, generally sheet flowing towards the Black Drain before Node 3. Catchment 104 generally slopes west towards the Black Drain at Node 3 and is comprised of a large amount of wooded area. Catchment 105 is located at the west end of the SE Site and generally slopes south towards the Black Drain, connecting before Node 4.

### 5.1.1 External Drainage

There are six external drainage areas that flow through the SE Site and ultimately reach the existing Black Drain. Table 2 identifies the external catchments.

**Table 2: External Catchments**

| Catchment ID | Area (ha) | Time to Peak (hrs) | TIMP (%) | XIMP (%) | Outlet Location |
|---|---|---|---|---|---|
| EXT1 | 7.93 | 0.44 | N/A Nashyd | | Node 1 |
| EXT2 | 0.34 | N/A Stanhyd | 51% | 36% | Node 3 |
| EXT3 | 1.23 | | 59% | 44% | |
| EXT4 | 0.18 | | 48% | 33% | |
| EXT5 | 8.51 | 0.44 | N/A Nashyd | | |
| EXT6 | 15.73 | 0.55 | N/A Nashyd | | Node 4 |
| **Total** | **33.92** | - | | | |

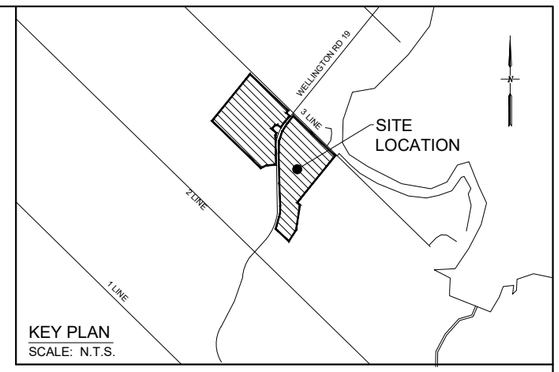
The first of these drainage areas (EXT1) is located on the north side of Wellington Road 19 and drains to the SE Site via roadside ditches and a culvert located under Wellington Road 19 that forms the start of the Black Drain. This drainage is indicated as the G-Drain shown on Drawing D-GA-W-128.

The second external drainage area (EXT2) is located on the south side of Wellington Road 19 and includes the South half of Wellington Road 19 and the roadside ditch. This area spills to the SE Site via a drainage ditch, east of the Black Drain.

The third of these drainage areas (EXT3) is located on the south side of Wellington Road 19 and includes the South half of Wellington Road 19 and the roadside ditch. It also includes the west side of 3rd Line and the roadside ditch. It currently appears that this drainage is captured in a ditch inlet catchbasin on the west side of 3rd Line and drains to the SE Site and ultimately the Black Drain via the D-Drain shown on Drawing D-GA-W-128.

The fourth of these drainage areas (EXT4) is located the west side of 3rd Line and the roadside ditch at the south end of the SE Site. It currently appears that this drainage is held in the ditch and ultimately spills into the SE Site via a low point on the east side of the SE Site.

The fifth and sixth external drainage areas (EXT5 and EXT6) sheet drains towards the existing golf course from the lands to the south of the SE Site.


## LEGEND

STORM DRAINAGE AREA

EXISTING OVERLAND FLOW DRAINAGE

C1
1.0 ha

ID NUMBER

DRAINAGE AREA IN HECTARES

N

0 50 100 200 300 400

Metres

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Figure Title

**FERGUS GOLF COURSE**

PRE-DEVELOPMENT DRAINAGE PLAN

| Drawn | Checked | Date | Figure No. |
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## 5.2 Proposed Storm Drainage

The post-development drainage scheme generally follows the existing drainage patterns. One stormwater management facility is proposed for the SE Site which is detailed in the following sections. All drainage from the SE Site including the stormwater management facility will discharge to the Black Drain.

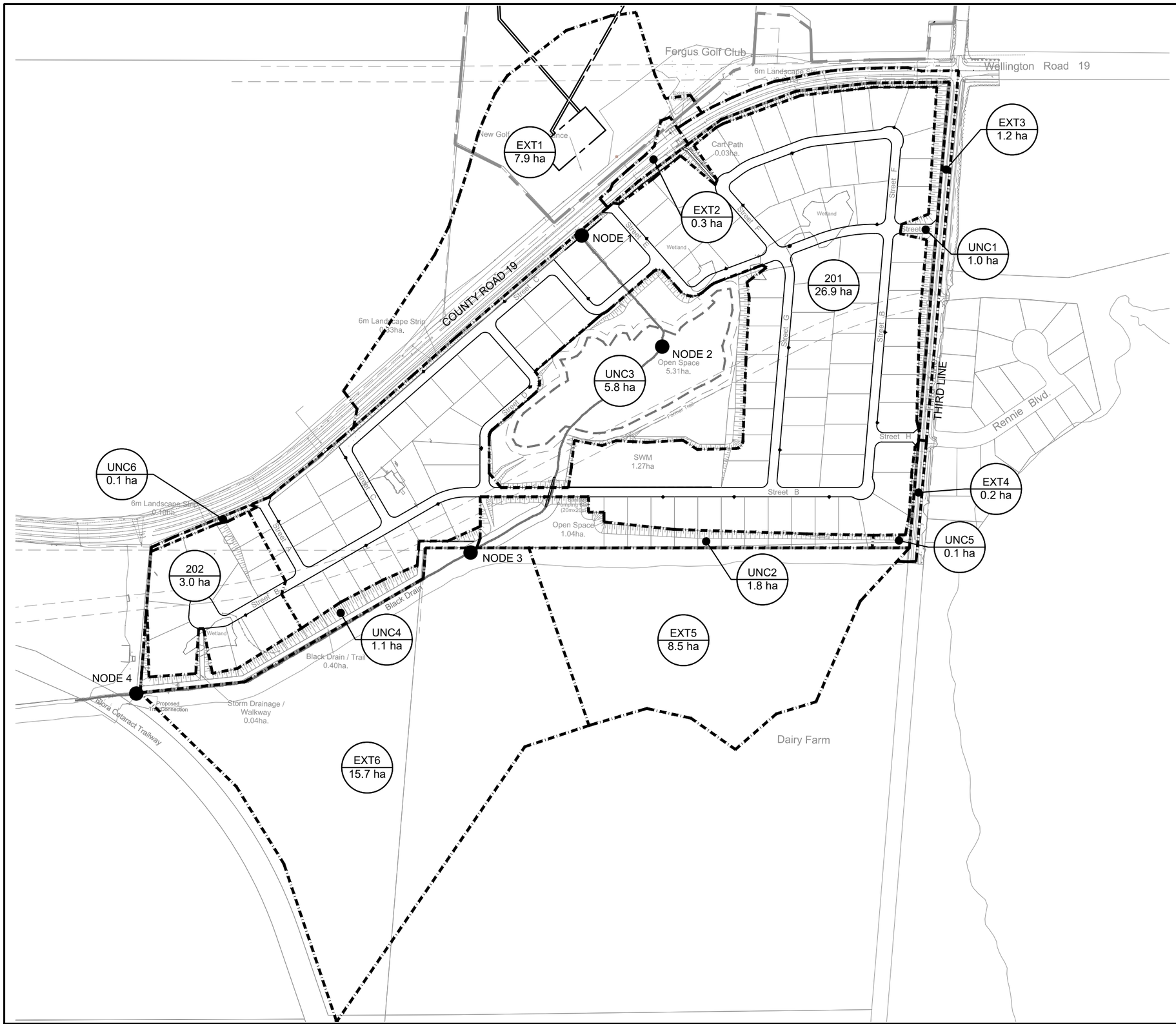
The minor system post-development flows for the SE Site will be directed to the stormwater management facility via a local storm sewer network. Major system flows will be routed to the stormwater management facility via roads and overland flow routes as required. The proposed stormwater treatment details for the SE Site are included in the sections following.

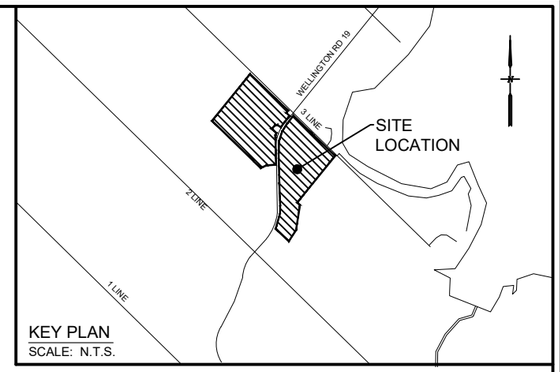
The roof drainage from the individual lots will be directed at the surface to pervious areas to promote infiltration and reduce surface runoff.

The storm drainage infrastructure for the development is highlighted on Drawing STM1, the proposed general drainage areas are highlighted on Figure 5.

### 5.2.1 Minor System

The minor storm system will be a series of storm sewers sized to convey the 5-year return period storm as per the Township of Centre Wellington standard. The storm sewers will follow the right-of-ways within the proposed development and ultimately outlet to the stormwater management pond. There will be one stormwater management facility, SWMF1, which is a wet pond located at the southern end, roughly in the middle of the SE Site. There will be another piped outlet to the Black Drain of uncontrolled flows at the southwest corner of the SE Site, this outlet will include an oil-grit separator and/or a surface LID measure to provide quality control prior to discharging to the Black Drain.




## LEGEND

PROPERTY BOUNDARY

STORM DRAINAGE AREA

C1 / 1.0 ha — ID NUMBER / DRAINAGE AREA IN HECTARES

0 50 100 200 300 400

Metres

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**FERGUS DEVELOPMENT INC.**

Figure Title

**FERGUS GOLF COURSE**

POST-DEVELOPMENT DRAINAGE PLAN

| Drawn | Checked | Date | Figure No. |
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| BF | DN | 22/01/21 | 5 |
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### 5.2.2 Major System

The major system flow route will follow a combination of proposed right-of-ways and overland flow blocks to convey overland flows from major storm events, up to and including the 100-year storm event. The major system flows will be directed to the proposed stormwater management facility. The entire 100-year flow will be contained within the major system flow route. During detailed design, flow capacity calculations will be completed to ensure the overland flow route is sufficiently sized to accommodate the flow. As the grading becomes more refined during detailed design, if the major flow exceeds the capacity of the right-of-way, there may be some oversize piping required to ensure containment of the flow within the right-of-way limits.

### 5.2.3 External Drainage Conveyance

As noted previously, external drainage area EXT1 (7.93 ha) drains to the SE Site via roadside ditches and a culvert located under Wellington Road 19 which forms the start of the Black Drain. As identified on Drawing STM1, under post-development conditions it is proposed that this drainage will be captured and conveyed within a dedicated pipe to the existing Black Drain at the north-western limits of the existing woodlot / wetland feature. It is also proposed that this pipe network collect ditch flows from external drainage area EXT2 (0.34 ha). The ditch along Wellington Road 19 will require some minor re-grading as identified on the Grading Plan G3, and the flows will be directed to a ditch inlet catchbasin and connected to this bypass system. The proposed pipe is sized to accommodate the existing 100-year storm flow (calculated using the Rational Method) from the drainage area as identified in Table 3 below.

**Table 3: External Drainage (EXT 1&2) Conveyance**

| Drainage Area (ha) | Calculated 100-Year Flow ($m^3/s$) | Pipe Size | Pipe Slope |
|---|---|---|---|
| 8.27 | 0.9 | 825 mm | 0.50% |

The preliminary alignment of the external drainage conveyance system is depicted along a rear lot line to the proposed discharge point as shown on Drawing STM1. During detailed design the final profile and alignment of the proposed conveyance system will be established.

The existing ditch inlet that currently captures external drainage area EXT3 (1.23 ha) is at an elevation too low to be captured within the proposed storm network. Therefore, it is proposed that this drainage will be captured and conveyed within a dedicated pipe to the existing Black Drain at the southern end of the site. This separate storm pipe network will also receive flow from external drainage area EXT4 (0.18 ha). The proposed system is sized to accommodate the existing 100-year storm flow (calculated using the Rational Method) from the drainage area as identified in Table 4.

Based on the proposed grading of the site there are two uncontrolled areas that drain out to 3rd Line, UNC1 (0.98 ha) and UNC 5 (0.13 ha). These areas will drain to the roadside ditch on the west side of 3rd Line and will ultimately be captured in the bypass storm network.

**Table 4: External Drainage (EXT3, EXT4, UNC1 & UNC5) Conveyance**

| Drainage Area (ha) | Calculated 100-Year Flow ($m^3/s$) | Pipe Size | Pipe Slope |
|---|---|---|---|
| 2.52 | 0.55 | 825 mm | 0.20% |

The preliminary alignment of the external drainage conveyance system from the east side of the site is depicted along Streets B and H to the proposed discharge point. During detailed design the final profile and alignment of the proposed conveyance system will be established. The preliminary design is identified on Drawing STM1.

External Drainage Area EXT5 will be collected in a swale and directed to the Black Drain at Node 3. Since the proposed grade along the south end of the site will increase as part of the proposed development and will cut off the external drainage area, it is proposed that the external area be connected to the Black Drain via an interceptor swale to convey flows southwest, generally consistent with existing conditions.

External Drainage Area EXT6 will continue to sheet drain to the Black Drain, consistent with existing conditions.

# 6.0 Stormwater Management Plan

The stormwater management for the proposed redevelopment will be achieved through the use of one stormwater management facility. The facility is an off-line stormwater management wet pond, with an outlet to the Black Drain which receives most of the drainage from the site. There are multiple uncontrolled areas that drain from the SE Site which have been accommodated in the allowable release rate from the stormwater management facility.

## 6.1 Existing Hydrologic Conditions

The computer model SWMHYMO was used to simulate peak flow rates for different design storms based on the existing conditions of the SE Site. The Chicago 4-hour rainfall distribution from the Fergus Shand Dam IDF values was used to generate each storm event. Refer to Appendix A for IDF parameter details.

As the Black Drain bisects the SE Site, the simulation is split into four (4) nodes along the Black Drain, Node 1, where the Black Drain begins on the property, Node 2, where the Black Drain turns southwest, Node 3, where the Black Drain exits the SE Site, halfway through the site and Node 4, at the very southwest corner of the SE Site. The SE Site has been divided into a number of sub-catchments based on the localized drainage as described in Section 5.1 above. The existing drainage areas and flow directions are outlined on Figure 4.

### 6.1.1 Curve Number

The curve numbers used in the SWMHYMO modelling was determined using Tables 9-1 and 9-5 from the National Engineering Handbook. Based on existing soil mapping, the site soils are generally loam, comprised of Perth Loam/Parkhill Loam (soil group C), Listowel Loam/Harriston Loam (soil group B) and Hillsburgh Fine Sandy Loam (soil group A). The SE Site is comprised of existing golf course and woodlots. Some of the external drainage area is comprised of agricultural land and has been classified as Meadow. Table 5 outlines the curve number associated with the specific land covers and soil types.

**Table 5: Curve Numbers**

| Land Cover | Soil Group | Curve Number |
|---|---|---|
| Golf Course | A | 39 |
| Woods | | 30 |
| Meadow | | 30 |
| Golf Course | B | 61 |
| Woods | | 60 |
| Meadow | | 58 |
| Golf Course | C | 74 |
| Woods | | 77 |
| Meadow | | 71 |

For each of the catchments a composite curve number was calculated. Refer to Appendix B for details of the composite curve number calculations.

### 6.1.2 Existing Flows

Based on the modelling described above, Table 6 identifies the pre-development peak flows for each storm event at the Node locations shown on Figure 4.

**Table 6: Pre-Development Peak Flow Rates**

| | Node 2 Total Flow ($m^3/s$) | Node 3 (On-site) Flows ($m^3/s$) | Node 3 Total Flow ($m^3/s$) | Node 4 Total Flow ($m^3/s$) |
|---|---|---|---|---|
| **Drainage Area (ha)** | 9.51 | 31.94 | 50.13 | 73.77 |
| **2-Year** | 0.087 | 0.204 | 0.328 | 0.539 |
| **5-Year** | 0.168 | 0.391 | 0.625 | 1.026 |
| **10-Year** | 0.232 | 0.54 | 0.861 | 1.411 |
| **25-Year** | 0.324 | 0.755 | 1.201 | 1.967 |
| **50-Year** | 0.399 | 0.929 | 1.476 | 2.414 |
| **100-Year** | 0.479 | 1.114 | 1.771 | 2.893 |

The flows for Node 1 have not been included in the summary as the only flows entering the Black Drain at Node 1 are from external drainage area EXT1. In post-development these flows are being re-routed to enter the drain further along the drain and the initial section of the Black Drain is proposed to be removed and replaced by a piped storm system.

## 6.2 Black Drain Conveyance Capacity

In order to confirm the Black Drain conveyance capacity and anticipated water levels at the outlet locations, an analysis of the Black Drain cross-section was completed using Hydraflow Express. Using the pre-development SWMHYMO model that was prepared,

the anticipated flows at the proposed nodes was determined, as described above. The anticipated 100-year water level at SWMF1 outlet location, just upstream from Node 3 in the Black Drain, were used to set the outlet elevation of SWMF 1. The anticipated 100-year water level at the outlet location from the storm sewers from Catchment 202, just upstream of Node 4 in the Black Drain, were used to set the outlet elevation of the storm outlet. The following table summarizes the results of the modelling and cross-section analysis. Further detail on these calculations can be found in Appendix C.

**Table 7: Black Drain Flows & Elevations**

| | SWMF1 Outlet (Node 3) | Storm Sewer Outlet (Node 4) |
|---|---|---|
| Pre-Development 100-year Flow (cms) | 1.77 | 2.893 |
| 100-year Flow Depth (m) | 0.50 | 0.70 |
| Black Drain Invert (m) | 425.50 | 424.50 |
| Anticipated Existing Black Drain 100-Year Elevation (m) | 426.00 | 425.20 |
| Proposed SWM Pond Outlet Elevation (m) | 426.00 | 425.50 |

As noted in Table 7 above, both proposed outlets have been set above the calculated existing 100-year flow elevation within the Black Drain. Based on the proposed quantity controls outlined in the sections below, the flows in post-development will be reduced at all nodes using stormwater management measures therefore it is anticipated that the flow depths in the Black Drain will be reduced from the elevations shown in the Table 7.

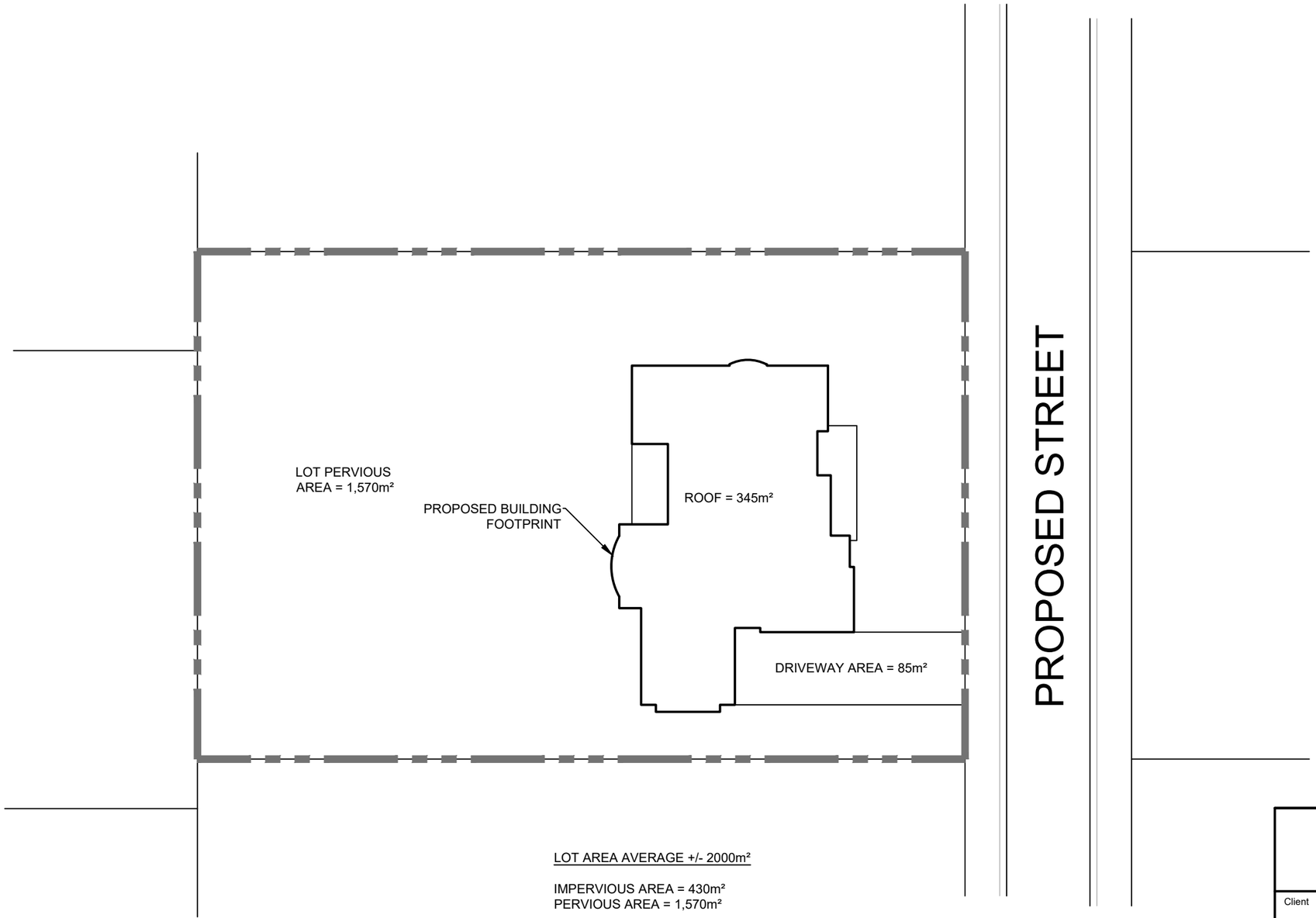
## 6.3 Proposed Hydrologic Conditions

The stormwater management for the proposed redevelopment will be achieved through the use of one stormwater management wet pond with an outlet to the Black Drain which receives most of the drainage from the site. There are multiple uncontrolled areas that drain from the site which have been accommodated in the allowable release rate from the stormwater management facility. The drainage from Catchment 202, which will drain uncontrolled, will require quality treatment as it is comprised of road runoff as well as landscape areas.

A hydrologic model has been created to simulate the anticipated post-development peak stormwater runoff rates for all design storm events. This model takes into account, development type for each sub-catchment. The assumed impervious values are shown in Table 8 below. Note, a composite impervious was calculated for the low-density residential for the proposed “estate lots” that will see a larger percentage of pervious area than a typical low-density residential lot. Refer to Figure 6 for a sample lot impervious area breakdown. This sample lot shows that the impervious percentage was calculated as 21.5%, a conservative impervious value of 25% has been used in the stormwater management design.

## Table 8: Post-Development Impervious Values

| Land Use | TIMP | XIMP |
|---|---|---|
| Roads | 65% | 50% |
| Open Space | 7% | 5% |
| SWM Block | 50% | 50% |
| Low-Density Residential | 25% | 15% |




LOT AREA AVERAGE +/- 2000m²

IMPERVIOUS AREA = 430m²
PERVIOUS AREA = 1,570m²

LOT % IMPERVIOUS = 21.5%

% IMPERVIOUS USED IN SWM
MODELLING = 25%

BURNSIDE

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**FERGUS DEVELOPMENT INC.**

Figure Title

**FERGUS GOLF COURSE**

SAMPLE LOT IMPERVIOUS BREAKDOWN

| Drawn | Checked | Date | Figure No. |
|---|---|---|---|
| LG | BF | 22/01/21 | 6 |
| Scale | | Project No. | |
| N.T.S. | | 300052719 | |

File: \\elmo\Shared Work Areas\052719 Fergus Golf Course\052719.05 FSR\07_Figures\FSR FIGURES\052719.05 FIG6_SAMPLE LOT.dwg Date Plotted: January 21, 2022 - 12:13 PM

Post-development sub-catchment areas and corresponding drainage areas are shown in Table 9 and on Figure 5.

**Table 9: Proposed Catchments**

| Catchment ID | Area (ha) | Time to Peak (hrs) | TIMP (%) | XIMP (%) | Outlet Location |
|---|---|---|---|---|---|
| 201 | 26.92 | N/A Stanhyd | 34% | 23% | Node 3 |
| 202 | 2.99 | N/A Stanhyd | 28% | 18% | Node 4 |
| UNC1 | 0.98 | 0.04 | N/A Nashyd | | Node 3 |
| UNC2 | 1.81 | 0.21 | N/A Nashyd | | Node 3 |
| UNC3 | 5.82 | 0.83 | N/A Nashyd | | Node 3 |
| UNC4 | 1.12 | 0.05 | N/A Nashyd | | Node 4 |
| UNC5 | 0.13 | 0.07 | N/A Nashyd | | Node 3 |
| UNC6 | 0.08 | 0.05 | N/A Nashyd | | Rd 19 Ditch |
| **Total** | **39.85** | - | | | |

## 6.4 Stormwater Management Design Criteria

The following describes the stormwater management pond design criteria that was used in the design of the proposed stormwater management ponds in accordance with the Township of Centre Wellington, Grand River Conservation Authority Design Criteria, and the Ministry of the Environment, Conservation and Parks (MECP) Stormwater Management Guidelines:

- Quality Control: Level 1 (Enhanced)
- Erosion Control: 24-hour retention of 25 mm runoff event
- Quantity Control: Post- to Pre-Control for 2- through 100-year storm events

### 6.4.1 Quantity Control

The post-development peak flow rates for the 2- through 100-year events are summarized in Table 10. The flow rates have been calculated at specific nodes for comparison purposes to pre-development conditions. The nodes, as identified on Figure 5, represent the flows entering the Black Drain at specific locations. Node 3 is the approximate location where Pond 1 will outlet and Node 4 is located at the edge of the SE Site. The hydrologic flow charts and SWMHYMO runs for all storms are included as Appendix D.

**Table 10: Post-Development Peak Flow Rates**

| | Node 2 Total Flow ($m^3/s$) | Node 3 (On-site) Flows ($m^3/s$) | Node 3 Total Flow ($m^3/s$) | Node 4 Total Flow ($m^3/s$) |
|---|---|---|---|---|
| **Drainage Area (ha)** | 8.27 | 35.66 | 53.85 | 73.69 |
| **2-Year** | 0.076 | 0.162 | 0.306 | 0.52 |
| **5-Year** | 0.145 | 0.322 | 0.476 | 0.822 |
| **10-Year** | 0.199 | 0.450 | 0.601 | 1.052 |
| **25-Year** | 0.278 | 0.635 | 0.769 | 1.368 |
| **50-Year** | 0.341 | 0.771 | 0.905 | 1.612 |
| **100-Year** | 0.408 | 0.923 | 1.096 | 1.893 |

Table 11 summarizes the net storm flows leaving the SE Site under both pre and post-development conditions.

**Table 11: Flow Rate Summary**

| Storm Event | Flow Rates ($m^3/s$) | |
|---|---|---|
| | Node 4 | |
| | Pre | Post |
| 2-Year | 0.539 | 0.52 |
| 5-Year | 1.026 | 0.822 |
| 10-Year | 1.411 | 1.052 |
| 25-Year | 1.967 | 1.368 |
| 50-Year | 2.414 | 1.612 |
| 100-Year | 2.893 | 1.893 |

As shown in the tables above, the post-development flows will be below the pre-development flows for all storms from the 2-through 100-year storm events at all nodes.

### 6.4.2 Quality Control

The stormwater management facility will be sized in accordance with the MECP requirements for the provision of Level 1 Quantity Control.

Extended Detention volume for each facility will be provided to meet the greater of the 40 $m^3$/ha noted in the MECP manual or the equivalent runoff from the 25 mm storm event. The extended detention will be released over a minimum 24-hour period.

The majority of the uncontrolled areas that do not reach the stormwater management ponds are rear yards which are considered “clean runoff” sources. The one uncontrolled catchment (Catchment 202) that includes driveways and roads, will require quality

control measures. It is proposed that an oil-grit separator and/or surface LID measures in the centre of the roundabout will be incorporated to ensure the provision of the 80% TSS removal associated with Level 1 quality control.

### 6.4.3 SWMF1

The stormwater management pond, SWMF1, is located at the south end of the SE Site roughly in the middle, adjacent to the Black Drain at a low point. The pond has been designed with 5:1 side slope and a 4 m wide access road to provide access to the forebay, pond inlet and outlet. The pond outlet will be directed to the Black Drain. The requirement for a pond liner will be confirmed at detailed design in order to maintain a permanent pool based on the groundwater levels observed.

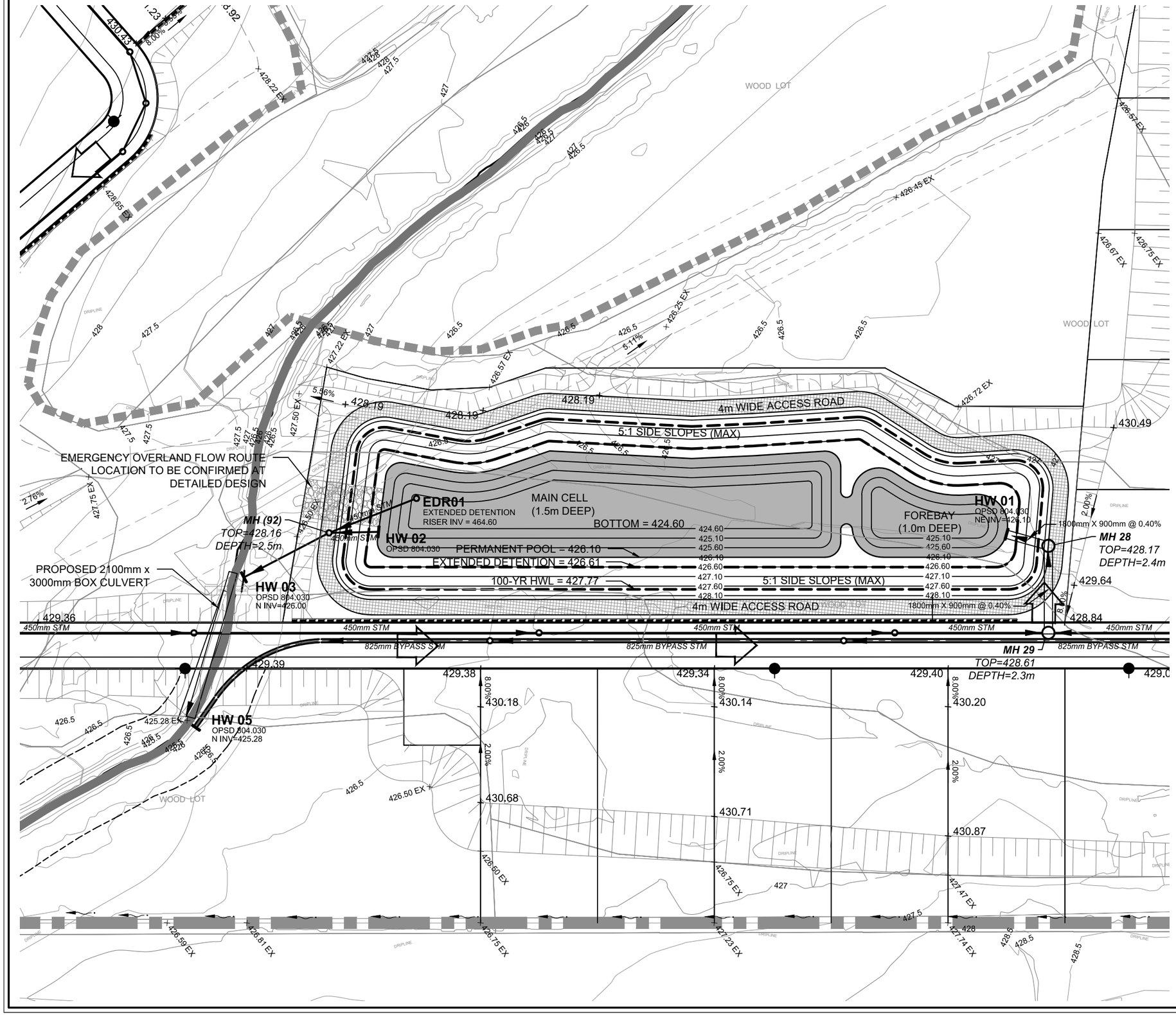
Table 12 summarizes the operating characteristics for SWMF1, and the storage volumes required to meet the design criteria.

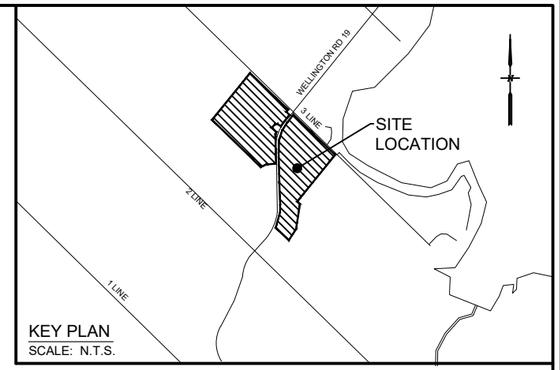
**Table 12 Summary Table for SWM Pond 1**

| | | | | | | |
|---|---|---|---|---|---|---|
| Drainage Area | = | 26.92 ha | % IMP= 33.6 | | | |
| Pond Block Area | = | 1.27 ha | | | | |
| Permanent Pool Required | = | 99.7 $m^3$/ha | x | 26.92 ha | = | 2,684 $m^3$ |
| Permanent Pool Provided | = | 3,546 $m^3$ | | | | |
| Max Depth | = | 1.5 m | | | | |
| Permanent Pool Elevation | = | 426.10 m | | | | |
| Erosion Control = | = | 8.321mm x 26.92 ha x 10 | | | | 2,240 $m^3$ |
| Release Rate | = | 39 L/s | | | | |
| ED Active Storage Provided | = | 2,249 $m^3$ | | | | |
| Depth | = | 0.51 m | @ | 426.61m | | |

| Return Event | Pond Out-Flow ($m^3$/s) | Storage Volume ($m^3$) | Water Elevation (m) |
|---|---|---|---|
| 2-year | 0.049 | 2,845 | 426.72 |
| 5-year | 0.106 | 4,463 | 427.03 |
| 10-year | 0.152 | 5,550 | 427.21 |
| 25-year | 0.138 | 7,007 | 427.45 |
| 50-year | 0.262 | 8,132 | 427.60 |
| 100-year | 0.311 | 9,283 | 427.77 |

Calculations associated with the stormwater management pond sizing are included in Appendix D. Figures 7 and 8 illustrate the proposed SWMF1 configuration and section including minor grading around the pond.




BURNSIDE

Client

**FERGUS DEVELOPMENT INC.**

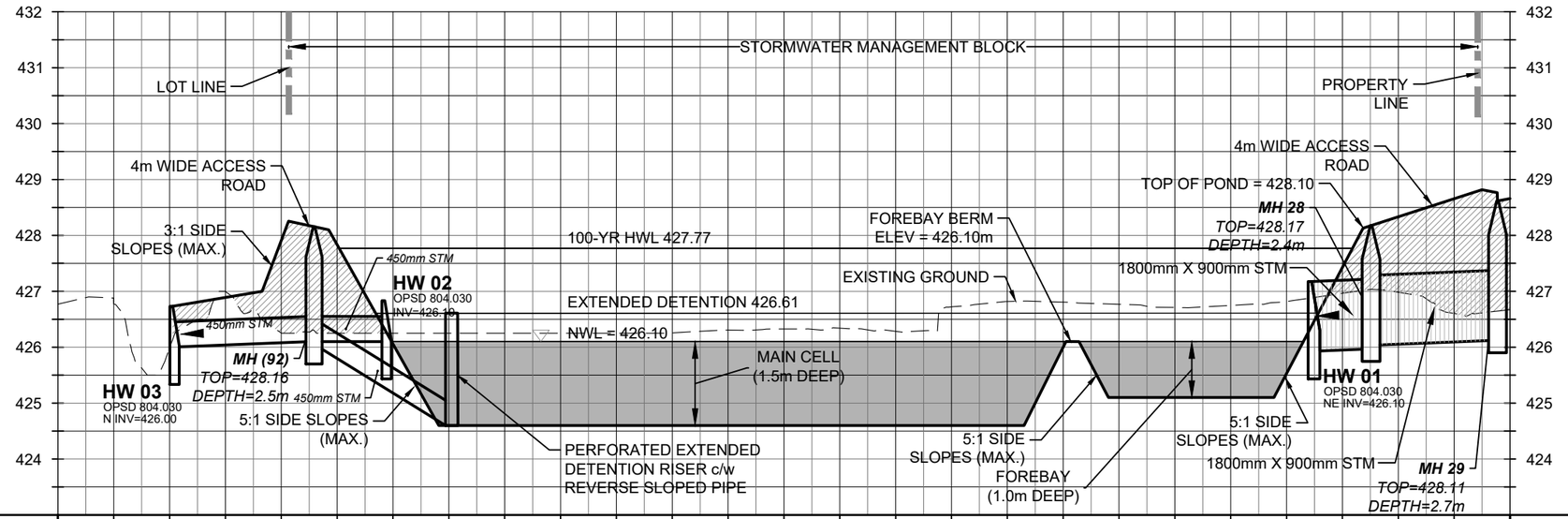
Figure Title

**FERGUS GOLF COURSE**

SWM POND PLAN

| Drawn | Checked | Date | Figure No. |
|---|---|---|---|
| BF | LG | 22/01/21 | 7 |
| Scale | | Project No. | |
| 1:1000 | | 300052719 | |

File: \\elmo\Shared Work Areas\052719 Fergus Golf Course\052719.05 FSR\07_Figures\FSR FIGURES\052719.05 SWM POND 1.dwg Date Plotted: January 21, 2022 - 12:20 PM




| EXIST\PROP CENTERLINE ELEVATION | | | | | | 427.69 | 427.69 | 425.79 | 425.79 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 424.60 | 426.02 | 426.02 | 425.10 | 425.10 | 425.10 | 425.10 | 425.10 | 425.10 | 425.37 | 425.37 | 427.28 | 427.28 | | | EXIST\PROP CENTERLINE ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CHAINAGE | 0+000 | 0+010 | 0+020 | 0+030 | 0+040 | 0+050 | 0+060 | 0+070 | 0+080 | 0+090 | 0+100 | 0+110 | 0+120 | 0+130 | 0+140 | 0+150 | 0+160 | 0+170 | 0+180 | 0+190 | 0+200 | 0+210 | 0+220 | 0+230 | 0+240 | 0+250 | 0+260 | CHAINAGE |

SWM POND - SECTION A-A
SCALE H1:1000 V1:100

BURNSIDE

Client

**FERGUS DEVELOPMENT INC.**

Figure Title

**FERGUS GOLF COURSE**

SWM POND SECTION

| Drawn | Checked | Date | Figure No. |
|---|---|---|---|
| BF | LG | 22/01/21 | **8** |
| Scale | | Project No. | |
| 1:500 | | 300052719 | |

## 6.5 Water Balance / Infiltration

A preliminary water balance was completed by Golder which reviewed the pre-development and unmitigated post-development water balance for the subdivision block. It is proposed, on a site wide basis, that the rooftop runoff can be directed to the surface to supplement the groundwater recharge. Based on the findings of the water balance, the site wide infiltration is expected to decrease by 14%, including the downspout disconnection.

In order to maintain pre-development infiltration, the report prepared by Golder recommends considering additional LID mitigation features. Refer to the section below for examples of LID options.

Based on the average depth to groundwater in the spring season being approximately 0.6 m below grade, there is limited feasibility to implement subsurface LID's (e.g., infiltration trenches or galleries). LID inverts and depth to groundwater of any proposed sub-surface LID features will be confirmed during detailed design.

## 6.6 Low Impact Development

Based on Golder's analysis of soil and groundwater conditions, the water balance, under post-development conditions, can be partially maintained through discharge of roof leaders to grade. The at grade discharge of roof leaders ensures that downspouts outlet to grassed swales within the rear yard or side yard, as opposed to outletting to the driveway and entering the storm sewer system.

To ensure the water balance is fully maintained under post-development conditions, LIDs measures will be implemented. LIDs such as linear bioswales implemented within the road right-of-way as well as potentially directing the cul-de-sac drainage to a centralized infiltration facility will be investigated at the detailed design stage.

The stormwater management block identified within the design currently does not reflect any reductions in runoff volume to the facility as a result of the use of LID techniques.

## 7.0 Erosion and Sediment Control.

The following general Erosion and Sediment Control (ESC) measures will be implemented as part of the construction works associated with the proposed redevelopment. A detailed Erosion Sediment Control Plan will be established during the detailed design approvals process. The ESC measures noted below are intended to mitigate the potential impacts associated with the construction activities on the surrounding environment. The ESC measures listed below are applicable to all construction activities within the subject property:

a) Erosion and Sediment Control (ESC) measures will be implemented prior to, and maintained during the construction phases, to prevent entry of sediment into the water.

b) Sediment control fence consisting of non-woven material shall be installed and maintained to prevent sediment from leaving the proposed construction areas. Location of fencing will be established based on the site staging and proposed construction work.

c) The contractor shall maintain a supply of silt fence, clear stone, straw bales and filter fabric on-site for emergency use.

d) All in-water and near water works will be conducted in the dry, with appropriate erosion and sediment controls.

e) No equipment or vehicles are permitted to cross through the watercourse, unless approved by Grand River Conservation Authority.

f) No sediment-laden water or deleterious substances will be released to the adjacent waterbody at any time. Dewatering discharge containing sediment laden water must be discharged to a sediment bag positioned in a vegetated area and allowed to discharge into existing established vegetation at least 30m from any watercourse or existing storm catchbasin.

g) Removal of vegetative cover will be staged and restricted to a period immediately preceding the commencement of earth works in each stage.

h) Disturbed areas will be temporarily or permanently stabilized or restored as the work progresses.

i) If site construction activities are interrupted, and/or inactivity exceeds 30 days, all stripped and/or bare soil areas are to be stabilized using either erosion control matting (e.g., jute), sodding/seeding/mulching or other approved methods to the satisfaction of the site inspector.

j) Equipment, stockpiled material or construction material will be stored outside watercourse and buffer areas and in a manner that prevents sediment or deleterious substances from entering the Black Drain.

k) Vehicular refueling and maintenance will be conducted a minimum of 30 metres from the water.

l) An ESC monitoring program will be used as detailed below in Section 9. Erosion and sediment control methods are to be continuously monitored, evaluated, and upgraded when necessary (see further details below in Section 9.0).

m) All damaged erosion and sediment control measures should be repaired and/or replaced within 48 hours of the inspection.

n) After hours contact numbers are to be posted on-site for emergencies.

# 8.0 Conclusions & Recommendations

The preceding report provides an investigation of existing drainage conditions and an assessment of the stormwater management plan for the Fergus Golf Club redevelopment in the Township of Centre Wellington.

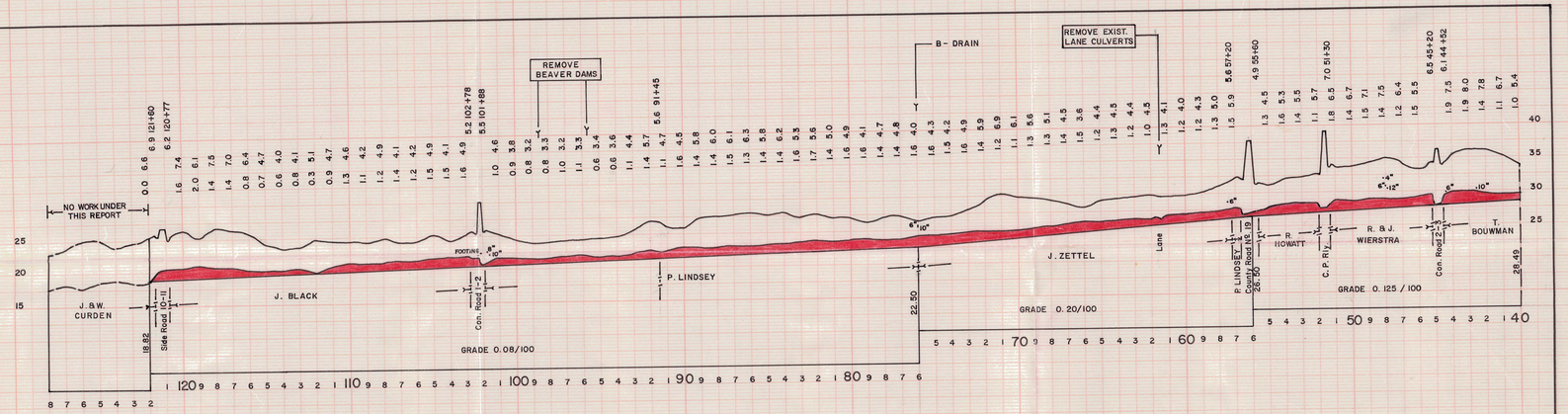
As outlined in the report above, the stormwater management blocks provided in the Draft Plan of Subdivision are adequate to support the stormwater management measures required to meet the design criteria.

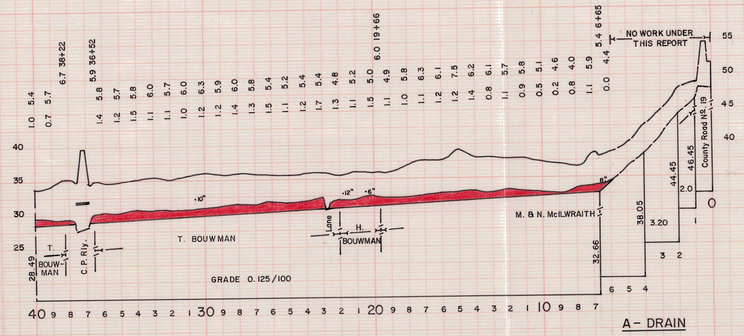
BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

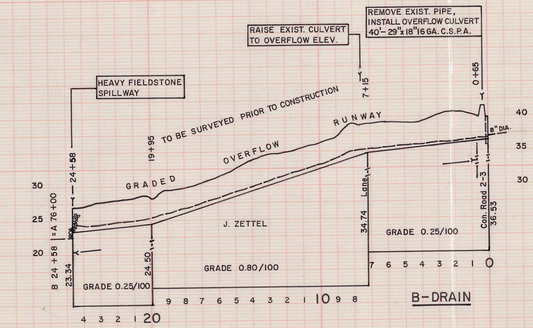
# Appendix A

# Background Information


A- DRAIN




B-DRAIN

## BENCH MARKS

| | | | | |
|---|---|---|---|---|
| A | 0+82 | TOP CENTRE DWST. 18" DIA. C.S.P. | | 49.50 |
| A | 1+00 | SPIKE IN FENCE POST | 40' S. | 50.31 |
| A | 14+40 | TOP CENTRE DWST. CONC. CULVERT | 12' W. | 40.12 |
| A | 36+90 | TOP CENTRE UPST. CONC. HEADWALL | | 37.25 |
| A | 45+10 | TOP CENTRE DWST. 5' DIA. C.S.P. | | 32.92 |
| A | 51+70 | TOP WEST TRACK | | 39.19 |
| A | 56+55 | TOP CENTRE DWST. 5.5' DIA. C.S.P. | | 32.26 |
| A | 91+50 | TOP CENTRE DWST. 18" DIA. C.S.P. | 20' N. | 26.22 |
| A | 102+32 | TOP CENTRE DWST. CONC. WHEELGUARD | | 30.87 |
| A | 121+26 | TOP CENTRE DWST. CONC. WHEELGUARD | | 27.99 |
| B | 0+60 | SPIKE IN 1' DIA. SPRUCE TREE | 2' S. | 41.21 |
| B | 14+45 | SPIKE IN FENCE POST | 30' N. | 34.03 |
| B | 24+78 | SPIKE IN FENCE POST | 45' N. | 28.34 |

BOTTOM WIDTH: A 0+00 - 90+00 3 ft.
A 90+00 - 122+00 4 ft.

SIDE SLOPE: 1 ft. vert. to 1 ft. horz.

## B DRAIN TILE SIZES

| | |
|---|---|
| 24+58 - 24+44 | 14 LIN. FT. 15" DIA. 18 GA. M.P. WITH GRATE |
| 24+44 - 19+95 | 449 LIN. FT. 12" DIA. FIELD TILE |
| 19+95 - 0+00 | 1955 LIN. FT. 10" DIA. FIELD TILE |
| CON. ROAD 2 - 3 | 40 LIN. FT. 12" DIA. 16 GA. M.P. |
| CATCH BASIN | 0+00 |

# PLAN & PROFILES

OF THE

# BLACK DRAINAGE WORKS

REPAIR & IMPROVEMENT, 1976

IN THE TOWNSHIPS OF

## NICHOL AND WEST GARAFRAXA

SCALES:

PLAN 0 1000 2000 3000 4000 FT.

PROFILE HORZ. 0 200 400 600 800 1000 1200 FT.

VERT. 0 5 10 15 20 25 30 FT.

DATED, MAR. 29, 1976

Orangeville, Ontario

SIGNED E. H. UDERSTADT O.L.S.

E. H. UDERSTADT & TING.

Engineers and Surveyors & Municipal Drainage Consultants

ASSOCIATION OF ONTARIO LAND SURVEYORS 1131

D-GA-W-128

**Project:** Fergus Golf Course
**File:** 300052719
**Designed by:** L.Garner
**Date:** 5-Apr-21

BURNSIDE

**IDF Parameter Conversion**

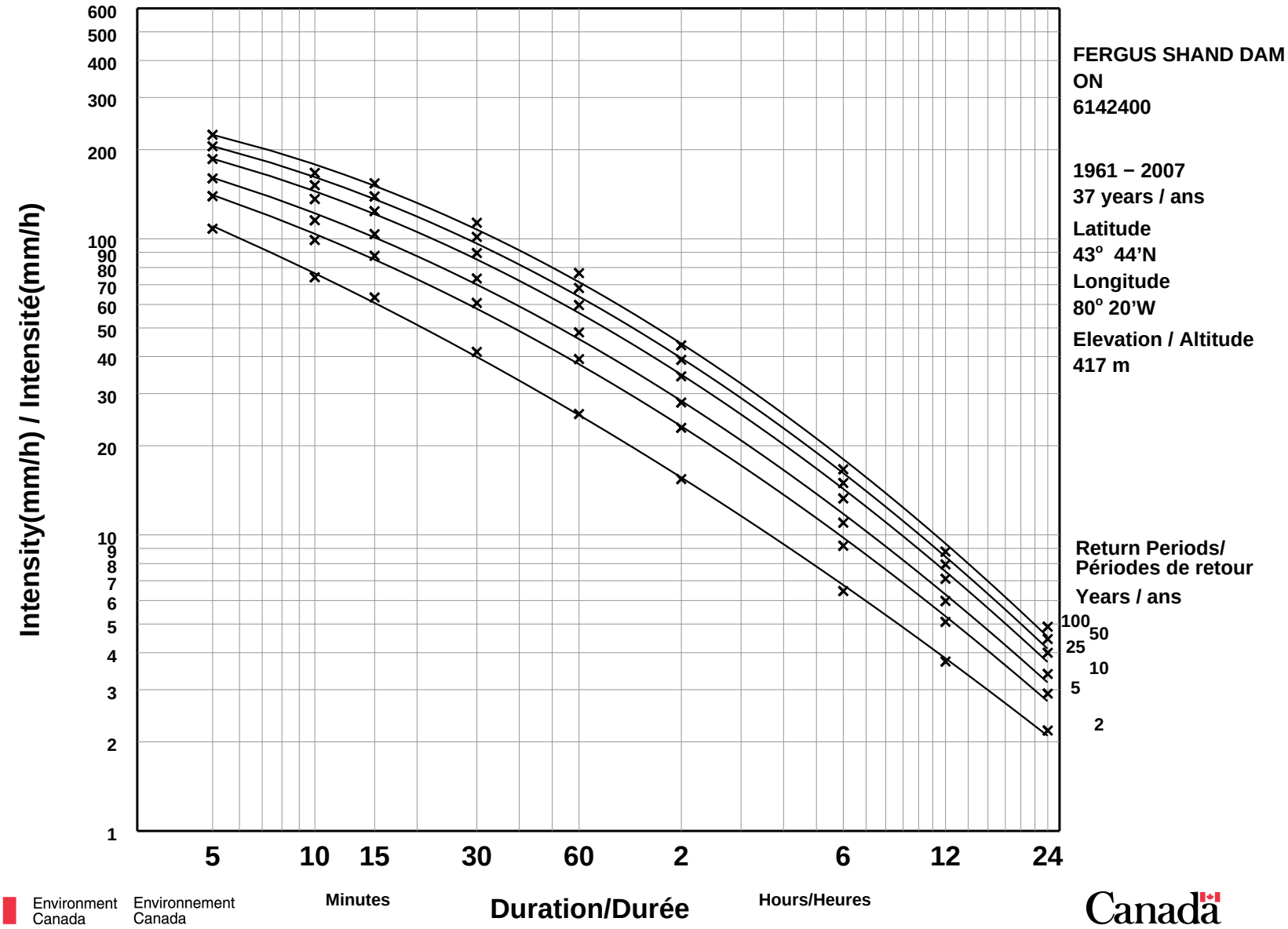
| | A | B | C |
|---|---|---|---|
| 2 Year | 22.6 | -0.702 | |
| 5 Year | 31.6 | -0.698 | |
| 10 Year | 37.5 | -0.696 | |
| 25 Year | 45 | -0.694 | |
| 50 Year | 50.5 | -0.693 | |
| 100 Year | 56 | -0.693 | |

| | A | B | C |
|---|---|---|---|
| 2 Year | 400.2862 | 0 | 0.702 |
| 5 Year | 550.6006 | 0 | 0.698 |
| 10 Year | 648.0739 | 0 | 0.696 |
| 25 Year | 771.3464 | 0 | 0.694 |
| 50 Year | 862.0852 | 0 | 0.693 |
| 100 Year | 955.9757 | 0 | 0.693 |

# Short Duration Rainfall Intensity−Duration−Frequency Data

2019/02/27

# Données sur l’intensité, la durée et la fréquence des chutes de pluie de courte durée




Environment Canada Environnement Canada

Canada

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Short Duration Rainfall Intensity-Duration-Frequency Data
Données sur l'intensité, la durée et la fréquence des chutes de pluie de courte durée

Gumbel - Method of moments/Méthode des moments

2019/02/27

==========

FERGUS SHAND DAM ON 6142400

Latitude: 43 44'N Longitude: 80 20'W Elevation/Altitude: 417 m

Years/Années : 1961 - 2007 # Years/Années : 37

==========

**********

Table 1 : Annual Maximum (mm)/Maximum annuel (mm)

**********

| Year / Année | 5 min | 10 min | 15 min | 30 min | 1 h | 2 h | 6 h | 12 h | 24 h |
|---|---|---|---|---|---|---|---|---|---|
| 1961 | 11.7 | 19.8 | 25.4 | 27.9 | 36.8 | 41.9 | 45.2 | 46.6 | 48.9 |
| 1962 | -99.9 | -99.9 | -99.9 | -99.9 | 21.6 | 24.4 | 43.4 | 52.8 | 59.2 |
| 1963 | -99.9 | 14.7 | 15.7 | 15.7 | 16.8 | 20.8 | 26.4 | 31.2 | 51.3 |
| 1964 | -99.9 | -99.9 | 19.6 | 25.7 | 26.2 | 26.7 | 31.2 | 34.8 | 53.3 |
| 1965 | -99.9 | 7.9 | 11.2 | 19.0 | 19.3 | 29.0 | 33.5 | 43.9 | 61.0 |
| 1966 | -99.9 | 7.6 | 7.9 | 8.9 | 10.9 | 17.5 | 20.1 | 30.2 | 37.1 |
| 1967 | -99.9 | -99.9 | 33.5 | 53.8 | 86.9 | 89.4 | 111.0 | 113.5 | 116.8 |
| 1968 | 10.4 | 15.7 | 21.3 | 29.0 | 38.4 | 52.8 | 64.5 | 65.0 | 117.6 |
| 1970 | 7.9 | 9.4 | 13.5 | 16.5 | 18.3 | 19.6 | 36.6 | 37.3 | 37.3 |
| 1972 | 9.1 | 16.0 | 23.1 | 37.1 | 58.4 | 65.8 | 67.3 | 78.2 | 78.2 |
| 1973 | 12.2 | 18.0 | 22.6 | 30.5 | 30.7 | 52.6 | 54.1 | 54.1 | 76.5 |
| 1974 | 6.6 | 9.1 | 12.2 | 18.0 | 23.9 | 34.8 | 46.5 | 63.8 | 65.5 |
| 1975 | 9.4 | 12.4 | 15.5 | 18.8 | 20.6 | 24.1 | 35.3 | 42.2 | 44.7 |
| 1976 | 13.5 | 13.5 | 16.8 | 24.1 | 29.2 | 38.1 | 59.2 | 59.2 | 59.2 |
| 1977 | 9.1 | 15.5 | 17.8 | 20.3 | 23.9 | 24.1 | 34.0 | 38.6 | 48.8 |
| 1978 | 11.7 | 12.8 | 12.8 | 17.6 | 23.4 | 34.1 | 40.6 | 43.4 | 50.0 |
| 1979 | 5.5 | 7.9 | 9.5 | 13.4 | 13.5 | 14.1 | 17.6 | 28.6 | 34.2 |
| 1980 | 11.6 | 13.0 | 17.1 | 23.7 | 42.0 | 54.5 | 62.8 | 63.0 | 63.2 |
| 1981 | 8.0 | 14.1 | 16.6 | 18.2 | 21.8 | 22.9 | 34.0 | 41.8 | 51.5 |
| 1982 | 8.1 | 11.2 | 12.7 | 18.0 | 23.2 | 24.2 | 29.2 | 31.2 | 34.0 |
| 1983 | 7.6 | 13.4 | 14.0 | 18.4 | 18.6 | 19.0 | 23.5 | 26.6 | 36.9 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1984 | 13.5 | 13.7 | 13.9 | 15.1 | 17.4 | 18.2 | 23.4 | 35.8 | 43.8 |
| 1985 | 11.5 | 13.2 | 17.8 | 26.6 | 26.6 | 32.4 | 37.5 | 49.0 | 65.4 |
| 1987 | 8.0 | 10.3 | 12.2 | 13.0 | 14.4 | -99.9 | -99.9 | 81.2 | 81.2 |
| 1988 | 7.4 | 9.5 | 11.8 | 17.9 | 31.9 | 35.3 | 42.2 | 42.2 | 42.6 |
| 1989 | 11.0 | 14.5 | 14.7 | 16.4 | 19.5 | 26.0 | 37.3 | 49.6 | 50.6 |
| 1990 | 6.1 | 9.0 | 13.2 | 20.8 | 23.7 | 25.0 | 27.4 | 31.4 | 36.8 |
| 1991 | 17.3 | 18.9 | 20.3 | 24.6 | 35.9 | 40.1 | 55.4 | 67.3 | 73.4 |
| 1992 | 9.7 | 12.6 | 17.1 | 19.8 | 31.0 | 36.5 | -99.9 | -99.9 | 67.8 |
| 1993 | 6.3 | 7.3 | 10.5 | 15.6 | 16.2 | 18.6 | 25.3 | 28.6 | 45.1 |
| 1994 | 7.5 | 9.7 | 11.8 | 13.4 | 13.6 | 15.9 | 21.8 | 30.3 | 36.7 |
| 1996 | 9.7 | 12.6 | 15.6 | 19.3 | 26.9 | 29.8 | 35.8 | 45.0 | 49.7 |
| 1997 | 4.5 | 6.1 | 8.1 | 9.9 | 12.8 | 14.4 | 21.8 | 26.0 | 32.0 |
| 1998 | 4.7 | 5.8 | 7.2 | 9.0 | 15.2 | 24.5 | 40.1 | 52.6 | 70.2 |
| 1999 | 11.1 | 18.0 | 23.6 | 33.1 | 37.6 | 40.9 | 57.2 | 60.5 | 63.4 |
| 2000 | 7.1 | 11.9 | 16.8 | 20.3 | 26.2 | 28.4 | 48.9 | 51.3 | 53.0 |
| 2001 | 8.3 | 13.6 | 19.3 | 32.0 | 38.7 | 40.8 | 44.0 | 44.0 | 44.0 |
| 2002 | 10.6 | 17.3 | 20.8 | 21.7 | 22.1 | 23.7 | 25.0 | 29.0 | 29.6 |
| 2003 | 17.0 | 31.2 | 43.0 | 65.2 | 75.6 | 79.6 | 79.6 | 80.0 | 80.0 |
| 2004 | 9.1 | 12.5 | 13.9 | 16.7 | 22.1 | 30.6 | 43.0 | 43.0 | 58.9 |
| 2005 | 11.3 | 20.2 | 29.1 | 37.8 | 46.6 | 65.4 | 65.5 | 65.5 | 65.5 |
| 2006 | 7.8 | 12.5 | 17.3 | 23.3 | 24.7 | 31.0 | 39.2 | 39.6 | 42.0 |
| 2007 | 9.5 | 12.8 | 16.0 | 20.4 | 26.9 | 26.9 | 27.1 | 30.8 | 36.1 |
| # Yrs. Années | 37 | 40 | 42 | 42 | 43 | 42 | 41 | 42 | 43 |
| Mean Moyenne | 9.5 | 13.1 | 17.0 | 22.5 | 28.1 | 33.7 | 41.8 | 47.8 | 55.7 |
| Std. Dev. Écart-type | 2.9 | 4.7 | 6.9 | 10.9 | 15.4 | 17.1 | 18.5 | 18.3 | 19.7 |
| Skew. Dissymétrie | 0.75 | 1.42 | 1.69 | 2.12 | 2.18 | 1.59 | 1.54 | 1.39 | 1.40 |
| Kurtosis | 4.03 | 7.51 | 7.45 | 8.94 | 8.71 | 5.59 | 6.72 | 5.79 | 5.74 |

*-99.9 Indicates Missing Data/Données manquantes

Warning: annual maximum amount greater than 100-yr return period amount
Avertissement : la quantité maximale annuelle excède la quantité pour une période de retour de 100 ans

| Year/Année | Duration/Durée | Data/Données | 100-yr/ans |
|---|---|---|---|
| 1967 | 1 h | 86.9 | 76.6 |
| 1967 | 2 h | 89.4 | 87.3 |
| 1967 | 6 h | 111.0 | 99.9 |
| 1967 | 12 h | 113.5 | 105.3 |
| 1968 | 24 h | 117.6 | 117.5 |
| 2003 | 10 min | 31.2 | 27.8 |
| 2003 | 15 min | 43.0 | 38.5 |
| 2003 | 30 min | 65.2 | 56.6 |

**********

Table 2a : Return Period Rainfall Amounts (mm)
Quantité de pluie (mm) par période de retour

| Duration/Durée | 2 yr/ans | 5 yr/ans | 10 yr/ans | 25 yr/ans | 50 yr/ans | 100 yr/ans | #Years Années |
|---|---|---|---|---|---|---|---|
| 5 min | 9.0 | 11.6 | 13.3 | 15.5 | 17.1 | 18.7 | 37 |
| 10 min | 12.4 | 16.5 | 19.2 | 22.7 | 25.3 | 27.8 | 40 |
| 15 min | 15.8 | 21.9 | 25.9 | 31.0 | 34.7 | 38.5 | 42 |
| 30 min | 20.8 | 30.4 | 36.7 | 44.8 | 50.7 | 56.6 | 42 |
| 1 h | 25.6 | 39.2 | 48.3 | 59.7 | 68.2 | 76.6 | 43 |
| 2 h | 30.9 | 46.0 | 56.0 | 68.6 | 78.0 | 87.3 | 42 |
| 6 h | 38.8 | 55.1 | 66.0 | 79.6 | 89.8 | 99.9 | 41 |
| 12 h | 44.8 | 61.0 | 71.7 | 85.3 | 95.3 | 105.3 | 42 |
| 24 h | 52.4 | 69.8 | 81.4 | 95.9 | 106.7 | 117.5 | 43 |

Table 2b :

Return Period Rainfall Rates (mm/h) - 95% Confidence limits
Intensité de la pluie (mm/h) par période de retour - Limites de confiance de 95%

| Duration/Durée | 2 yr/ans | 5 yr/ans | 10 yr/ans | 25 yr/ans | 50 yr/ans | 100 yr/ans | #Years Années |
|---|---|---|---|---|---|---|---|
| 5 min | 108.2 | 139.3 | 159.9 | 186.0 | 205.3 | 224.5 | 37 |
| | +/- 10.4 | +/- 17.6 | +/- 23.7 | +/- 32.0 | +/- 38.3 | +/- 44.6 | 37 |
| 10 min | 74.2 | 99.0 | 115.4 | 136.2 | 151.6 | 166.9 | 40 |
| | +/- 8.0 | +/- 13.5 | +/- 18.2 | +/- 24.5 | +/- 29.3 | +/- 34.2 | 40 |
| 15 min | 63.4 | 87.6 | 103.7 | 124.0 | 139.0 | 153.9 | 42 |
| | +/- 7.6 | +/- 12.8 | +/- 17.3 | +/- 23.4 | +/- 27.9 | +/- 32.6 | 42 |
| 30 min | 41.5 | 60.7 | 73.4 | 89.5 | 101.4 | 113.3 | 42 |
| | +/- 6.0 | +/- 10.2 | +/- 13.7 | +/- 18.5 | +/- 22.1 | +/- 25.8 | 42 |
| 1 h | 25.6 | 39.2 | 48.3 | 59.7 | 68.2 | 76.6 | 43 |
| | +/- 4.2 | +/- 7.1 | +/- 9.6 | +/- 13.0 | +/- 15.5 | +/- 18.1 | 43 |
| 2 h | 15.4 | 23.0 | 28.0 | 34.3 | 39.0 | 43.7 | 42 |
| | +/- 2.4 | +/- 4.0 | +/- 5.4 | +/- 7.3 | +/- 8.7 | +/- 10.2 | 42 |
| 6 h | 6.5 | 9.2 | 11.0 | 13.3 | 15.0 | 16.6 | 41 |
| | +/- 0.9 | +/- 1.5 | +/- 2.0 | +/- 2.7 | +/- 3.2 | +/- 3.7 | 41 |
| 12 h | 3.7 | 5.1 | 6.0 | 7.1 | 7.9 | 8.8 | 42 |
| | +/- 0.4 | +/- 0.7 | +/- 1.0 | +/- 1.3 | +/- 1.6 | +/- 1.8 | 42 |
| 24 h | 2.2 | 2.9 | 3.4 | 4.0 | 4.4 | 4.9 | 43 |
| | +/- 0.2 | +/- 0.4 | +/- 0.5 | +/- 0.7 | +/- 0.8 | +/- 1.0 | 43 |

Table 3 : Interpolation Equation / Équation d'interpolation: R = A*T^B

R = Interpolated Rainfall rate (mm/h)/Intensité interpolée de la pluie (mm/h)
RR = Rainfall rate (mm/h) / Intensité de la pluie (mm/h)
T = Rainfall duration (h) / Durée de la pluie (h)

**********

| Statistics/Statistiques | 2 yr/ans | 5 yr/ans | 10 yr/ans | 25 yr/ans | 50 yr/ans | 100 yr/ans |
|---|---|---|---|---|---|---|
| Mean of RR/Moyenne de RR | 37.8 | 51.8 | 61.0 | 72.7 | 81.3 | 89.9 |
| Std. Dev. /Écart-type (RR) | 37.1 | 48.3 | 55.7 | 65.2 | 72.2 | 79.2 |
| Std. Error/Erreur-type | 8.6 | 16.4 | 21.4 | 27.8 | 32.5 | 37.1 |
| Coefficient (A) | 22.6 | 31.6 | 37.5 | 45.0 | 50.5 | 56.0 |
| Exponent/Exposant (B) | -0.702 | -0.698 | -0.696 | -0.694 | -0.693 | -0.693 |
| Mean % Error/% erreur moyenne | 9.2 | 13.9 | 15.7 | 17.4 | 18.3 | 19.1 |

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# Appendix B

# SWMHYMO Modelling Parameters and Model Output

**Table 9–5** Runoff curve numbers for urban areas 1/

| Cover description<br>cover type and hydrologic condition | Average percent impervious area 2/ | -- CN for hydrologic soil group -- A | B | C | D |
|---|---|---|---|---|---|
| Fully developed urban areas (vegetation established) | | | | | |
| Open space (lawns, parks, golf courses, cemeteries, etc.) 3/ | | | | | |
| Poor condition (grass cover < 50%) | | 68 | 79 | 86 | 89 |
| Fair condition (grass cover 50% to 75%) | | 49 | 69 | 79 | 84 |
| Good condition (grass cover > 75%) | | 39 | 61 | 74 | 80 |
| Impervious areas: | | | | | |
| Paved parking lots, roofs, driveways, etc. (excluding right-of-way) | | 98 | 98 | 98 | 98 |
| Streets and roads: | | | | | |
| Paved; curbs and storm sewers (excluding rig | | 98 | 98 | 98 | 98 |
| Paved; open ditches (including right-of-way) | | 83 | 89 | 92 | 93 |
| Gravel (including right-of-way) | | 76 | 85 | 89 | 91 |
| Dirt (including right-of-way) | | 72 | 82 | 87 | 89 |
| Western desert urban areas: | | | | | |
| Natural desert landscaping (pervious areas on | | 63 | 77 | 85 | 88 |
| Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders) | | 96 | 96 | 96 | 96 |
| Urban districts: | | | | | |
| Commercial and business | 85 | 89 | 92 | 94 | 95 |
| Industrial | 72 | 81 | 88 | 91 | 93 |
| Residential districts by average lot size: | | | | | |
| 1/8 acre or less (town houses) | 65 | 77 | 85 | 90 | 92 |
| 1/4 acre | 38 | 61 | 75 | 83 | 87 |
| 1/3 acre | 30 | 57 | 72 | 81 | 86 |
| 1/2 acre | 25 | 54 | 70 | 80 | 85 |
| 1 acre | 20 | 51 | 68 | 79 | 84 |
| 2 acres | 12 | 46 | 65 | 77 | 82 |
| Developing urban areas | | | | | |
| Newly graded areas (pervious areas only, no vegetation) | | 77 | 86 | 91 | 94 |

Site Soil Groups:
Perth/Parkhill Loam = Soil Group C
Listowel/Harriston Loam = Soil Group B
Hillsburgh Fine Sandy Loam = Soil Group A

The golf course can be said to be in good condition, refer to composite CN calculation

1/ Average runoff condition, and $I_a = 0.2S$.

2/ The average percent impervious area shown was used to develop the composite CNs. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition.

3/ CNs shown are equivalent to those of pasture. Composite CNs may be computed for other combinations of open space type.

4/ Composite CNs for natural desert landscaping should be computed using figures 9–3 or 9–4 based on the impervious area percentage (CN=98) and the pervious area CN. The pervious area CNs are assumed equivalent to desert shrub in poor hydrologic condition.

**Table 9–1** Runoff curve numbers for agricultural lands 1/ — Continued

| Cover description | | | CN for hydrologic soil group | | | |
|---|---|---|---|---|---|---|
| cover type | treatment 2/ | hydrologic condition 3/ | A | B | C | D |
| Pasture, grassland, or range-continuous forage for grazing 4/ | | Poor | 68 | 79 | 86 | 89 |
| | | Fair | 49 | 69 | 79 | 84 |
| | | Good | 39 | 61 | 74 | 80 |
| Meadow-continuous grass, protected from grazing and generally mowed for hay | | Good | 30 | 58 | 71 | 78 |
| Brush-brush-forbs-grass mixture with brush the major element 5/ | | Poor | 48 | 67 | 77 | 83 |
| | | Fair | 35 | 56 | 70 | 77 |
| | | Good | 30 6/ | 48 | 65 | 73 |
| Woods-grass combination (orchard or tree farm) 7/ | | Poor | 57 | 73 | 82 | 86 |
| | | Fair | 43 | 65 | 76 | 82 |
| | | Good | 32 | 58 | 72 | 79 |
| Woods 8/ | | Poor | 45 | 66 | 77 | 83 |
| | | Fair | 36 | 60 | 73 | 79 |
| | | Good | 30 | 55 | 70 | 77 |
| Farmstead–buildings, lanes, driveways, and surrounding lots | | --- | 59 | 74 | 82 | 86 |
| Roads (including right-of-way): | | | | | | |
| Dirt | | --- | 72 | 82 | 87 | 89 |
| Gravel | | --- | 76 | 85 | 89 | 91 |

Site Soil Groups:
Perth/Parkhill Loam = Soil Group C
Listowel/Harriston Loam = Soil Group B
Hillsburgh Fine Sandy Loam = Soil Group A

The external agricultural land can be said to be in good condition, refer to composite CN calculation

Site Soil Groups:
Perth/Parkhill Loam = Soil Group C (Poor Drainage)
Listowel/Harriston Loam = Soil Group B (Fair Drainage)
Hillsburgh Fine Sandy Loam = Soil Group A (Good Drainage)

The drainage type is as per the Soils Map for Wellington County, refer to composite CN calculation

1/ Average runoff condition, and $I_a$=0.2s.

2/ Crop residue cover applies only if residue is on at least 5 percent of the surface throughout the year.

3/ Hydrologic condition is based on combinations of factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥20%), and (e) degree of surface toughness.
Poor: Factors impair infiltration and tend to increase runoff.
Good: Factors encourage average and better then average infiltration and tend to decrease runoff.
For conservation tillage poor hydrologic condition, 5 to 20 percent of the surface is covered with residue (less than 750 pounds per acre for row crops or 300 pounds per acre for small grain).
For conservation tillage good hydrologic condition, more than 20 percent of the surface is covered with residue (greater than 750 pounds per acre for row crops or 300 pounds per acre for small grain).

4/ Poor: < 50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

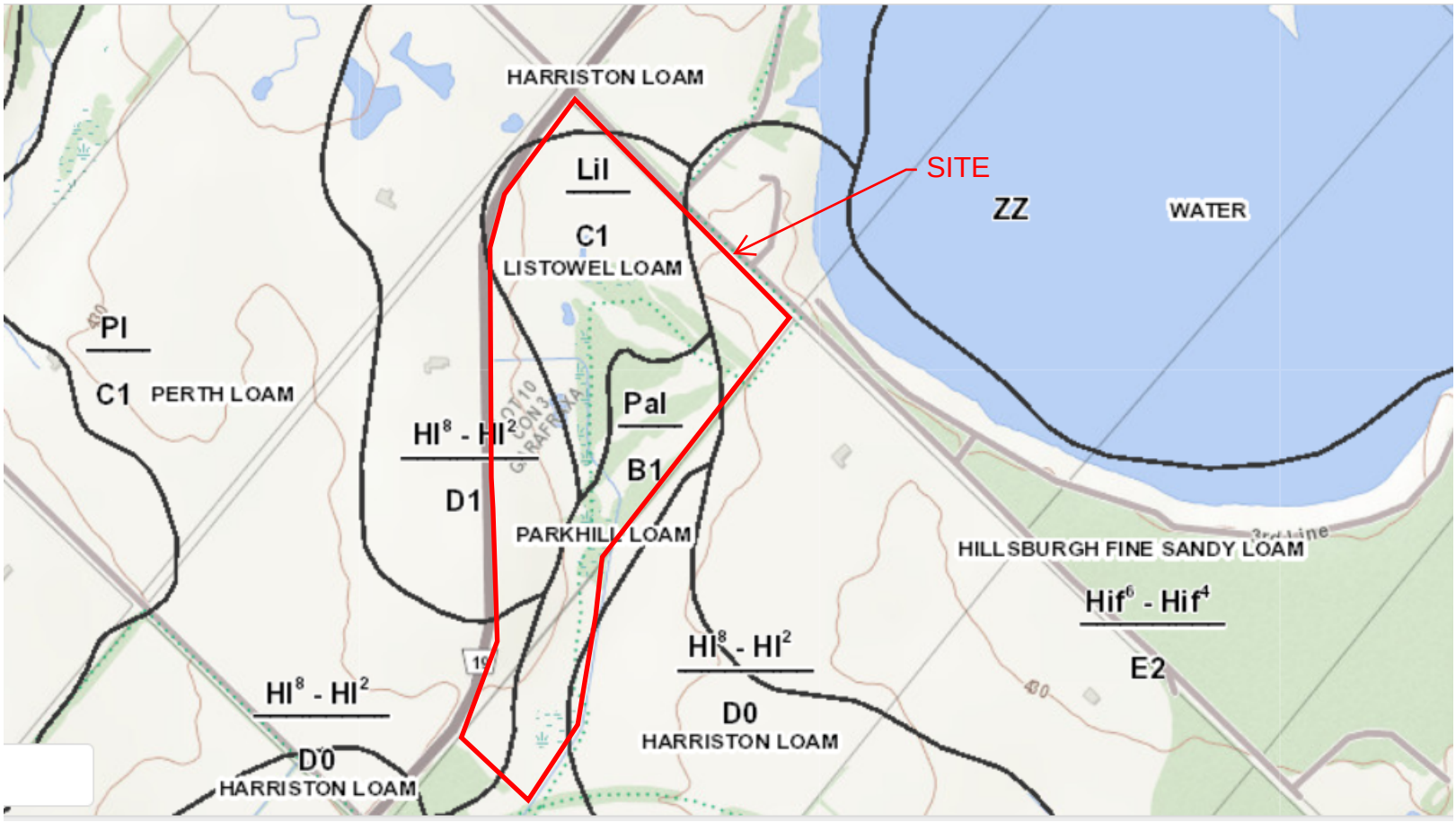
5/ Poor: < 50% ground cover.
Fair: 50 to 75% ground cover.
Good: > 75% ground cover.

6/ If actual curve number is less than 30, use CN = 30 for runoff computation.

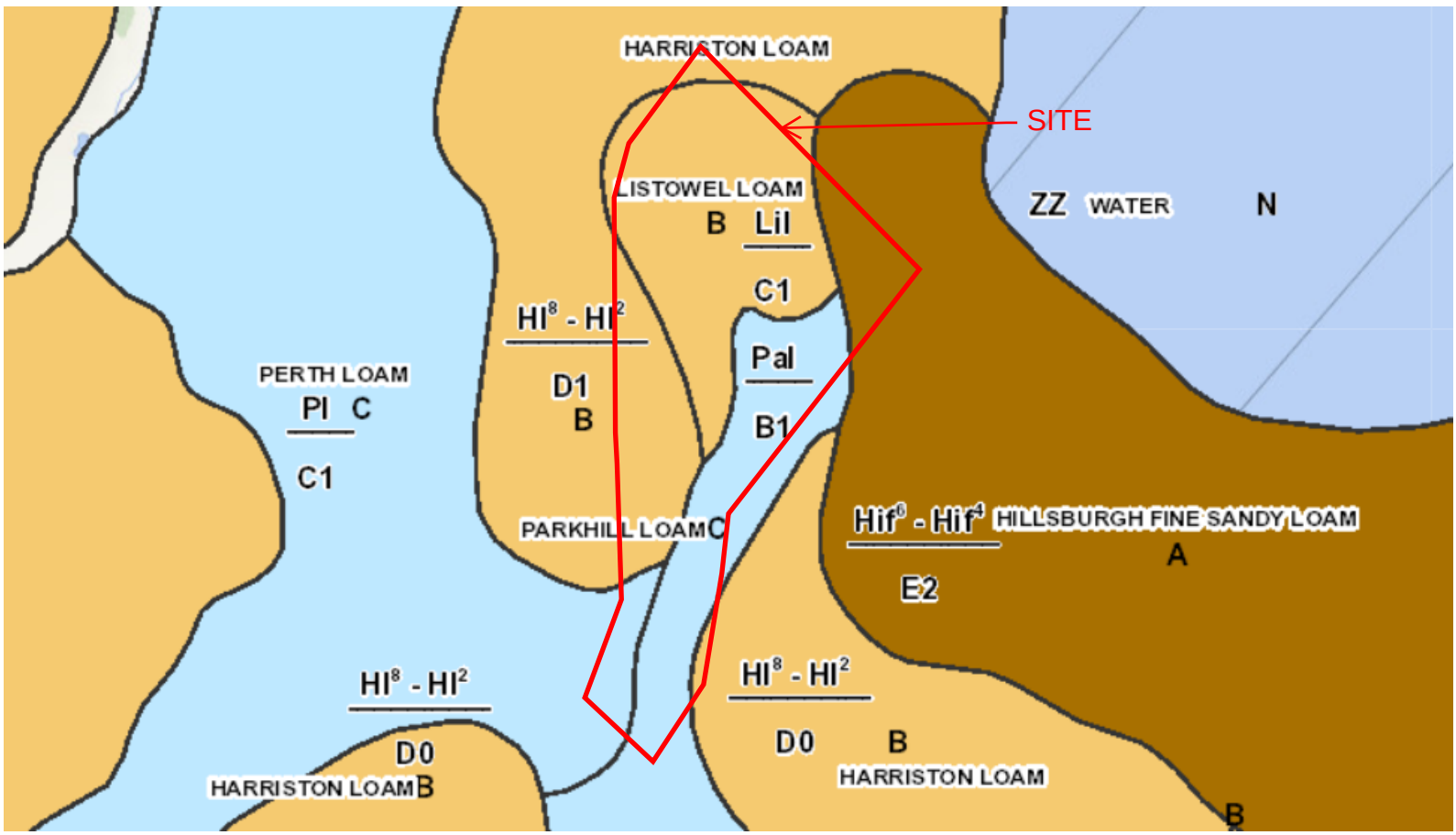
7/ CNs shown were computed for areas with 50 percent woods and 50 percent grass (pasture) cover. Other combinations of conditions may be computed from the CNs for woods and pasture.

8/ Poor: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed, but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Hydrologic Soil Group Mapping - Ontario AgMaps




Mapping with Soil Group



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Project: **Fergus Golf Club**

Task: **Curve Number Summary**

Date: **20-Dec-21**

Prepared by: **L.Garner**

Project no.: **300052719**

**Pre-Development**

| | Perth Loam | | | Listowel Loam | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Soil Name** | Parkhill Loam | | | Harriston Loam | | | Hillsburgh Fine Sandy Loam | | |
| **Land Cover** | Golf Course/Lawn | Woods | Meadow | Golf Course/Lawn | Woods | Meadow | Golf Course/Lawn | Woods | Meadow |
| **Soil Group** | C | C | C | B | B | B | A | A | A |
| **CN Number** | 74 | 77 | 71 | 61 | 60 | 58 | 39 | 30 | 30 |

| | | Soil Group C | | | Soil Group B | | | Soil Group A | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Catchment** | **Total Area** | **Golf Course** | **Woods** | **Meadow** | **Golf Course** | **Woods** | **Meadow** | **Golf Course** | **Woods** | **Meadow** | **CN Number** |
| EXT1 | 7.93 | | | | 7.93 | | | | | | 61 |
| EXT2* | 0.34 | | | | | | 0.34 | | | | 58 |
| EXT3* | 1.23 | | | | | | 1.15 | | | 0.08 | 56 |
| EXT4* | 0.18 | | | | | | | | | 0.18 | 30 |
| EXT5 | 8.51 | | | 0.63 | | | 0.74 | | | 7.14 | 35 |
| EXT6 | 15.73 | | | 0.74 | | | 12.93 | | | 2.06 | 55 |
| 101 | 1.58 | | | | 1.46 | 0.12 | | | | | 61 |
| 102 | 16.14 | | 0.78 | | 10.62 | 3.68 | | 1.06 | | | 60 |
| 103 | 7.09 | 0.88 | 0.27 | | 5.18 | 0.75 | | | | | 63 |
| 104 | 7.13 | 1.53 | 2.86 | | | 0.15 | | 1.79 | 0.80 | | 61 |
| 105 | 7.91 | 5.97 | 0.18 | | 1.64 | 0.12 | | | | | 71 |

*Note: For Stanhyd commands CN value is based solely on the pervious surfaces, in this case the road side ditch ground cover

**Post-Development**

| | | Soil Group C | | Soil Group B | | Soil Group A | | CN Number |
|---|---|---|---|---|---|---|---|---|
| **Catchment** | **Total Area** | **Lawns** | **Woods** | **Lawns** | **Woods** | **Lawns** | **Woods** | |
| 201 | 26.92 | 6.22 | | 17.79 | | 2.91 | | 62 |
| 202 | 2.99 | 2.99 | | | | | | 74 |
| UNC1 | 0.98 | | | 0.98 | | | | 61 |
| UNC2 | 1.81 | 1.41 | | | | 0.40 | | 66 |
| UNC3 | 5.82 | | 0.59 | 3.18 | 2.05 | | | 62 |
| UNC4 | 1.12 | 0.28 | | 0.84 | | | | 64 |
| UNC5 | 0.13 | | | | | 0.13 | | 39 |
| UNC6 | 0.08 | 0.08 | | | | | | 74 |

Note: For Stanhyd commands CN value is based solely on the pervious surfaces

Project: **Fergus Golf Club**
Project #: 300052719
Designed By: L.Garner
Date: 22-Dec-2021

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**Airport Method for Time to Peak Calculations**

Natural Area Watershed Information

| WS | Area (ha) | Length (m) | RC | Slope (%) | Time of Concentration (min) | Time to Peak (hrs) |
|---|---|---|---|---|---|---|
| PRE-DEVELOPMENT | | | | | | |
| 101 | 1.58 | 207 | 0.2 | 2.46 | 31.35 | 0.31 |
| 102 | 16.14 | 618 | 0.2 | 0.73 | 80.75 | 0.81 |
| 103 | 7.09 | 234 | 0.2 | 5.19 | 26.06 | 0.26 |
| 104 | 7.13 | 446 | 0.2 | 1.00 | 62.01 | 0.62 |
| 105 | 7.91 | 269 | 0.2 | 3.94 | 30.61 | 0.31 |
| EXTERNAL | | | | | | |
| EXT1 | 7.93 | 361 | 0.25 | 1.74 | 43.88 | 0.44 |
| EXT5 | 8.51 | 260 | 0.2 | 1.20 | 44.48 | 0.44 |
| EXT6 | 15.73 | 510 | 0.2 | 1.79 | 54.67 | 0.55 |
| POST-DEVELOPMENT | | | | | | |
| UNC1 | 0.98 | 15 | 0.2 | 29.30 | 3.73 | 0.04 |
| UNC2 | 1.81 | 131 | 0.2 | 4.34 | 20.69 | 0.21 |
| UNC3 | 5.82 | 412 | 0.2 | 0.36 | 83.12 | 0.83 |
| UNC4 | 1.12 | 27 | 0.2 | 23.40 | 5.39 | 0.05 |
| UNC5 | 0.13 | 24 | 0.2 | 8.42 | 7.12 | 0.07 |
| UNC6 | 0.08 | 6 | 0.2 | 3.83 | 4.61 | 0.05 |

NOTE: Time to Peak = 0.60Tc

NOTE: Airport method was selected to calculate the watershed time of concentration as per the MOE Drainage Management Manual (for RC less than 0.4) - see below

## Airport Formula

For watersheds where the runoff coefficient, C, is less than 0.40, the Airport formula gives a better estimate of $t_c$. This method was developed for airfields and is expressed as follows:

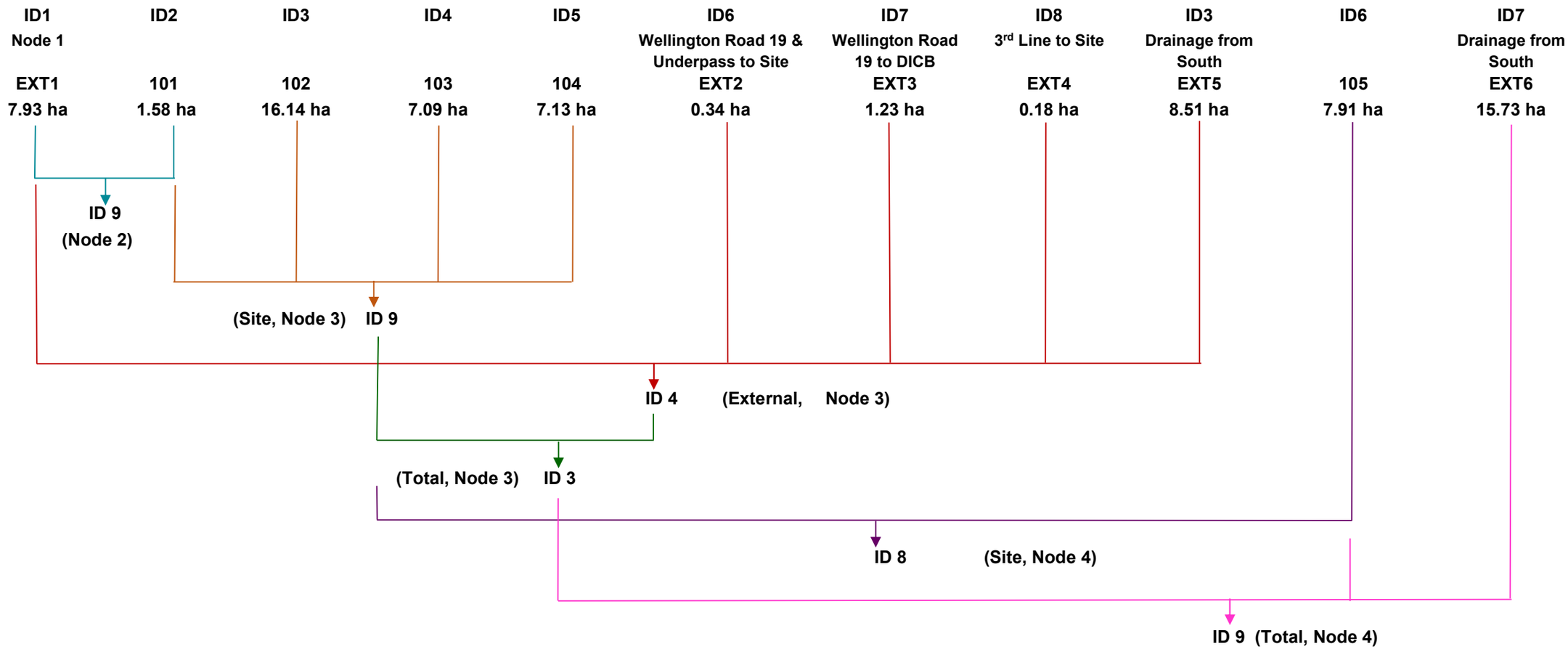
$$t_c = \frac{3.26 * (1.1 - C) * L^{0.5}}{S_w^{0.33}} \qquad (8.16)$$

where:

$t_c$ = time of concentration, min
C = runoff coefficient
$S_w$ = watershed slope, %
L = watershed length, m

When a watershed length is made up of widely differing surfaces (e.g. grass and concrete), $t_c$, can be calculated for each surface, and the individual values summed to give the overall value.

# Pre-Development SWMHYMO Model Schematic




| | |
|---|---|
| **Project Name** | Fergus Golf Course |
| **Project No.** | 300052719.0000 |
| **Date** | September 24, 2021 |

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```
00001> 2     Metric units
00002> *#*************************************************************************
00003> *#  Project Name: [Fergus Golf Club] Project Number: [300052719]
00004> *#  Date        : 09-22-2021
00005> *#  Modeller    : [L.Garner]
00006> *#  Company     : R.J. Burnside & Associates
00007> *#  License #   :  3245976
00008> *#*************************************************************************
00009> *%
00010> *%
00011> *%
00012> *%-----------------|-------------------------------------------------------|
00013> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[0],  NRUN=[0]
00014> *%                   [] <--storm filename
00015> *%-----------------|-------------------------------------------------------|
00016> *2-Year
00017> CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
00018>                     ICASEcs=[1],
00019>                      A=[400.29],  B=[0.0001], and C=[0.702],
00020> *%-----------------|-------------------------------------------------------|
00021> *# ***************************************************************
00022> *# Fergus Golf Club Pre Development                *
00023> *# ***************************************************************
00024> *
00025> *Note: For Time-To-Peak calculations refer to Appendix.
00026> *The existing land use for the site varies between golf course & woods.
00027> *A Composite CN number was established based on Soils Mapping for each catchment
00028> *%-----------------|-------------------------------------------------------|
00029> *%-----------------|-------------------------------------------------------|
00030> *Catchment EXT1
00031> *External area on the northwest of Wellington Road 19.
00032> *This catchment drains to the golf course via a culvert under Wellington Road 19
00033> *and forms the start of the Black Drain at NODE 1
00034>
00035> DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
00036>                     DWF=[0](cms), CN/C=[61], TP=[0.44]hrs,
00037>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00038> *%-----------------|-------------------------------------------------------|
00039> *Catchment 101
00040> *Drains to NODE 2
00041>
00042> DESIGN NASHYD       ID=[2], NHYD=["101"], DT=[2]min, AREA=[1.58](ha),
00043>                     DWF=[0](cms), CN/C=[61], TP=[0.31]hrs,
00044>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00045> *%-----------------|-------------------------------------------------------|
00046> *Total Flow at Node 2 (Catchment EXT1 & 101)
00047>
00048> ADD HYD             IDsum=[9], NHYD=["Node2"], IDs to add=[1,2]
00049> *%-----------------|-------------------------------------------------------|
00050> *Catchment 102
00051> *This catchment refers to the north corner of the site
00052> *These lands ultimately enter the drain by Node 3
00053>
00054> DESIGN NASHYD       ID=[3], NHYD=["102"], DT=[2]min, AREA=[16.14](ha),
00055>                     DWF=[0](cms), CN/C=[60], TP=[0.81]hrs,
00056>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00057> *%-----------------|-------------------------------------------------------|
00058> *Catchment 103
00059> *This catchment refers to the northwest side of the site, existing golf course,
00060> *These land drain to Node 3 along the Black Drain
00061>
00062> DESIGN NASHYD       ID=[4], NHYD=["103"], DT=[2]min, AREA=[7.09](ha),
00063>                     DWF=[0](cms), CN/C=[63], TP=[0.26]hrs,
00064>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00065> *%-----------------|-------------------------------------------------------|
00066> *Catchment 104
00067> *This catchment refers to the southeast corner of the site, existing golf course
00068> * and woods. These land drain to Node 3 along the Black Drain
00069>
00070> DESIGN NASHYD       ID=[5], NHYD=["104"], DT=[2]min, AREA=[7.13](ha),
00071>                     DWF=[0](cms), CN/C=[61], TP=[0.62]hrs,
00072>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00073> *%-----------------|-------------------------------------------------------|
00074> *Total Flow at Node 3, no external (101, 102, 103, 104)
00075> *Pond 1 Allowable Release Rate
00076>
00077> ADD HYD             IDsum=[9], NHYD=["Node3SITE"], IDs to add=[2,3,4,5]
00078> *%-----------------|-------------------------------------------------------|
00079> *Catchment EXT2
00080> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
00081> *This catchment drains to the golf course via a spill point and CB on south side
00082> *Wellington Road 19 and is directed to the Black Drain by Node 3
00083>
00084> DESIGN STANDHYD     ID=[6], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
00085>                     XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
00086>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00087> *%-----------------|-------------------------------------------------------|
00088> *Catchment EXT3
00089> *External area - Wellington Road 19 and 3rd line and
00090> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
00091> *This catchment drains to the golf course via a DICB on west side of 3rd Line
00092> *and is directed to the Black Drain by Node 3
00093>
00094> DESIGN STANDHYD     ID=[7], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
00095>                     XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
00096>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00097> *%-----------------|-------------------------------------------------------|
00098> *Catchment EXT4
00099> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
00100> *This catchment spills to the golf course and is directed to the Black Drain by
00101>
00102> DESIGN STANDHYD     ID=[8], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
00103>                     XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
00104>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00105> *%-----------------|-------------------------------------------------------|
00106> *Catchment EXT5
00107> *External area on the south of the site, existing agricultural
00108> *flows to the Black Drain at Node 3
00109>
00110> DESIGN NASHYD       ID=[3], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
00111>                     DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
00112>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00113> *%-----------------|-------------------------------------------------------|
00114> *Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
00115> *Pond 1 Allowable Release Rate
00116>
00117> ADD HYD             IDsum=[4], NHYD=["Node3EXT"], IDs to add=[1,6,7,8,3]
00118> *%-----------------|-------------------------------------------------------|
00119>
00120> *Total Flow at Node 3, with external
00121> *(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)
00122>
00123> ADD HYD             IDsum=[3], NHYD=["Node3Tot"], IDs to add=[9,4]
00124> *%-----------------|-------------------------------------------------------|
00125> *Catchment 105
00126> *This catchment refers to the southeast corner of the site, existing golf course
00127> *These land drain to Node 4 along the Black Drain
00128> *Pond 2 Allowable Release Rate
00129>
00130> DESIGN NASHYD       ID=[6], NHYD=["105"], DT=[2]min, AREA=[7.91](ha),
00131>                     DWF=[0](cms), CN/C=[71], TP=[0.31]hrs,
00132>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00133> *%-----------------|-------------------------------------------------------|
00134> *Catchment EXT6
00135> *External area on the south of the site, existing agricultural
00136> *flows to the Black Drain at Node 4
00137>
00138> DESIGN NASHYD       ID=[7], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
00139>                     DWF=[0](cms), CN/C=[55], TP=[.55]hrs,
00140>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00141> *%-----------------|-------------------------------------------------------|
00142> *Total Flow at Node 4, no external (101, 102, 103, 104, 105)
00143>
00144> ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[6,9]
00145> *%-----------------|-------------------------------------------------------|
00146> *Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
00147> *103, 104, EXT5, 105, EXT6)
00148>
00149> ADD HYD             IDsum=[9], NHYD=["Node4Tot"], IDs to add=[3,6,7]
00150> *%-----------------|-------------------------------------------------------|
00151> *%-----------------|-------------------------------------------------------|
00152> *5-Year
00153> CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
00154>                     ICASEcs=[1],
00155>                      A=[550.60],  B=[0.0001], and C=[0.698],
00156> *%-----------------|-------------------------------------------------------|
00157> *%-----------------|-------------------------------------------------------|
00158> *Catchment EXT1
00159> *External area on the northwest of Wellington Road 19.
00160> *This catchment drains to the golf course via a culvert under Wellington Road 19
00161> *and forms the start of the Black Drain at NODE 1
00162>
00163> DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
00164>                     DWF=[0](cms), CN/C=[61], TP=[0.44]hrs,
00165>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00166> *%-----------------|-------------------------------------------------------|
00167> *Catchment 101
00168> *Drains to NODE 2
00169>
00170> DESIGN NASHYD       ID=[2], NHYD=["101"], DT=[2]min, AREA=[1.58](ha),
00171>                     DWF=[0](cms), CN/C=[61], TP=[0.31]hrs,
00172>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00173> *%-----------------|-------------------------------------------------------|
00174> *Total Flow at Node 2 (Catchment EXT1 & 101)
00175>
00176> ADD HYD             IDsum=[9], NHYD=["Node2"], IDs to add=[1,2]
00177> *%-----------------|-------------------------------------------------------|
00178> *Catchment 102
00179> *This catchment refers to the north corner of the site
00180> *These lands ultimately enter the drain by Node 3
00181>
00182> DESIGN NASHYD       ID=[3], NHYD=["102"], DT=[2]min, AREA=[16.14](ha),
00183>                     DWF=[0](cms), CN/C=[60], TP=[0.81]hrs,
00184>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00185> *%-----------------|-------------------------------------------------------|
00186> *Catchment 103
00187> *This catchment refers to the northwest side of the site, existing golf course,
00188> *These land drain to Node 3 along the Black Drain
00189>
00190> DESIGN NASHYD       ID=[4], NHYD=["103"], DT=[2]min, AREA=[7.09](ha),
00191>                     DWF=[0](cms), CN/C=[63], TP=[0.26]hrs,
00192>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00193> *%-----------------|-------------------------------------------------------|
00194> *Catchment 104
00195> *This catchment refers to the southeast corner of the site, existing golf course
00196> * and woods. These land drain to Node 3 along the Black Drain
00197>
00198> DESIGN NASHYD       ID=[5], NHYD=["104"], DT=[2]min, AREA=[7.13](ha),
00199>                     DWF=[0](cms), CN/C=[61], TP=[0.62]hrs,
00200>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00201> *%-----------------|-------------------------------------------------------|
00202> *Total Flow at Node 3, no external (101, 102, 103, 104)
00203> *Pond 1 Allowable Release Rate
00204>
00205> ADD HYD             IDsum=[9], NHYD=["Node3SITE"], IDs to add=[2,3,4,5]
00206> *%-----------------|-------------------------------------------------------|
00207> *Catchment EXT2
00208> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
00209> *This catchment drains to the golf course via a spill point and CB on south side
00210> *Wellington Road 19 and is directed to the Black Drain by Node 3
00211>
00212> DESIGN STANDHYD     ID=[6], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
00213>                     XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
00214>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00215> *%-----------------|-------------------------------------------------------|
00216> *Catchment EXT3
00217> *External area - Wellington Road 19 and 3rd line and
00218> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
00219> *This catchment drains to the golf course via a DICB on west side of 3rd Line
00220> *and is directed to the Black Drain by Node 3
00221>
00222> DESIGN STANDHYD     ID=[7], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
00223>                     XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
00224>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00225> *%-----------------|-------------------------------------------------------|
00226> *Catchment EXT4
00227> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
00228> *This catchment spills to the golf course and is directed to the Black Drain by
00229>
00230> DESIGN STANDHYD     ID=[8], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
00231>                     XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
00232>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00233> *%-----------------|-------------------------------------------------------|
00234> *Catchment EXT5
00235> *External area on the south of the site, existing agricultural
00236> *flows to the Black Drain at Node 3
00237>
00238> DESIGN NASHYD       ID=[3], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
00239>                     DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
00240>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00241> *%-----------------|-------------------------------------------------------|
00242> *Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
00243> *Pond 1 Allowable Release Rate
00244>
00245> ADD HYD             IDsum=[4], NHYD=["Node3EXT"], IDs to add=[1,6,7,8,3]
00246> *%-----------------|-------------------------------------------------------|
00247>
00248> *Total Flow at Node 3, with external
00249> *(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)
00250>
00251> ADD HYD             IDsum=[3], NHYD=["Node3Tot"], IDs to add=[9,4]
00252> *%-----------------|-------------------------------------------------------|
00253> *Catchment 105
00254> *This catchment refers to the southeast corner of the site, existing golf course
00255> *These land drain to Node 4 along the Black Drain
00256> *Pond 2 Allowable Release Rate
00257>
00258> DESIGN NASHYD       ID=[6], NHYD=["105"], DT=[2]min, AREA=[7.91](ha),
00259>                     DWF=[0](cms), CN/C=[71], TP=[0.31]hrs,
00260>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00261> *%-----------------|-------------------------------------------------------|
00262> *Catchment EXT6
00263> *External area on the south of the site, existing agricultural
00264> *flows to the Black Drain at Node 4
00265>
00266> DESIGN NASHYD       ID=[7], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
00267>                     DWF=[0](cms), CN/C=[55], TP=[.55]hrs,
00268>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00269> *%-----------------|-------------------------------------------------------|
00270> *Total Flow at Node 4, no external (101, 102, 103, 104, 105)
```

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00271>
00272> ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[6,9]
00273> *%-----------------|-------------------------------------------------------------|
00274> *Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
00275> *103, 104, EXT5, 105, EXT6)
00276>
00277> ADD HYD             IDsum=[9], NHYD=["Node4Tot"], IDs to add=[3,6,7]
00278> *%-----------------|-------------------------------------------------------------|
00279> *%-----------------|-------------------------------------------------------------|
00280> *10-Year
00281> CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
00282>                     ICASEcs=[1],
00283>                      A=[648.07],  B=[0.0001], and C=[0.696],
00284> *%-----------------|-------------------------------------------------------------|
00285> *%-----------------|-------------------------------------------------------------|
00286> *Catchment EXT1
00287> *External area on the northwest of Wellington Road 19.
00288> *This catchment drains to the golf course via a culvert under Wellington Road 19
00289> *and forms the start of the Black Drain at NODE 1
00290>
00291> DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
00292>                     DWF=[0](cms), CN/C=[61], TP=[0.44]hrs,
00293>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00294> *%-----------------|-------------------------------------------------------------|
00295> *Catchment 101
00296> *Drains to NODE 2
00297>
00298> DESIGN NASHYD       ID=[2], NHYD=["101"], DT=[2]min, AREA=[1.58](ha),
00299>                     DWF=[0](cms), CN/C=[61], TP=[0.31]hrs,
00300>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00301> *%-----------------|-------------------------------------------------------------|
00302> *Total Flow at Node 2 (Catchment EXT1 & 101)
00303>
00304> ADD HYD             IDsum=[9], NHYD=["Node2"], IDs to add=[1,2]
00305> *%-----------------|-------------------------------------------------------------|
00306> *Catchment 102
00307> *This catchment refers to the north corner of the site
00308> *These lands ultimately enter the drain by Node 3
00309>
00310> DESIGN NASHYD       ID=[3], NHYD=["102"], DT=[2]min, AREA=[16.14](ha),
00311>                     DWF=[0](cms), CN/C=[60], TP=[0.81]hrs,
00312>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00313> *%-----------------|-------------------------------------------------------------|
00314> *Catchment 103
00315> *This catchment refers to the northwest side of the site, existing golf course,
00316> *These land drain to Node 3 along the Black Drain
00317>
00318> DESIGN NASHYD       ID=[4], NHYD=["103"], DT=[2]min, AREA=[7.09](ha),
00319>                     DWF=[0](cms), CN/C=[63], TP=[0.26]hrs,
00320>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00321> *%-----------------|-------------------------------------------------------------|
00322> *Catchment 104
00323> *This catchment refers to the southeast corner of the site, existing golf course
00324> * and woods. These land drain to Node 3 along the Black Drain
00325>
00326> DESIGN NASHYD       ID=[5], NHYD=["104"], DT=[2]min, AREA=[7.13](ha),
00327>                     DWF=[0](cms), CN/C=[61], TP=[0.62]hrs,
00328>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00329> *%-----------------|-------------------------------------------------------------|
00330> *Total Flow at Node 3, no external (101, 102, 103, 104)
00331> *Pond 1 Allowable Release Rate
00332>
00333> ADD HYD             IDsum=[9], NHYD=["Node3SITE"], IDs to add=[2,3,4,5]
00334> *%-----------------|-------------------------------------------------------------|
00335> *Catchment EXT2
00336> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
00337> *This catchment drains to the golf course via a spill point and CB on south side
00338> *Wellington Road 19 and is directed to the Black Drain by Node 3
00339>
00340> DESIGN STANDHYD     ID=[6], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
00341>                     XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
00342>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00343> *%-----------------|-------------------------------------------------------------|
00344> *Catchment EXT3
00345> *External area - Wellington Road 19 and 3rd line and
00346> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
00347> *This catchment drains to the golf course via a DICB on west side of 3rd Line
00348> *and is directed to the Black Drain by Node 3
00349>
00350> DESIGN STANDHYD     ID=[7], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
00351>                     XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
00352>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00353> *%-----------------|-------------------------------------------------------------|
00354> *Catchment EXT4
00355> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
00356> *This catchment spills to the golf course and is directed to the Black Drain by
00357>
00358> DESIGN STANDHYD     ID=[8], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
00359>                     XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
00360>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00361> *%-----------------|-------------------------------------------------------------|
00362> *Catchment EXT5
00363> *External area on the south of the site, existing agricultural
00364> *flows to the Black Drain at Node 3
00365>
00366> DESIGN NASHYD       ID=[3], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
00367>                     DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
00368>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00369> *%-----------------|-------------------------------------------------------------|
00370> *Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
00371> *Pond 1 Allowable Release Rate
00372>
00373> ADD HYD             IDsum=[4], NHYD=["Node3EXT"], IDs to add=[1,6,7,8,3]
00374> *%-----------------|-------------------------------------------------------------|
00375>
00376> *Total Flow at Node 3, with external
00377> *(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)
00378>
00379> ADD HYD             IDsum=[3], NHYD=["Node3Tot"], IDs to add=[9,4]
00380> *%-----------------|-------------------------------------------------------------|
00381> *Catchment 105
00382> *This catchment refers to the southeast corner of the site, existing golf course
00383> *These land drain to Node 4 along the Black Drain
00384> *Pond 2 Allowable Release Rate
00385>
00386> DESIGN NASHYD       ID=[6], NHYD=["105"], DT=[2]min, AREA=[7.91](ha),
00387>                     DWF=[0](cms), CN/C=[71], TP=[0.31]hrs,
00388>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00389> *%-----------------|-------------------------------------------------------------|
00390> *Catchment EXT6
00391> *External area on the south of the site, existing agricultural
00392> *flows to the Black Drain at Node 4
00393>
00394> DESIGN NASHYD       ID=[7], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
00395>                     DWF=[0](cms), CN/C=[55], TP=[.55]hrs,
00396>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00397> *%-----------------|-------------------------------------------------------------|
00398> *Total Flow at Node 4, no external (101, 102, 103, 104, 105)
00399>
00400> ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[6,9]
00401> *%-----------------|-------------------------------------------------------------|
00402> *Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
00403> *103, 104, EXT5, 105, EXT6)
00404>
00405> ADD HYD             IDsum=[9], NHYD=["Node4Tot"], IDs to add=[3,6,7]
00406> *%-----------------|-------------------------------------------------------------|
00407> *%-----------------|-------------------------------------------------------------|
00408> *25-Year
00409> CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
00410>                     ICASEcs=[1],
00411>                      A=[771.35],  B=[0.0001], and C=[0.694],
00412> *%-----------------|-------------------------------------------------------------|
00413> *%-----------------|-------------------------------------------------------------|
00414> *Catchment EXT1
00415> *External area on the northwest of Wellington Road 19.
00416> *This catchment drains to the golf course via a culvert under Wellington Road 19
00417> *and forms the start of the Black Drain at NODE 1
00418>
00419> DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
00420>                     DWF=[0](cms), CN/C=[61], TP=[0.44]hrs,
00421>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00422> *%-----------------|-------------------------------------------------------------|
00423> *Catchment 101
00424> *Drains to NODE 2
00425>
00426> DESIGN NASHYD       ID=[2], NHYD=["101"], DT=[2]min, AREA=[1.58](ha),
00427>                     DWF=[0](cms), CN/C=[61], TP=[0.31]hrs,
00428>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00429> *%-----------------|-------------------------------------------------------------|
00430> *Total Flow at Node 2 (Catchment EXT1 & 101)
00431>
00432> ADD HYD             IDsum=[9], NHYD=["Node2"], IDs to add=[1,2]
00433> *%-----------------|-------------------------------------------------------------|
00434> *Catchment 102
00435> *This catchment refers to the north corner of the site
00436> *These lands ultimately enter the drain by Node 3
00437>
00438> DESIGN NASHYD       ID=[3], NHYD=["102"], DT=[2]min, AREA=[16.14](ha),
00439>                     DWF=[0](cms), CN/C=[60], TP=[0.81]hrs,
00440>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00441> *%-----------------|-------------------------------------------------------------|
00442> *Catchment 103
00443> *This catchment refers to the northwest side of the site, existing golf course,
00444> *These land drain to Node 3 along the Black Drain
00445>
00446> DESIGN NASHYD       ID=[4], NHYD=["103"], DT=[2]min, AREA=[7.09](ha),
00447>                     DWF=[0](cms), CN/C=[63], TP=[0.26]hrs,
00448>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00449> *%-----------------|-------------------------------------------------------------|
00450> *Catchment 104
00451> *This catchment refers to the southeast corner of the site, existing golf course
00452> * and woods. These land drain to Node 3 along the Black Drain
00453>
00454> DESIGN NASHYD       ID=[5], NHYD=["104"], DT=[2]min, AREA=[7.13](ha),
00455>                     DWF=[0](cms), CN/C=[61], TP=[0.62]hrs,
00456>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00457> *%-----------------|-------------------------------------------------------------|
00458> *Total Flow at Node 3, no external (101, 102, 103, 104)
00459> *Pond 1 Allowable Release Rate
00460>
00461> ADD HYD             IDsum=[9], NHYD=["Node3SITE"], IDs to add=[2,3,4,5]
00462> *%-----------------|-------------------------------------------------------------|
00463> *Catchment EXT2
00464> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
00465> *This catchment drains to the golf course via a spill point and CB on south side
00466> *Wellington Road 19 and is directed to the Black Drain by Node 3
00467>
00468> DESIGN STANDHYD     ID=[6], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
00469>                     XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
00470>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00471> *%-----------------|-------------------------------------------------------------|
00472> *Catchment EXT3
00473> *External area - Wellington Road 19 and 3rd line and
00474> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
00475> *This catchment drains to the golf course via a DICB on west side of 3rd Line
00476> *and is directed to the Black Drain by Node 3
00477>
00478> DESIGN STANDHYD     ID=[7], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
00479>                     XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
00480>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00481> *%-----------------|-------------------------------------------------------------|
00482> *Catchment EXT4
00483> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
00484> *This catchment spills to the golf course and is directed to the Black Drain by
00485>
00486> DESIGN STANDHYD     ID=[8], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
00487>                     XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
00488>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00489> *%-----------------|-------------------------------------------------------------|
00490> *Catchment EXT5
00491> *External area on the south of the site, existing agricultural
00492> *flows to the Black Drain at Node 3
00493>
00494> DESIGN NASHYD       ID=[3], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
00495>                     DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
00496>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00497> *%-----------------|-------------------------------------------------------------|
00498> *Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
00499> *Pond 1 Allowable Release Rate
00500>
00501> ADD HYD             IDsum=[4], NHYD=["Node3EXT"], IDs to add=[1,6,7,8,3]
00502> *%-----------------|-------------------------------------------------------------|
00503>
00504> *Total Flow at Node 3, with external
00505> *(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)
00506>
00507> ADD HYD             IDsum=[3], NHYD=["Node3Tot"], IDs to add=[9,4]
00508> *%-----------------|-------------------------------------------------------------|
00509> *Catchment 105
00510> *This catchment refers to the southeast corner of the site, existing golf course
00511> *These land drain to Node 4 along the Black Drain
00512> *Pond 2 Allowable Release Rate
00513>
00514> DESIGN NASHYD       ID=[6], NHYD=["105"], DT=[2]min, AREA=[7.91](ha),
00515>                     DWF=[0](cms), CN/C=[71], TP=[0.31]hrs,
00516>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00517> *%-----------------|-------------------------------------------------------------|
00518> *Catchment EXT6
00519> *External area on the south of the site, existing agricultural
00520> *flows to the Black Drain at Node 4
00521>
00522> DESIGN NASHYD       ID=[7], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
00523>                     DWF=[0](cms), CN/C=[55], TP=[.55]hrs,
00524>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00525> *%-----------------|-------------------------------------------------------------|
00526> *Total Flow at Node 4, no external (101, 102, 103, 104, 105)
00527>
00528> ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[6,9]
00529> *%-----------------|-------------------------------------------------------------|
00530> *Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
00531> *103, 104, EXT5, 105, EXT6)
00532>
00533> ADD HYD             IDsum=[9], NHYD=["Node4Tot"], IDs to add=[3,6,7]
00534> *%-----------------|-------------------------------------------------------------|
00535> *%-----------------|-------------------------------------------------------------|
00536> *50-Year
00537> CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
00538>                     ICASEcs=[1],
00539>                      A=[862.09],  B=[0.0001], and C=[0.693],
00540> *%-----------------|-------------------------------------------------------------|
```

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*%-----------------|-------------------------------------------------------------|
*Catchment EXT1
*External area on the northwest of Wellington Road 19.
*This catchment drains to the golf course via a culvert under Wellington Road 19
*and forms the start of the Black Drain at NODE 1

DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
                    DWF=[0](cms), CN/C=[61], TP=[0.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment 101
*Drains to NODE 2

DESIGN NASHYD       ID=[2], NHYD=["101"], DT=[2]min, AREA=[1.58](ha),
                    DWF=[0](cms), CN/C=[61], TP=[0.31]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow at Node 2 (Catchment EXT1 & 101)

ADD HYD             IDsum=[9], NHYD=["Node2"], IDs to add=[1,2]
*%-----------------|-------------------------------------------------------------|
*Catchment 102
*This catchment refers to the north corner of the site
*These lands ultimately enter the drain by Node 3

DESIGN NASHYD       ID=[3], NHYD=["102"], DT=[2]min, AREA=[16.14](ha),
                    DWF=[0](cms), CN/C=[60], TP=[0.81]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment 103
*This catchment refers to the northwest side of the site, existing golf course,
*These land drain to Node 3 along the Black Drain

DESIGN NASHYD       ID=[4], NHYD=["103"], DT=[2]min, AREA=[7.09](ha),
                    DWF=[0](cms), CN/C=[63], TP=[0.26]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment 104
*This catchment refers to the southeast corner of the site, existing golf course
* and woods. These land drain to Node 3 along the Black Drain

DESIGN NASHYD       ID=[5], NHYD=["104"], DT=[2]min, AREA=[7.13](ha),
                    DWF=[0](cms), CN/C=[61], TP=[0.62]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow at Node 3, no external (101, 102, 103, 104)
*Pond 1 Allowable Release Rate

ADD HYD             IDsum=[9], NHYD=["Node3SITE"], IDs to add=[2,3,4,5]
*%-----------------|-------------------------------------------------------------|
*Catchment EXT2
*External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
*This catchment drains to the golf course via a spill point and CB on south side
*Wellington Road 19 and is directed to the Black Drain by Node 3

DESIGN STANDHYD     ID=[6], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
                    XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment drains to the golf course via a DICB on west side of 3rd Line
*and is directed to the Black Drain by Node 3

DESIGN STANDHYD     ID=[7], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
                    XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment spills to the golf course and is directed to the Black Drain by

DESIGN STANDHYD     ID=[8], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
                    XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[3], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
                    DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
*Pond 1 Allowable Release Rate

ADD HYD             IDsum=[4], NHYD=["Node3EXT"], IDs to add=[1,6,7,8,3]
*%-----------------|-------------------------------------------------------------|

*Total Flow at Node 3, with external
*(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)

ADD HYD             IDsum=[3], NHYD=["Node3Tot"], IDs to add=[9,4]
*%-----------------|-------------------------------------------------------------|
*Catchment 105
*This catchment refers to the southeast corner of the site, existing golf course
*These land drain to Node 4 along the Black Drain
*Pond 2 Allowable Release Rate

DESIGN NASHYD       ID=[6], NHYD=["105"], DT=[2]min, AREA=[7.91](ha),
                    DWF=[0](cms), CN/C=[71], TP=[0.31]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4

DESIGN NASHYD       ID=[7], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
                    DWF=[0](cms), CN/C=[55], TP=[.55]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow at Node 4, no external (101, 102, 103, 104, 105)

ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[6,9]
*%-----------------|-------------------------------------------------------------|
*Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
*103, 104, EXT5, 105, EXT6)

ADD HYD             IDsum=[9], NHYD=["Node4Tot"], IDs to add=[3,6,7]
*%-----------------|-------------------------------------------------------------|
*%-----------------|-------------------------------------------------------------|
*100-Year
CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
                    ICASEcs=[1],
                     A=[955.98],  B=[0.0001], and C=[0.693],
*%-----------------|-------------------------------------------------------------|
*%-----------------|-------------------------------------------------------------|
*Catchment EXT1
*External area on the northwest of Wellington Road 19.
*This catchment drains to the golf course via a culvert under Wellington Road 19
*and forms the start of the Black Drain at NODE 1

DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
                    DWF=[0](cms), CN/C=[61], TP=[0.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment 101
*Drains to NODE 2

DESIGN NASHYD       ID=[2], NHYD=["101"], DT=[2]min, AREA=[1.58](ha),
                    DWF=[0](cms), CN/C=[61], TP=[0.31]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow at Node 2 (Catchment EXT1 & 101)

ADD HYD             IDsum=[9], NHYD=["Node2"], IDs to add=[1,2]
*%-----------------|-------------------------------------------------------------|
*Catchment 102
*This catchment refers to the north corner of the site
*These lands ultimately enter the drain by Node 3

DESIGN NASHYD       ID=[3], NHYD=["102"], DT=[2]min, AREA=[16.14](ha),
                    DWF=[0](cms), CN/C=[60], TP=[0.81]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment 103
*This catchment refers to the northwest side of the site, existing golf course,
*These land drain to Node 3 along the Black Drain

DESIGN NASHYD       ID=[4], NHYD=["103"], DT=[2]min, AREA=[7.09](ha),
                    DWF=[0](cms), CN/C=[63], TP=[0.26]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment 104
*This catchment refers to the southeast corner of the site, existing golf course
* and woods. These land drain to Node 3 along the Black Drain

DESIGN NASHYD       ID=[5], NHYD=["104"], DT=[2]min, AREA=[7.13](ha),
                    DWF=[0](cms), CN/C=[61], TP=[0.62]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow at Node 3, no external (101, 102, 103, 104)
*Pond 1 Allowable Release Rate

ADD HYD             IDsum=[9], NHYD=["Node3SITE"], IDs to add=[2,3,4,5]
*%-----------------|-------------------------------------------------------------|
*Catchment EXT2
*External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
*This catchment drains to the golf course via a spill point and CB on south side
*Wellington Road 19 and is directed to the Black Drain by Node 3

DESIGN STANDHYD     ID=[6], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
                    XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment drains to the golf course via a DICB on west side of 3rd Line
*and is directed to the Black Drain by Node 3

DESIGN STANDHYD     ID=[7], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
                    XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment spills to the golf course and is directed to the Black Drain by

DESIGN STANDHYD     ID=[8], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
                    XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[3], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
                    DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
*Pond 1 Allowable Release Rate

ADD HYD             IDsum=[4], NHYD=["Node3EXT"], IDs to add=[1,6,7,8,3]
*%-----------------|-------------------------------------------------------------|

*Total Flow at Node 3, with external
*(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)

ADD HYD             IDsum=[3], NHYD=["Node3Tot"], IDs to add=[9,4]
*%-----------------|-------------------------------------------------------------|
*Catchment 105
*This catchment refers to the southeast corner of the site, existing golf course
*These land drain to Node 4 along the Black Drain
*Pond 2 Allowable Release Rate

DESIGN NASHYD       ID=[6], NHYD=["105"], DT=[2]min, AREA=[7.91](ha),
                    DWF=[0](cms), CN/C=[71], TP=[0.31]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4

DESIGN NASHYD       ID=[7], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
                    DWF=[0](cms), CN/C=[55], TP=[.55]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow at Node 4, no external (101, 102, 103, 104, 105)

ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[6,9]
*%-----------------|-------------------------------------------------------------|
*Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
*103, 104, EXT5, 105, EXT6)

ADD HYD             IDsum=[9], NHYD=["Node4Tot"], IDs to add=[3,6,7]
*%-----------------|-------------------------------------------------------------|
FINISH
```

```
00811>
00812>
00813>
00814>
00815>
00816>
00817>
00818>
00819>
00820>
00821>
00822>
00823>
00824>
```

```
00001> ================================================================================
00002>
00003>    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
00004>    S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
00006>        S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
00007>    SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
00008>                                                          9   9  9   9   # 3877524
00009>          StormWater Management HYdrologic Model          999    999    =========
00010>
00011>  ********************************************************************************
00012>  ************************** SWMHYMO Ver/4.05 ***************************************
00013>  *********  A single event and continuous hydrologic simulation model  *********
00014>  *********     based on the principles of HYMO and its successors      *********
00015>  *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
00016>  ********************************************************************************
00017>  ******** Distributed by:  J.F. Sabourin and Associates Inc.           *********
00018>  *********                  Ottawa,  Ontario: (613) 836-3884           *********
00019>  *********                  Gatineau, Quebec: (819) 243-6858           *********
00020>  *********                  E-Mail: swmhymo@jfsa.com                   *********
00021>  ********************************************************************************
00022>
00023>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++++ Licensed user: R.J. Burnside & Associates Ltd                +++++++++
00025>  +++++++++                Brampton              SERIAL#:3877524        +++++++++
00026>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
00030>  *********           Maximum value for ID numbers  :     10            *********
00031>  *********           Max. number of rainfall points: 105408            *********
00032>  *********           Max. number of flow points    : 105408            *********
00033>  ********************************************************************************
00034>
00035>
00036>  **********************   D E T A I L E D   O U T P U T   **********************
00037>  ********************************************************************************
00038>  *         DATE: 2021-12-22     TIME: 13:08:22     RUN COUNTER: 002535         *
00039>  ********************************************************************************
00040>  * Input   filename: C:\SWMHYM~1\FERGUS~1\PRE.DAT                              *
00041>  * Output  filename: C:\SWMHYM~1\FERGUS~1\PRE.out                              *
00042>  * Summary filename: C:\SWMHYM~1\FERGUS~1\PRE.sum                              *
00043>  * User comments:                                                             *
00044>  * 1:_____________________________________________________________________    *
00045>  * 2:_____________________________________________________________________    *
00046>  * 3:_____________________________________________________________________    *
00047>  ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001-----------------------------------------------------------------------
00051> *#*************************************************************************
00052> *#  Project Name: [Fergus Golf Club] Project Number: [300052719]
00053> *#  Date        : 09-22-2021
00054> *#  Modeller    : [L.Garner]
00055> *#  Company     : R.J. Burnside & Associates
00056> *#  License #   :  3245976
00057> *#*************************************************************************
00058> --------------------------------------------------------------------------------
00059> | START            |  Project  dir.: C:\SWMHYM~1\FERGUS~1\
00060> --------------------  Rainfall dir.: C:\SWMHYM~1\FERGUS~1\
00061>     TZERO =   .00 hrs on        0
00062>     METOUT=   2 (output = METRIC)
00063>     NRUN  = 001
00064>     NSTORM=   0
00065> --------------------------------------------------------------------------------
00066> 001:0002-----------------------------------------------------------------------
00067> *2-Year
00068> --------------------
00069> | CHICAGO STORM    |     IDF curve parameters: A= 400.290
00070> | Ptotal= 34.16 mm |                           B=    .000
00071> --------------------                           C=    .702
00072>                          used in:   INTENSITY =  A / (t + B)^C
00073>
00074>                          Duration of storm  =  4.00 hrs
00075>                          Storm time step    =  5.00 min
00076>                          Time to peak ratio =   .33
00077>
00078>                TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00079>                 hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00080>                 .08   2.683 |   1.08   8.628 |   2.08   6.127 |   3.08   3.403
00081>                 .17   2.817 |   1.17  11.819 |   2.17   5.697 |   3.17   3.295
00082>                 .25   2.970 |   1.25  22.044 |   2.25   5.333 |   3.25   3.194
00083>                 .33   3.144 |   1.33 129.328 |   2.33   5.021 |   3.33   3.101
00084>                 .42   3.345 |   1.42  27.075 |   2.42   4.750 |   3.42   3.014
00085>                 .50   3.581 |   1.50  17.037 |   2.50   4.512 |   3.50   2.932
00086>                 .58   3.862 |   1.58  12.977 |   2.58   4.301 |   3.58   2.856
00087>                 .67   4.202 |   1.67  10.680 |   2.67   4.112 |   3.67   2.785
00088>                 .75   4.626 |   1.75   9.174 |   2.75   3.942 |   3.75   2.717
00089>                 .83   5.172 |   1.83   8.098 |   2.83   3.789 |   3.83   2.654
00090>                 .92   5.906 |   1.92   7.285 |   2.92   3.649 |   3.92   2.594
00091>                1.00   6.958 |   2.00   6.645 |   3.00   3.521 |   4.00   2.537
00092>
00093> --------------------------------------------------------------------------------
00094> 001:0003-----------------------------------------------------------------------
00095> *# ************************************************************
00096> *# Fergus Golf Club Pre Development         *
00097> *# ************************************************************
00098> *
00099> *Note: For Time-To-Peak calculations refer to Appendix.
00100> *The existing land use for the site varies between golf course & woods.
00101> *A Composite CN number was established based on Soils Mapping for each catchment
00102> *Catchment EXT1
00103> *External area on the northwest of Wellington Road 19.
00104> *This catchment drains to the golf course via a culvert under Wellington Road 19
00105> *and forms the start of the Black Drain at NODE 1
00106> ----------------------
00107> | DESIGN NASHYD      |   Area     (ha)=    7.93   Curve Number    (CN)=61.00
00108> | 01:EXT1    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00109> ----------------------   U.H. Tp(hrs)=    .440
00110>
00111>      Unit Hyd Qpeak  (cms)=     .688
00112>
00113>      PEAK FLOW       (cms)=     .071 (i)
00114>      TIME TO PEAK    (hrs)=    1.875
00115>      RUNOFF VOLUME    (mm)=    5.468
00116>      TOTAL RAINFALL   (mm)=   34.158
00117>      RUNOFF COEFFICIENT   =     .160
00118>
00119>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00120>
00121> --------------------------------------------------------------------------------
00122> 001:0004-----------------------------------------------------------------------
00123> *Catchment 101
00124> *Drains to NODE 2
00125> ----------------------
00126> | DESIGN NASHYD      |   Area     (ha)=    1.58   Curve Number    (CN)=61.00
00127> | 02:101     DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00128> ----------------------   U.H. Tp(hrs)=    .310
00129>
00130>      Unit Hyd Qpeak  (cms)=     .195
00131>
00132>      PEAK FLOW       (cms)=     .018 (i)
00133>      TIME TO PEAK    (hrs)=    1.708
00134>      RUNOFF VOLUME    (mm)=    5.468
00135>      TOTAL RAINFALL   (mm)=   34.158
00136>      RUNOFF COEFFICIENT   =     .160
00137>
00138>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00139>
00140> --------------------------------------------------------------------------------
00141> 001:0005-----------------------------------------------------------------------
00142> *Total Flow at Node 2 (Catchment EXT1 & 101)
00143> ----------------------
00144> | ADD HYD (Node2     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00145> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00146>                        ID1 01:EXT1         7.93     .071    1.88   5.47    .000
00147>                       +ID2 02:101          1.58     .018    1.71   5.47    .000
00148>                        ========================================================
00149>                        SUM 09:Node2         9.51     .087    1.83   5.47    .000
00150>
00151>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00152>
00153> --------------------------------------------------------------------------------
00154> 001:0006-----------------------------------------------------------------------
00155> *Catchment 102
00156> *This catchment refers to the north corner of the site
00157> *These lands ultimately enter the drain by Node 3
00158> ----------------------
00159> | DESIGN NASHYD      |   Area     (ha)=   16.14   Curve Number    (CN)=60.00
00160> | 03:102     DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00161> ----------------------   U.H. Tp(hrs)=    .810
00162>
00163>      Unit Hyd Qpeak  (cms)=     .761
00164>
00165>      PEAK FLOW       (cms)=     .094 (i)
00166>      TIME TO PEAK    (hrs)=    2.417
00167>      RUNOFF VOLUME    (mm)=    5.280
00168>      TOTAL RAINFALL   (mm)=   34.158
00169>      RUNOFF COEFFICIENT   =     .155
00170>
00171>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00172>
00173> --------------------------------------------------------------------------------
00174> 001:0007-----------------------------------------------------------------------
00175> *Catchment 103
00176> *This catchment refers to the northwest side of the site, existing golf course,
00177> *These land drain to Node 3 along the Black Drain
00178> ----------------------
00179> | DESIGN NASHYD      |   Area     (ha)=    7.09   Curve Number    (CN)=63.00
00180> | 04:103     DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00181> ----------------------   U.H. Tp(hrs)=    .260
00182>
00183>      Unit Hyd Qpeak  (cms)=    1.042
00184>
00185>      PEAK FLOW       (cms)=     .097 (i)
00186>      TIME TO PEAK    (hrs)=    1.625
00187>      RUNOFF VOLUME    (mm)=    5.865
00188>      TOTAL RAINFALL   (mm)=   34.158
00189>      RUNOFF COEFFICIENT   =     .172
00190>
00191>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00192>
00193> --------------------------------------------------------------------------------
00194> 001:0008-----------------------------------------------------------------------
00195> *Catchment 104
00196> *This catchment refers to the southeast corner of the site, existing golf course
00197> * and woods. These land drain to Node 3 along the Black Drain
00198> ----------------------
00199> | DESIGN NASHYD      |   Area     (ha)=    7.13   Curve Number    (CN)=61.00
00200> | 05:104     DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00201> ----------------------   U.H. Tp(hrs)=    .620
00202>
00203>      Unit Hyd Qpeak  (cms)=     .439
00204>
00205>      PEAK FLOW       (cms)=     .051 (i)
00206>      TIME TO PEAK    (hrs)=    2.167
00207>      RUNOFF VOLUME    (mm)=    5.468
00208>      TOTAL RAINFALL   (mm)=   34.158
00209>      RUNOFF COEFFICIENT   =     .160
00210>
00211>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00212>
00213> --------------------------------------------------------------------------------
00214> 001:0009-----------------------------------------------------------------------
00215> *Total Flow at Node 3, no external (101, 102, 103, 104)
00216> *Pond 1 Allowable Release Rate
00217> ----------------------
00218> | ADD HYD (Node3SITE ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00219> ----------------------                   (ha)     (cms)   (hrs)   (mm)    (cms)
00220>                        ID1 02:101          1.58     .018    1.71   5.47    .000
00221>                       +ID2 03:102         16.14     .094    2.42   5.28    .000
00222>                       +ID3 04:103          7.09     .097    1.63   5.87    .000
00223>                       +ID4 05:104          7.13     .051    2.17   5.47    .000
00224>                        ========================================================
00225>                        SUM 09:Node3SITE    31.94     .204    1.92   5.46    .000
00226>
00227>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00228>
00229> --------------------------------------------------------------------------------
00230> 001:0010-----------------------------------------------------------------------
00231> *Catchment EXT2
00232> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
00233> *This catchment drains to the golf course via a spill point and CB on south side
00234> *Wellington Road 19 and is directed to the Black Drain by Node 3
00235> ----------------------
00236> | DESIGN STANDHYD    |   Area     (ha)=     .34
00237> | 06:EXT2    DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
00238> ----------------------
00239>                                IMPERVIOUS    PERVIOUS (i)
00240>      Surface Area      (ha)=         .17          .17
00241>      Dep. Storage      (mm)=         .80         1.50
00242>      Average Slope     (%)=         .50          .50
00243>      Length            (m)=       47.61        40.00
00244>      Mannings n            =        .013         .250
00245>
00246>      Max.eff.Inten.(mm/hr)=      129.33         7.75
00247>                over (min)          2.50        32.50
00248>      Storage Coeff.  (min)=        1.82 (ii)   31.57 (ii)
00249>      Unit Hyd. Tpeak (min)=        2.50        32.50
00250>      Unit Hyd. peak  (cms)=         .51          .04
00251>                                                          *TOTALS*
00252>      PEAK FLOW       (cms)=         .04          .00          .042 (iii)
00253>      TIME TO PEAK    (hrs)=        1.33         1.88         1.333
00254>      RUNOFF VOLUME    (mm)=       33.36         6.27        16.020
00255>      TOTAL RAINFALL   (mm)=       34.16        34.16        34.158
00256>      RUNOFF COEFFICIENT   =         .98          .18          .469
00257>       *** WARNING: Storage Coefficient is smaller than DT!
00258>                    Use a smaller DT or a larger area.
00259>
00260>       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00261>           CN* =  58.0     Ia = Dep. Storage  (Above)
00262>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00263>            THAN THE STORAGE COEFFICIENT.
00264>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00265>
00266> --------------------------------------------------------------------------------
00267> 001:0011-----------------------------------------------------------------------
00268> *Catchment EXT3
00269> *External area - Wellington Road 19 and 3rd line and
00270> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
```

```
*This catchment drains to the golf course via a DICB on west side of 3rd Line
*and is directed to the Black Drain by Node 3
----------
| DESIGN STANDHYD    |   Area    (ha)=    1.23
| 07:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
----------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .73          .50
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      90.55        40.00
     Mannings n         =         .013         .250

     Max.eff.Inten.(mm/hr)=     129.33         7.88
                   over (min)        2.50        32.50
     Storage Coeff.  (min)=       2.67 (ii)   32.23 (ii)
     Unit Hyd. Tpeak (min)=       2.50        32.50
     Unit Hyd. peak  (cms)=        .41          .04
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .17          .01          .170 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.88         1.333
     RUNOFF VOLUME    (mm)=      33.36         6.10        18.093
     TOTAL RAINFALL   (mm)=      34.16        34.16        34.158
     RUNOFF COEFFICIENT   =        .98          .18          .530

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  56.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0012---------------------------------------------------------------------
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment spills to the golf course and is directed to the Black Drain by
----------
| DESIGN STANDHYD    |   Area    (ha)=     .18
| 08:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
----------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .09          .09
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      34.64        40.00
     Mannings n         =         .013         .250

     Max.eff.Inten.(mm/hr)=     129.33         8.26
                   over (min)        2.50        30.00
     Storage Coeff.  (min)=       1.50 (ii)   30.51 (ii)
     Unit Hyd. Tpeak (min)=       2.50        30.00
     Unit Hyd. peak  (cms)=        .55          .04
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .02          .00          .021 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.83         1.333
     RUNOFF VOLUME    (mm)=      33.36         2.21        12.487
     TOTAL RAINFALL   (mm)=      34.16        34.16        34.158
     RUNOFF COEFFICIENT   =        .98          .06          .366
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  30.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0013---------------------------------------------------------------------
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3
----------
| DESIGN NASHYD      |   Area    (ha)=    8.51   Curve Number   (CN)=35.00
| 03:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------  U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .739

     PEAK FLOW       (cms)=     .029 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=    2.115
     TOTAL RAINFALL   (mm)=   34.158
     RUNOFF COEFFICIENT   =     .062

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

--------------------------------------------------------------------------------
001:0014---------------------------------------------------------------------
*Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
*Pond 1 Allowable Release Rate
----------
| ADD HYD (Node3EXT  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXT1          7.93     .071    1.88   5.47    .000
                     +ID2 06:EXT2           .34     .042    1.33  16.02    .000
                     +ID3 07:EXT3          1.23     .170    1.33  18.09    .000
                     +ID4 08:EXT4           .18     .021    1.33  12.49    .000
                     +ID5 03:EXT5          8.51     .029    1.88   2.11    .000
                      ========================================================
                      SUM 04:Node3EXT     18.19     .243    1.33   5.02    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0015---------------------------------------------------------------------
*Total Flow at Node 3, with external
*(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)
----------
| ADD HYD (Node3Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 09:Node3SITE    31.94     .204    1.92   5.46    .000
                     +ID2 04:Node3EXT     18.19     .243    1.33   5.02    .000
                      ========================================================
                      SUM 03:Node3Tot     50.13     .328    1.88   5.30    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0016---------------------------------------------------------------------
*Catchment 105
*This catchment refers to the southeast corner of the site, existing golf course
*These land drain to Node 4 along the Black Drain
*Pond 2 Allowable Release Rate
----------
| DESIGN NASHYD      |   Area    (ha)=    7.91   Curve Number   (CN)=71.00
| 06:105    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------  U.H. Tp(hrs)=    .310

     Unit Hyd Qpeak  (cms)=     .975

     PEAK FLOW       (cms)=     .131 (i)
     TIME TO PEAK    (hrs)=    1.708
     RUNOFF VOLUME    (mm)=    7.819
     TOTAL RAINFALL   (mm)=   34.158
     RUNOFF COEFFICIENT   =     .229

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

--------------------------------------------------------------------------------
001:0017---------------------------------------------------------------------
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4
----------
| DESIGN NASHYD      |   Area    (ha)=   15.73   Curve Number   (CN)=55.00
| 07:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------  U.H. Tp(hrs)=    .550

     Unit Hyd Qpeak  (cms)=    1.092

     PEAK FLOW       (cms)=     .098 (i)
     TIME TO PEAK    (hrs)=    2.042
     RUNOFF VOLUME    (mm)=    4.435
     TOTAL RAINFALL   (mm)=   34.158
     RUNOFF COEFFICIENT   =     .130

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

--------------------------------------------------------------------------------
001:0018---------------------------------------------------------------------
*Total Flow at Node 4, no external (101, 102, 103, 104, 105)
----------
| ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 06:105           7.91     .131    1.71   7.82    .000
                     +ID2 09:Node3SITE    31.94     .204    1.92   5.46    .000
                      ========================================================
                      SUM 08:Node4         39.85     .327    1.75   5.93    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0019---------------------------------------------------------------------
*Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
*103, 104, EXT5, 105, EXT6)
----------
| ADD HYD (Node4Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 03:Node3Tot     50.13     .328    1.88   5.30    .000
                     +ID2 06:105           7.91     .131    1.71   7.82    .000
                     +ID3 07:EXT6         15.73     .098    2.04   4.44    .000
                      ========================================================
                      SUM 09:Node4Tot     73.77     .539    1.83   5.39    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0020---------------------------------------------------------------------
*5-Year
----------
| CHICAGO STORM    |    IDF curve parameters: A= 550.600
| Ptotal= 48.03 mm |                          B=    .000
----------                                    C=    .698
                          used in:   INTENSITY =  A / (t + B)^C

                          Duration of storm  =  4.00 hrs
                          Storm time step    =  5.00 min
                          Time to peak ratio =   .33

              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
              hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
              .08   3.821 |   1.08  12.209 |   2.08   8.686 |   3.08   4.841
              .17   4.012 |   1.17  16.693 |   2.17   8.080 |   3.17   4.688
              .25   4.228 |   1.25  31.019 |   2.25   7.567 |   3.25   4.545
              .33   4.475 |   1.33 179.040 |   2.33   7.127 |   3.33   4.413
              .42   4.759 |   1.42  38.058 |   2.42   6.744 |   3.42   4.290
              .50   5.093 |   1.50  24.013 |   2.50   6.408 |   3.50   4.175
              .58   5.489 |   1.58  18.319 |   2.58   6.110 |   3.58   4.067
              .67   5.971 |   1.67  15.094 |   2.67   5.843 |   3.67   3.966
              .75   6.569 |   1.75  12.977 |   2.75   5.603 |   3.75   3.870
              .83   7.340 |   1.83  11.463 |   2.83   5.386 |   3.83   3.780
              .92   8.375 |   1.92  10.318 |   2.92   5.188 |   3.92   3.695
             1.00   9.858 |   2.00   9.417 |   3.00   5.007 |   4.00   3.615

--------------------------------------------------------------------------------
001:0021---------------------------------------------------------------------
*Catchment EXT1
*External area on the northwest of Wellington Road 19.
*This catchment drains to the golf course via a culvert under Wellington Road 19
*and forms the start of the Black Drain at NODE 1
----------
| DESIGN NASHYD      |   Area    (ha)=    7.93   Curve Number   (CN)=61.00
| 01:EXT1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------  U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .688

     PEAK FLOW       (cms)=     .137 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=   10.361
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .216

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

--------------------------------------------------------------------------------
001:0022---------------------------------------------------------------------
*Catchment 101
*Drains to NODE 2
----------
| DESIGN NASHYD      |   Area    (ha)=    1.58   Curve Number   (CN)=61.00
| 02:101    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------  U.H. Tp(hrs)=    .310

     Unit Hyd Qpeak  (cms)=     .195

     PEAK FLOW       (cms)=     .034 (i)
     TIME TO PEAK    (hrs)=    1.708
     RUNOFF VOLUME    (mm)=   10.361
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .216

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

--------------------------------------------------------------------------------
001:0023---------------------------------------------------------------------
*Total Flow at Node 2 (Catchment EXT1 & 101)
----------
| ADD HYD (Node2     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXT1          7.93     .137    1.88  10.36    .000
                     +ID2 02:101           1.58     .034    1.71  10.36    .000
                      ========================================================
                      SUM 09:Node2          9.51     .168    1.83  10.36    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0024---------------------------------------------------------------------
```

```
*Catchment 102
*This catchment refers to the north corner of the site
*These lands ultimately enter the drain by Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=   16.14   Curve Number   (CN)=60.00
| 03:102    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .810

     Unit Hyd Qpeak  (cms)=     .761

     PEAK FLOW       (cms)=     .181 (i)
     TIME TO PEAK    (hrs)=    2.417
     RUNOFF VOLUME    (mm)=   10.028
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .209

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

-------------------------------------------------------------------------------
001:0025-------------------------------------------------------------------------
*Catchment 103
*This catchment refers to the northwest side of the site, existing golf course,
*These land drain to Node 3 along the Black Drain
----------------------
| DESIGN NASHYD      |   Area    (ha)=    7.09   Curve Number   (CN)=63.00
| 04:103    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=    1.042

     PEAK FLOW       (cms)=     .186 (i)
     TIME TO PEAK    (hrs)=    1.625
     RUNOFF VOLUME    (mm)=   11.061
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .230

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

-------------------------------------------------------------------------------
001:0026-------------------------------------------------------------------------
*Catchment 104
*This catchment refers to the southeast corner of the site, existing golf course
* and woods. These land drain to Node 3 along the Black Drain
----------------------
| DESIGN NASHYD      |   Area    (ha)=    7.13   Curve Number   (CN)=61.00
| 05:104    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .620

     Unit Hyd Qpeak  (cms)=     .439

     PEAK FLOW       (cms)=     .098 (i)
     TIME TO PEAK    (hrs)=    2.125
     RUNOFF VOLUME    (mm)=   10.361
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .216

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

-------------------------------------------------------------------------------
001:0027-------------------------------------------------------------------------
*Total Flow at Node 3, no external (101, 102, 103, 104)
*Pond 1 Allowable Release Rate
------------------------
| ADD HYD (Node3SITE ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 02:101           1.58     .034    1.71  10.36    .000
                     +ID2 03:102          16.14     .181    2.42  10.03    .000
                     +ID3 04:103           7.09     .186    1.63  11.06    .000
                     +ID4 05:104           7.13     .098    2.13  10.36    .000
                      ========================================================
                      SUM 09:Node3SITE    31.94     .391    1.92  10.35    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
001:0028-------------------------------------------------------------------------
*Catchment EXT2
*External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
*This catchment drains to the golf course via a spill point and CB on south side
*Wellington Road 19 and is directed to the Black Drain by Node 3
----------------------
| DESIGN STANDHYD    |   Area    (ha)=    .34
| 06:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
----------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .17          .17
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      47.61        40.00
     Mannings n            =      .013         .250

     Max.eff.Inten.(mm/hr)=     179.04        18.38
               over (min)        2.50        22.50
     Storage Coeff.  (min)=      1.60 (ii)   22.66 (ii)
     Unit Hyd. Tpeak (min)=      2.50        22.50
     Unit Hyd. peak  (cms)=       .54          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       .06          .00          .060 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.67         1.333
     RUNOFF VOLUME    (mm)=     47.23        11.71        24.494
     TOTAL RAINFALL   (mm)=     48.03        48.03        48.025
     RUNOFF COEFFICIENT   =       .98          .24          .510
      *** WARNING: Storage Coefficient is smaller than DT!
                  Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  58.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
001:0029-------------------------------------------------------------------------
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment drains to the golf course via a DICB on west side of 3rd Line
*and is directed to the Black Drain by Node 3
----------------------
| DESIGN STANDHYD    |   Area    (ha)=   1.23
| 07:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
----------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .73          .50
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      90.55        40.00
     Mannings n            =      .013         .250

     Max.eff.Inten.(mm/hr)=     179.04        18.70
               over (min)        2.50        22.50
     Storage Coeff.  (min)=      2.35 (ii)   23.27 (ii)
     Unit Hyd. Tpeak (min)=      2.50        22.50
     Unit Hyd. peak  (cms)=       .45          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       .24          .02          .245 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.67         1.333
     RUNOFF VOLUME    (mm)=     47.23        11.41        27.167
     TOTAL RAINFALL   (mm)=     48.03        48.03        48.025
     RUNOFF COEFFICIENT   =       .98          .24          .566
      *** WARNING: Storage Coefficient is smaller than DT!
                  Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  56.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
001:0030-------------------------------------------------------------------------
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment spills to the golf course and is directed to the Black Drain by
----------------------
| DESIGN STANDHYD    |   Area    (ha)=    .18
| 08:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
----------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .09          .09
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      34.64        40.00
     Mannings n            =      .013         .250

     Max.eff.Inten.(mm/hr)=     179.04         4.69
               over (min)        2.50        37.50
     Storage Coeff.  (min)=      1.32 (ii)   37.68 (ii)
     Unit Hyd. Tpeak (min)=      2.50        37.50
     Unit Hyd. peak  (cms)=       .58          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=       .03          .00          .029 (iii)
     TIME TO PEAK    (hrs)=      1.33         2.00         1.333
     RUNOFF VOLUME    (mm)=     47.23         4.33        18.487
     TOTAL RAINFALL   (mm)=     48.03        48.03        48.025
     RUNOFF COEFFICIENT   =       .98          .09          .385
      *** WARNING: Storage Coefficient is smaller than DT!
                  Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  30.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
001:0031-------------------------------------------------------------------------
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.51   Curve Number   (CN)=35.00
| 03:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .739

     PEAK FLOW       (cms)=     .057 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=    4.177
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .087

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

-------------------------------------------------------------------------------
001:0032-------------------------------------------------------------------------
*Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
*Pond 1 Allowable Release Rate
------------------------
| ADD HYD (Node3EXT  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXT1          7.93     .137    1.88  10.36    .000
                      +ID2 06:EXT2           .34     .060    1.33  24.49    .000
                      +ID3 07:EXT3          1.23     .245    1.33  27.17    .000
                      +ID4 08:EXT4           .18     .029    1.33  18.49    .000
                      +ID5 03:EXT5          8.51     .057    1.88   4.18    .000
                       ========================================================
                       SUM 04:Node3EXT     18.19     .356    1.33   8.95    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
001:0033-------------------------------------------------------------------------
*Total Flow at Node 3, with external
*(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)
------------------------
| ADD HYD (Node3Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 09:Node3SITE    31.94     .391    1.92  10.35    .000
                      +ID2 04:Node3EXT     18.19     .356    1.33   8.95    .000
                       ========================================================
                       SUM 03:Node3Tot     50.13     .625    1.83   9.84    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
001:0034-------------------------------------------------------------------------
*Catchment 105
*This catchment refers to the southeast corner of the site, existing golf course
*These land drain to Node 4 along the Black Drain
*Pond 2 Allowable Release Rate
----------------------
| DESIGN NASHYD      |   Area    (ha)=    7.91   Curve Number   (CN)=71.00
| 06:105    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .310

     Unit Hyd Qpeak  (cms)=     .975

     PEAK FLOW       (cms)=     .245 (i)
     TIME TO PEAK    (hrs)=    1.667
     RUNOFF VOLUME    (mm)=   14.405
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .300

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

-------------------------------------------------------------------------------
001:0035-------------------------------------------------------------------------
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD      |   Area    (ha)=   15.73   Curve Number   (CN)=55.00
| 07:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .550

     Unit Hyd Qpeak  (cms)=    1.092

     PEAK FLOW       (cms)=     .191 (i)
```

```
00811>      TIME TO PEAK    (hrs)=    2.042
00812>      RUNOFF VOLUME    (mm)=    8.511
00813>      TOTAL RAINFALL   (mm)=   48.025
00814>      RUNOFF COEFFICIENT   =     .177
00815>
00816>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00817>
00818> ---------------------------------------------------------------------------
00819> 001:0036-----------------------------------------------------------------
00820> *Total Flow at Node 4, no external (101, 102, 103, 104, 105)
00821> ----------------------
00822> | ADD HYD (Node4     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
00823> ----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
00824>                       ID1 06:105            7.91     .245    1.67  14.40    .000
00825>                      +ID2 09:Node3SITE     31.94     .391    1.92  10.35    .000
00826>                       ========================================================
00827>                       SUM 08:Node4          39.85     .622    1.75  11.15    .000
00828>
00829>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00830>
00831> ---------------------------------------------------------------------------
00832> 001:0037-----------------------------------------------------------------
00833> *Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
00834> *103, 104, EXT5, 105, EXT6)
00835> ----------------------
00836> | ADD HYD (Node4Tot  ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
00837> ----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
00838>                       ID1 03:Node3Tot      50.13     .625    1.83   9.84    .000
00839>                      +ID2 06:105            7.91     .245    1.67  14.40    .000
00840>                      +ID3 07:EXT6          15.73     .191    2.04   8.51    .000
00841>                       ========================================================
00842>                       SUM 09:Node4Tot      73.77    1.026    1.83  10.05    .000
00843>
00844>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00845>
00846> ---------------------------------------------------------------------------
00847> 001:0038-----------------------------------------------------------------
00848> *10-Year
00849> --------------------
00850> | CHICAGO STORM    |    IDF curve parameters: A= 648.070
00851> | Ptotal= 57.15 mm |                          B=    .000
00852> --------------------                          C=    .696
00853>                         used in:   INTENSITY =  A / (t + B)^C
00854>
00855>                         Duration of storm  =  4.00 hrs
00856>                         Storm time step    =  5.00 min
00857>                         Time to peak ratio =   .33
00858>
00859>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00860>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00861>               .08   4.577 |   1.08  14.574 |   2.08  10.379 |   3.08   5.794
00862>               .17   4.805 |   1.17  19.908 |   2.17   9.656 |   3.17   5.611
00863>               .25   5.063 |   1.25  36.926 |   2.25   9.045 |   3.25   5.441
00864>               .33   5.357 |   1.33 211.414 |   2.33   8.520 |   3.33   5.283
00865>               .42   5.697 |   1.42  45.280 |   2.42   8.064 |   3.42   5.136
00866>               .50   6.095 |   1.50  28.609 |   2.50   7.663 |   3.50   4.999
00867>               .58   6.568 |   1.58  21.843 |   2.58   7.308 |   3.58   4.870
00868>               .67   7.142 |   1.67  18.007 |   2.67   6.990 |   3.67   4.749
00869>               .75   7.856 |   1.75  15.488 |   2.75   6.704 |   3.75   4.635
00870>               .83   8.774 |   1.83  13.686 |   2.83   6.445 |   3.83   4.528
00871>               .92  10.008 |   1.92  12.323 |   2.92   6.209 |   3.92   4.426
00872>              1.00  11.775 |   2.00  11.249 |   3.00   5.993 |   4.00   4.330
00873>
00874> ---------------------------------------------------------------------------
00875> 001:0039-----------------------------------------------------------------
00876> *Catchment EXT1
00877> *External area on the northwest of Wellington Road 19.
00878> *This catchment drains to the golf course via a culvert under Wellington Road 19
00879> *and forms the start of the Black Drain at NODE 1
00880> ----------------------
00881> | DESIGN NASHYD      |   Area    (ha)=    7.93   Curve Number   (CN)=61.00
00882> | 01:EXT1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00883> ----------------------   U.H. Tp(hrs)=    .440
00884>
00885>      Unit Hyd Qpeak  (cms)=     .688
00886>
00887>      PEAK FLOW       (cms)=     .189 (i)
00888>      TIME TO PEAK    (hrs)=    1.875
00889>      RUNOFF VOLUME    (mm)=   14.203
00890>      TOTAL RAINFALL   (mm)=   57.150
00891>      RUNOFF COEFFICIENT   =     .249
00892>
00893>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00894>
00895> ---------------------------------------------------------------------------
00896> 001:0040-----------------------------------------------------------------
00897> *Catchment 101
00898> *Drains to NODE 2
00899> ----------------------
00900> | DESIGN NASHYD      |   Area    (ha)=    1.58   Curve Number   (CN)=61.00
00901> | 02:101    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00902> ----------------------   U.H. Tp(hrs)=    .310
00903>
00904>      Unit Hyd Qpeak  (cms)=     .195
00905>
00906>      PEAK FLOW       (cms)=     .047 (i)
00907>      TIME TO PEAK    (hrs)=    1.667
00908>      RUNOFF VOLUME    (mm)=   14.203
00909>      TOTAL RAINFALL   (mm)=   57.150
00910>      RUNOFF COEFFICIENT   =     .249
00911>
00912>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00913>
00914> ---------------------------------------------------------------------------
00915> 001:0041-----------------------------------------------------------------
00916> *Total Flow at Node 2 (Catchment EXT1 & 101)
00917> ----------------------
00918> | ADD HYD (Node2     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
00919> ----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
00920>                       ID1 01:EXT1           7.93     .189    1.88  14.20    .000
00921>                      +ID2 02:101            1.58     .047    1.67  14.20    .000
00922>                       ========================================================
00923>                       SUM 09:Node2          9.51     .232    1.83  14.20    .000
00924>
00925>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00926>
00927> ---------------------------------------------------------------------------
00928> 001:0042-----------------------------------------------------------------
00929> *Catchment 102
00930> *This catchment refers to the north corner of the site
00931> *These lands ultimately enter the drain by Node 3
00932> ----------------------
00933> | DESIGN NASHYD      |   Area    (ha)=   16.14   Curve Number   (CN)=60.00
00934> | 03:102    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00935> ----------------------   U.H. Tp(hrs)=    .810
00936>
00937>      Unit Hyd Qpeak  (cms)=     .761
00938>
00939>      PEAK FLOW       (cms)=     .249 (i)
00940>      TIME TO PEAK    (hrs)=    2.417
00941>      RUNOFF VOLUME    (mm)=   13.765
00942>      TOTAL RAINFALL   (mm)=   57.150
00943>      RUNOFF COEFFICIENT   =     .241
00944>
00945>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00946>
00947> ---------------------------------------------------------------------------
00948> 001:0043-----------------------------------------------------------------
00949> *Catchment 103
00950> *This catchment refers to the northwest side of the site, existing golf course,
00951> *These land drain to Node 3 along the Black Drain
00952> ----------------------
00953> | DESIGN NASHYD      |   Area    (ha)=    7.09   Curve Number   (CN)=63.00
00954> | 04:103    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00955> ----------------------   U.H. Tp(hrs)=    .260
00956>
00957>      Unit Hyd Qpeak  (cms)=    1.042
00958>
00959>      PEAK FLOW       (cms)=     .256 (i)
00960>      TIME TO PEAK    (hrs)=    1.625
00961>      RUNOFF VOLUME    (mm)=   15.120
00962>      TOTAL RAINFALL   (mm)=   57.150
00963>      RUNOFF COEFFICIENT   =     .265
00964>
00965>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00966>
00967> ---------------------------------------------------------------------------
00968> 001:0044-----------------------------------------------------------------
00969> *Catchment 104
00970> *This catchment refers to the southeast corner of the site, existing golf course
00971> * and woods. These land drain to Node 3 along the Black Drain
00972> ----------------------
00973> | DESIGN NASHYD      |   Area    (ha)=    7.13   Curve Number   (CN)=61.00
00974> | 05:104    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00975> ----------------------   U.H. Tp(hrs)=    .620
00976>
00977>      Unit Hyd Qpeak  (cms)=     .439
00978>
00979>      PEAK FLOW       (cms)=     .135 (i)
00980>      TIME TO PEAK    (hrs)=    2.125
00981>      RUNOFF VOLUME    (mm)=   14.203
00982>      TOTAL RAINFALL   (mm)=   57.150
00983>      RUNOFF COEFFICIENT   =     .249
00984>
00985>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00986>
00987> ---------------------------------------------------------------------------
00988> 001:0045-----------------------------------------------------------------
00989> *Total Flow at Node 3, no external (101, 102, 103, 104)
00990> *Pond 1 Allowable Release Rate
00991> ----------------------
00992> | ADD HYD (Node3SITE ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
00993> ----------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
00994>                       ID1 02:101            1.58     .047    1.67  14.20    .000
00995>                      +ID2 03:102           16.14     .249    2.42  13.77    .000
00996>                      +ID3 04:103            7.09     .256    1.63  15.12    .000
00997>                      +ID4 05:104            7.13     .135    2.13  14.20    .000
00998>                       ========================================================
00999>                       SUM 09:Node3SITE     31.94     .540    1.92  14.19    .000
01000>
01001>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01002>
01003> ---------------------------------------------------------------------------
01004> 001:0046-----------------------------------------------------------------
01005> *Catchment EXT2
01006> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
01007> *This catchment drains to the golf course via a spill point and CB on south side
01008> *Wellington Road 19 and is directed to the Black Drain by Node 3
01009> ----------------------
01010> | DESIGN STANDHYD    |   Area    (ha)=     .34
01011> | 06:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
01012> ----------------------
01013>                              IMPERVIOUS    PERVIOUS (i)
01014>      Surface Area     (ha)=        .17          .17
01015>      Dep. Storage     (mm)=        .80         1.50
01016>      Average Slope     (%)=        .50          .50
01017>      Length            (m)=      47.61        40.00
01018>      Mannings n            =       .013         .250
01019>
01020>      Max.eff.Inten.(mm/hr)=     211.41        27.15
01021>                    over (min)       2.50        20.00
01022>      Storage Coeff.  (min)=       1.49 (ii)   19.51 (ii)
01023>      Unit Hyd. Tpeak (min)=       2.50        20.00
01024>      Unit Hyd. peak  (cms)=        .55          .06
01025>                                                          *TOTALS*
01026>      PEAK FLOW       (cms)=        .07          .01          .071 (iii)
01027>      TIME TO PEAK    (hrs)=       1.33         1.63         1.333
01028>      RUNOFF VOLUME    (mm)=      56.35        15.93        30.484
01029>      TOTAL RAINFALL   (mm)=      57.15        57.15        57.150
01030>      RUNOFF COEFFICIENT   =        .99          .28          .533
01031>       *** WARNING: Storage Coefficient is smaller than DT!
01032>                    Use a smaller DT or a larger area.
01033>
01034>       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
01035>           CN* =  58.0    Ia = Dep. Storage  (Above)
01036>      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
01037>           THAN THE STORAGE COEFFICIENT.
01038>     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01039>
01040> ---------------------------------------------------------------------------
01041> 001:0047-----------------------------------------------------------------
01042> *Catchment EXT3
01043> *External area - Wellington Road 19 and 3rd line and
01044> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
01045> *This catchment drains to the golf course via a DICB on west side of 3rd Line
01046> *and is directed to the Black Drain by Node 3
01047> ----------------------
01048> | DESIGN STANDHYD    |   Area    (ha)=    1.23
01049> | 07:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
01050> ----------------------
01051>                              IMPERVIOUS    PERVIOUS (i)
01052>      Surface Area     (ha)=        .73          .50
01053>      Dep. Storage     (mm)=        .80         1.50
01054>      Average Slope     (%)=        .50          .50
01055>      Length            (m)=      90.55        40.00
01056>      Mannings n            =       .013         .250
01057>
01058>      Max.eff.Inten.(mm/hr)=     211.41        27.64
01059>                    over (min)       2.50        20.00
01060>      Storage Coeff.  (min)=       2.20 (ii)   20.09 (ii)
01061>      Unit Hyd. Tpeak (min)=       2.50        20.00
01062>      Unit Hyd. peak  (cms)=        .46          .06
01063>                                                          *TOTALS*
01064>      PEAK FLOW       (cms)=        .29          .02          .295 (iii)
01065>      TIME TO PEAK    (hrs)=       1.33         1.63         1.333
01066>      RUNOFF VOLUME    (mm)=      56.35        15.54        33.497
01067>      TOTAL RAINFALL   (mm)=      57.15        57.15        57.150
01068>      RUNOFF COEFFICIENT   =        .99          .27          .586
01069>       *** WARNING: Storage Coefficient is smaller than DT!
01070>                    Use a smaller DT or a larger area.
01071>
01072>       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
01073>           CN* =  56.0    Ia = Dep. Storage  (Above)
01074>      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
01075>           THAN THE STORAGE COEFFICIENT.
01076>     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01077>
01078> ---------------------------------------------------------------------------
01079> 001:0048-----------------------------------------------------------------
01080> *Catchment EXT4
```

```
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment spills to the golf course and is directed to the Black Drain by
----------------------
| DESIGN STANDHYD    |   Area     (ha)=     .18
| 08:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .09          .09
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      34.64        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     211.41         7.18
                   over (min)        2.50        32.50
     Storage Coeff.  (min)=       1.23 (ii)   31.91 (ii)
     Unit Hyd. Tpeak (min)=       2.50        32.50
     Unit Hyd. peak  (cms)=        .59          .04
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .03          .00          .035 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.88         1.333
     RUNOFF VOLUME    (mm)=      56.35         6.07        22.666
     TOTAL RAINFALL   (mm)=      57.15        57.15        57.150
     RUNOFF COEFFICIENT   =        .99          .11          .397
      *** WARNING: Storage Coefficient is smaller than DT!
                  Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  30.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
001:0049--------------------------------------------------------------------------
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area     (ha)=    8.51   Curve Number   (CN)=35.00
| 03:EXT5   DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .739

     PEAK FLOW       (cms)=     .080 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=    5.872
     TOTAL RAINFALL   (mm)=   57.150
     RUNOFF COEFFICIENT   =     .103

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
001:0050--------------------------------------------------------------------------
*Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
*Pond 1 Allowable Release Rate
------------------------
| ADD HYD (Node3EXT  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXT1          7.93     .189    1.88  14.20    .000
                      +ID2 06:EXT2           .34     .071    1.33  30.48    .000
                      +ID3 07:EXT3          1.23     .295    1.33  33.50    .000
                      +ID4 08:EXT4           .18     .035    1.33  22.67    .000
                      +ID5 03:EXT5          8.51     .080    1.88   5.87    .000
                       ==========================================================
                       SUM 04:Node3EXT      18.19     .434    1.33  12.00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0051--------------------------------------------------------------------------
*Total Flow at Node 3, with external
*(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)
------------------------
| ADD HYD (Node3Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 09:Node3SITE     31.94     .540    1.92  14.19    .000
                      +ID2 04:Node3EXT      18.19     .434    1.33  12.00    .000
                       ==========================================================
                       SUM 03:Node3Tot      50.13     .861    1.83  13.39    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0052--------------------------------------------------------------------------
*Catchment 105
*This catchment refers to the southeast corner of the site, existing golf course
*These land drain to Node 4 along the Black Drain
*Pond 2 Allowable Release Rate
----------------------
| DESIGN NASHYD      |   Area     (ha)=    7.91   Curve Number   (CN)=71.00
| 06:105    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .310

     Unit Hyd Qpeak  (cms)=     .975

     PEAK FLOW       (cms)=     .335 (i)
     TIME TO PEAK    (hrs)=    1.667
     RUNOFF VOLUME    (mm)=   19.429
     TOTAL RAINFALL   (mm)=   57.150
     RUNOFF COEFFICIENT   =     .340

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
001:0053--------------------------------------------------------------------------
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD      |   Area     (ha)=   15.73   Curve Number   (CN)=55.00
| 07:EXT6   DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .550

     Unit Hyd Qpeak  (cms)=    1.092

     PEAK FLOW       (cms)=     .264 (i)
     TIME TO PEAK    (hrs)=    2.042
     RUNOFF VOLUME    (mm)=   11.754
     TOTAL RAINFALL   (mm)=   57.150
     RUNOFF COEFFICIENT   =     .206

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
001:0054--------------------------------------------------------------------------
*Total Flow at Node 4, no external (101, 102, 103, 104, 105)
------------------------
| ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 06:105           7.91     .335    1.67  19.43    .000
                      +ID2 09:Node3SITE     31.94     .540    1.92  14.19    .000
                       ==========================================================
                       SUM 08:Node4         39.85     .855    1.75  15.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0055--------------------------------------------------------------------------
*Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
*103, 104, EXT5, 105, EXT6)
------------------------
| ADD HYD (Node4Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 03:Node3Tot      50.13     .861    1.83  13.39    .000
                      +ID2 06:105           7.91     .335    1.67  19.43    .000
                      +ID3 07:EXT6         15.73     .264    2.04  11.75    .000
                       ==========================================================
                       SUM 09:Node4Tot      73.77    1.411    1.83  13.69    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0056--------------------------------------------------------------------------
*25-Year
----------------------
| CHICAGO STORM    |    IDF curve parameters: A= 771.350
| Ptotal= 68.77 mm |                          B=    .000
----------------------                       C=    .694
                          used in:   INTENSITY =  A / (t + B)^C

                          Duration of storm  =  4.00 hrs
                          Storm time step    =  5.00 min
                          Time to peak ratio =   .33

               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                .08   5.543 |   1.08  17.591 |   2.08  12.540 |   3.08   7.012
                .17   5.818 |   1.17  24.008 |   2.17  11.669 |   3.17   6.791
                .25   6.129 |   1.25  44.448 |   2.25  10.933 |   3.25   6.586
                .33   6.485 |   1.33 252.441 |   2.33  10.300 |   3.33   6.396
                .42   6.895 |   1.42  54.475 |   2.42   9.751 |   3.42   6.219
                .50   7.375 |   1.50  34.465 |   2.50   9.267 |   3.50   6.053
                .58   7.946 |   1.58  26.335 |   2.58   8.839 |   3.58   5.897
                .67   8.638 |   1.67  21.722 |   2.67   8.455 |   3.67   5.751
                .75   9.500 |   1.75  18.692 |   2.75   8.110 |   3.75   5.613
                .83  10.606 |   1.83  16.523 |   2.83   7.797 |   3.83   5.484
                .92  12.093 |   1.92  14.881 |   2.92   7.513 |   3.92   5.361
               1.00  14.222 |   2.00  13.589 |   3.00   7.252 |   4.00   5.245
--------------------------------------------------------------------------------
001:0057--------------------------------------------------------------------------
*Catchment EXT1
*External area on the northwest of Wellington Road 19.
*This catchment drains to the golf course via a culvert under Wellington Road 19
*and forms the start of the Black Drain at NODE 1
----------------------
| DESIGN NASHYD      |   Area     (ha)=    7.93   Curve Number   (CN)=61.00
| 01:EXT1   DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .688

     PEAK FLOW       (cms)=     .264 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=   19.704
     TOTAL RAINFALL   (mm)=   68.771
     RUNOFF COEFFICIENT   =     .287

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
001:0058--------------------------------------------------------------------------
*Catchment 101
*Drains to NODE 2
----------------------
| DESIGN NASHYD      |   Area     (ha)=    1.58   Curve Number   (CN)=61.00
| 02:101    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .310

     Unit Hyd Qpeak  (cms)=     .195

     PEAK FLOW       (cms)=     .066 (i)
     TIME TO PEAK    (hrs)=    1.667
     RUNOFF VOLUME    (mm)=   19.704
     TOTAL RAINFALL   (mm)=   68.771
     RUNOFF COEFFICIENT   =     .287

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
001:0059--------------------------------------------------------------------------
*Total Flow at Node 2 (Catchment EXT1 & 101)
------------------------
| ADD HYD (Node2     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 01:EXT1          7.93     .264    1.88  19.70    .000
                      +ID2 02:101           1.58     .066    1.67  19.70    .000
                       ==========================================================
                       SUM 09:Node2          9.51     .324    1.83  19.70    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0060--------------------------------------------------------------------------
*Catchment 102
*This catchment refers to the north corner of the site
*These lands ultimately enter the drain by Node 3
----------------------
| DESIGN NASHYD      |   Area     (ha)=   16.14   Curve Number   (CN)=60.00
| 03:102    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .810

     Unit Hyd Qpeak  (cms)=     .761

     PEAK FLOW       (cms)=     .348 (i)
     TIME TO PEAK    (hrs)=    2.417
     RUNOFF VOLUME    (mm)=   19.126
     TOTAL RAINFALL   (mm)=   68.771
     RUNOFF COEFFICIENT   =     .278

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
--------------------------------------------------------------------------------
001:0061--------------------------------------------------------------------------
*Catchment 103
*This catchment refers to the northwest side of the site, existing golf course,
*These land drain to Node 3 along the Black Drain
----------------------
| DESIGN NASHYD      |   Area     (ha)=    7.09   Curve Number   (CN)=63.00
| 04:103    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .260

     Unit Hyd Qpeak  (cms)=    1.042

     PEAK FLOW       (cms)=     .357 (i)
     TIME TO PEAK    (hrs)=    1.625
     RUNOFF VOLUME    (mm)=   20.908
     TOTAL RAINFALL   (mm)=   68.771
```

```
01351>      RUNOFF COEFFICIENT   =     .304
01352>
01353>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01354>
01355> -------------------------------------------------------------------------------
01356> 001:0062-------------------------------------------------------------------------
01357> *Catchment 104
01358> *This catchment refers to the southeast corner of the site, existing golf course
01359> * and woods. These land drain to Node 3 along the Black Drain
01360> ----------------------
01361> | DESIGN NASHYD     |   Area    (ha)=    7.13   Curve Number    (CN)=61.00
01362> | 05:104    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01363> ----------------------   U.H. Tp(hrs)=    .620
01364>
01365>      Unit Hyd Qpeak  (cms)=     .439
01366>
01367>      PEAK FLOW       (cms)=     .189 (i)
01368>      TIME TO PEAK    (hrs)=    2.125
01369>      RUNOFF VOLUME    (mm)=   19.704
01370>      TOTAL RAINFALL   (mm)=   68.771
01371>      RUNOFF COEFFICIENT   =     .287
01372>
01373>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01374>
01375> -------------------------------------------------------------------------------
01376> 001:0063-------------------------------------------------------------------------
01377> *Total Flow at Node 3, no external (101, 102, 103, 104)
01378> *Pond 1 Allowable Release Rate
01379> ------------------------
01380> | ADD HYD (Node3SITE ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01381> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
01382>                       ID1 02:101           1.58     .066    1.67  19.70    .000
01383>                      +ID2 03:102          16.14     .348    2.42  19.13    .000
01384>                      +ID3 04:103           7.09     .357    1.63  20.91    .000
01385>                      +ID4 05:104           7.13     .189    2.13  19.70    .000
01386>                       ========================================================
01387>                       SUM 09:Node3SITE     31.94     .755    1.88  19.68    .000
01388>
01389>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01390>
01391> -------------------------------------------------------------------------------
01392> 001:0064-------------------------------------------------------------------------
01393> *Catchment EXT2
01394> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
01395> *This catchment drains to the golf course via a spill point and CB on south side
01396> *Wellington Road 19 and is directed to the Black Drain by Node 3
01397> ----------------------
01398> | DESIGN STANDHYD    |   Area    (ha)=     .34
01399> | 06:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
01400> ----------------------
01401>                              IMPERVIOUS    PERVIOUS (i)
01402>      Surface Area     (ha)=        .17          .17
01403>      Dep. Storage     (mm)=        .80         1.50
01404>      Average Slope     (%)=        .50          .50
01405>      Length            (m)=      47.61        40.00
01406>      Mannings n             =      .013         .250
01407>
01408>      Max.eff.Inten.(mm/hr)=     252.44        40.89
01409>                 over (min)        2.50        17.50
01410>      Storage Coeff.  (min)=       1.39 (ii)   16.69 (ii)
01411>      Unit Hyd. Tpeak (min)=       2.50        17.50
01412>      Unit Hyd. peak  (cms)=        .57          .07
01413>                                                          *TOTALS*
01414>      PEAK FLOW       (cms)=        .08          .01          .087 (iii)
01415>      TIME TO PEAK    (hrs)=       1.33         1.58         1.333
01416>      RUNOFF VOLUME    (mm)=      67.97        21.94        38.510
01417>      TOTAL RAINFALL   (mm)=      68.77        68.77        68.771
01418>      RUNOFF COEFFICIENT   =        .99          .32          .560
01419>       *** WARNING: Storage Coefficient is smaller than DT!
01420>                   Use a smaller DT or a larger area.
01421>
01422>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
01423>            CN* =  58.0    Ia = Dep. Storage  (Above)
01424>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
01425>            THAN THE STORAGE COEFFICIENT.
01426>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01427>
01428> -------------------------------------------------------------------------------
01429> 001:0065-------------------------------------------------------------------------
01430> *Catchment EXT3
01431> *External area - Wellington Road 19 and 3rd line and
01432> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
01433> *This catchment drains to the golf course via a DICB on west side of 3rd Line
01434> *and is directed to the Black Drain by Node 3
01435> ----------------------
01436> | DESIGN STANDHYD    |   Area    (ha)=    1.23
01437> | 07:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
01438> ----------------------
01439>                              IMPERVIOUS    PERVIOUS (i)
01440>      Surface Area     (ha)=        .73          .50
01441>      Dep. Storage     (mm)=        .80         1.50
01442>      Average Slope     (%)=        .50          .50
01443>      Length            (m)=      90.55        40.00
01444>      Mannings n             =      .013         .250
01445>
01446>      Max.eff.Inten.(mm/hr)=     252.44        41.66
01447>                 over (min)        2.50        17.50
01448>      Storage Coeff.  (min)=       2.05 (ii)   17.23 (ii)
01449>      Unit Hyd. Tpeak (min)=       2.50        17.50
01450>      Unit Hyd. peak  (cms)=        .48          .07
01451>                                                          *TOTALS*
01452>      PEAK FLOW       (cms)=        .35          .04          .361 (iii)
01453>      TIME TO PEAK    (hrs)=       1.33         1.58         1.333
01454>      RUNOFF VOLUME    (mm)=      67.97        21.42        41.903
01455>      TOTAL RAINFALL   (mm)=      68.77        68.77        68.771
01456>      RUNOFF COEFFICIENT   =        .99          .31          .609
01457>       *** WARNING: Storage Coefficient is smaller than DT!
01458>                   Use a smaller DT or a larger area.
01459>
01460>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
01461>            CN* =  56.0    Ia = Dep. Storage  (Above)
01462>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
01463>            THAN THE STORAGE COEFFICIENT.
01464>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01465>
01466> -------------------------------------------------------------------------------
01467> 001:0066-------------------------------------------------------------------------
01468> *Catchment EXT4
01469> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
01470> *This catchment spills to the golf course and is directed to the Black Drain by
01471> ----------------------
01472> | DESIGN STANDHYD    |   Area    (ha)=     .18
01473> | 08:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
01474> ----------------------
01475>                              IMPERVIOUS    PERVIOUS (i)
01476>      Surface Area     (ha)=        .09          .09
01477>      Dep. Storage     (mm)=        .80         1.50
01478>      Average Slope     (%)=        .50          .50
01479>      Length            (m)=      34.64        40.00
01480>      Mannings n             =      .013         .250
01481>
01482>      Max.eff.Inten.(mm/hr)=     252.44        11.35
01483>                 over (min)        2.50        27.50
01484>      Storage Coeff.  (min)=       1.15 (ii)   26.69 (ii)
01485>      Unit Hyd. Tpeak (min)=       2.50        27.50
01486>      Unit Hyd. peak  (cms)=        .60          .04
01487>                                                          *TOTALS*
01488>      PEAK FLOW       (cms)=        .04          .00          .041 (iii)
01489>      TIME TO PEAK    (hrs)=       1.33         1.75         1.333
01490>      RUNOFF VOLUME    (mm)=      67.97         8.66        28.235
01491>      TOTAL RAINFALL   (mm)=      68.77        68.77        68.771
01492>      RUNOFF COEFFICIENT   =        .99          .13          .411
01493>       *** WARNING: Storage Coefficient is smaller than DT!
01494>                   Use a smaller DT or a larger area.
01495>
01496>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
01497>            CN* =  30.0    Ia = Dep. Storage  (Above)
01498>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
01499>            THAN THE STORAGE COEFFICIENT.
01500>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01501>
01502> -------------------------------------------------------------------------------
01503> 001:0067-------------------------------------------------------------------------
01504> *Catchment EXT5
01505> *External area on the south of the site, existing agricultural
01506> *flows to the Black Drain at Node 3
01507> ----------------------
01508> | DESIGN NASHYD     |   Area    (ha)=    8.51   Curve Number    (CN)=35.00
01509> | 03:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01510> ----------------------   U.H. Tp(hrs)=    .440
01511>
01512>      Unit Hyd Qpeak  (cms)=     .739
01513>
01514>      PEAK FLOW       (cms)=     .115 (i)
01515>      TIME TO PEAK    (hrs)=    1.875
01516>      RUNOFF VOLUME    (mm)=    8.396
01517>      TOTAL RAINFALL   (mm)=   68.771
01518>      RUNOFF COEFFICIENT   =     .122
01519>
01520>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01521>
01522> -------------------------------------------------------------------------------
01523> 001:0068-------------------------------------------------------------------------
01524> *Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
01525> *Pond 1 Allowable Release Rate
01526> ------------------------
01527> | ADD HYD (Node3EXT  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01528> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
01529>                       ID1 01:EXT1           7.93     .264    1.88  19.70    .000
01530>                      +ID2 06:EXT2            .34     .087    1.33  38.51    .000
01531>                      +ID3 07:EXT3           1.23     .361    1.33  41.90    .000
01532>                      +ID4 08:EXT4            .18     .041    1.33  28.23    .000
01533>                      +ID5 03:EXT5           8.51     .115    1.88   8.40    .000
01534>                       ========================================================
01535>                       SUM 04:Node3EXT      18.19     .537    1.33  16.35    .000
01536>
01537>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01538>
01539> -------------------------------------------------------------------------------
01540> 001:0069-------------------------------------------------------------------------
01541> *Total Flow at Node 3, with external
01542> *(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)
01543> ------------------------
01544> | ADD HYD (Node3Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01545> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
01546>                       ID1 09:Node3SITE     31.94     .755    1.88  19.68    .000
01547>                      +ID2 04:Node3EXT      18.19     .537    1.33  16.35    .000
01548>                       ========================================================
01549>                       SUM 03:Node3Tot      50.13    1.201    1.83  18.47    .000
01550>
01551>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01552>
01553> -------------------------------------------------------------------------------
01554> 001:0070-------------------------------------------------------------------------
01555> *Catchment 105
01556> *This catchment refers to the southeast corner of the site, existing golf course
01557> *These land drain to Node 4 along the Black Drain
01558> *Pond 2 Allowable Release Rate
01559> ----------------------
01560> | DESIGN NASHYD     |   Area    (ha)=    7.91   Curve Number    (CN)=71.00
01561> | 06:105    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01562> ----------------------   U.H. Tp(hrs)=    .310
01563>
01564>      Unit Hyd Qpeak  (cms)=     .975
01565>
01566>      PEAK FLOW       (cms)=     .461 (i)
01567>      TIME TO PEAK    (hrs)=    1.667
01568>      RUNOFF VOLUME    (mm)=   26.462
01569>      TOTAL RAINFALL   (mm)=   68.771
01570>      RUNOFF COEFFICIENT   =     .385
01571>
01572>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01573>
01574> -------------------------------------------------------------------------------
01575> 001:0071-------------------------------------------------------------------------
01576> *Catchment EXT6
01577> *External area on the south of the site, existing agricultural
01578> *flows to the Black Drain at Node 4
01579> ----------------------
01580> | DESIGN NASHYD     |   Area    (ha)=   15.73   Curve Number    (CN)=55.00
01581> | 07:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01582> ----------------------   U.H. Tp(hrs)=    .550
01583>
01584>      Unit Hyd Qpeak  (cms)=    1.092
01585>
01586>      PEAK FLOW       (cms)=     .372 (i)
01587>      TIME TO PEAK    (hrs)=    2.042
01588>      RUNOFF VOLUME    (mm)=   16.451
01589>      TOTAL RAINFALL   (mm)=   68.771
01590>      RUNOFF COEFFICIENT   =     .239
01591>
01592>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01593>
01594> -------------------------------------------------------------------------------
01595> 001:0072-------------------------------------------------------------------------
01596> *Total Flow at Node 4, no external (101, 102, 103, 104, 105)
01597> ------------------------
01598> | ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01599> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
01600>                       ID1 06:105            7.91     .461    1.67  26.46    .000
01601>                      +ID2 09:Node3SITE     31.94     .755    1.88  19.68    .000
01602>                       ========================================================
01603>                       SUM 08:Node4         39.85    1.189    1.75  21.03    .000
01604>
01605>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01606>
01607> -------------------------------------------------------------------------------
01608> 001:0073-------------------------------------------------------------------------
01609> *Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
01610> *103, 104, EXT5, 105, EXT6)
01611> ------------------------
01612> | ADD HYD (Node4Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01613> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
01614>                       ID1 03:Node3Tot      50.13    1.201    1.83  18.47    .000
01615>                      +ID2 06:105            7.91     .461    1.67  26.46    .000
01616>                      +ID3 07:EXT6          15.73     .372    2.04  16.45    .000
01617>                       ========================================================
01618>                       SUM 09:Node4Tot      73.77    1.967    1.83  18.90    .000
01619>
01620>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
01621>
01622> ------------------------------------------------------------------------------
01623> 001:0074------------------------------------------------------------------------
01624> *50-Year
01625> --------------------
01626> | CHICAGO STORM    |    IDF curve parameters: A= 862.090
01627> | Ptotal= 77.28 mm |                          B=    .000
01628> --------------------                          C=    .693
01629>                          used in:   INTENSITY =  A / (t + B)^C
01630>
01631>                          Duration of storm  =  4.00 hrs
01632>                          Storm time step    =  5.00 min
01633>                          Time to peak ratio =   .33
01634>
01635>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
01636>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
01637>               .08   6.249 |   1.08  19.799 |   2.08  14.121 |   3.08   7.903
01638>               .17   6.559 |   1.17  27.009 |   2.17  13.142 |   3.17   7.654
01639>               .25   6.909 |   1.25  49.956 |   2.25  12.313 |   3.25   7.423
01640>               .33   7.309 |   1.33 282.592 |   2.33  11.602 |   3.33   7.209
01641>               .42   7.771 |   1.42  61.210 |   2.42  10.984 |   3.42   7.009
01642>               .50   8.311 |   1.50  38.752 |   2.50  10.440 |   3.50   6.823
01643>               .58   8.953 |   1.58  29.622 |   2.58   9.958 |   3.58   6.648
01644>               .67   9.732 |   1.67  24.441 |   2.67   9.526 |   3.67   6.483
01645>               .75  10.701 |   1.75  21.035 |   2.75   9.138 |   3.75   6.328
01646>               .83  11.946 |   1.83  18.598 |   2.83   8.786 |   3.83   6.182
01647>               .92  13.618 |   1.92  16.753 |   2.92   8.466 |   3.92   6.044
01648>              1.00  16.011 |   2.00  15.300 |   3.00   8.173 |   4.00   5.913
01649>
01650> ------------------------------------------------------------------------------
01651> 001:0075------------------------------------------------------------------------
01652> *Catchment EXT1
01653> *External area on the northwest of Wellington Road 19.
01654> *This catchment drains to the golf course via a culvert under Wellington Road 19
01655> *and forms the start of the Black Drain at NODE 1
01656> ----------------------
01657> | DESIGN NASHYD      |   Area    (ha)=    7.93   Curve Number    (CN)=61.00
01658> | 01:EXT1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01659> ----------------------   U.H. Tp(hrs)=    .440
01660>
01661>      Unit Hyd Qpeak  (cms)=     .688
01662>
01663>      PEAK FLOW       (cms)=     .325 (i)
01664>      TIME TO PEAK    (hrs)=    1.875
01665>      RUNOFF VOLUME    (mm)=   24.113
01666>      TOTAL RAINFALL   (mm)=   77.284
01667>      RUNOFF COEFFICIENT   =     .312
01668>
01669>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01670>
01671> ------------------------------------------------------------------------------
01672> 001:0076------------------------------------------------------------------------
01673> *Catchment 101
01674> *Drains to NODE 2
01675> ----------------------
01676> | DESIGN NASHYD      |   Area    (ha)=    1.58   Curve Number    (CN)=61.00
01677> | 02:101    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01678> ----------------------   U.H. Tp(hrs)=    .310
01679>
01680>      Unit Hyd Qpeak  (cms)=     .195
01681>
01682>      PEAK FLOW       (cms)=     .082 (i)
01683>      TIME TO PEAK    (hrs)=    1.667
01684>      RUNOFF VOLUME    (mm)=   24.113
01685>      TOTAL RAINFALL   (mm)=   77.284
01686>      RUNOFF COEFFICIENT   =     .312
01687>
01688>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01689>
01690> ------------------------------------------------------------------------------
01691> 001:0077------------------------------------------------------------------------
01692> *Total Flow at Node 2 (Catchment EXT1 & 101)
01693> ------------------------
01694> | ADD HYD (Node2     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01695> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
01696>                         ID1 01:EXT1          7.93     .325    1.88  24.11    .000
01697>                        +ID2 02:101           1.58     .082    1.67  24.11    .000
01698>                         ============================================================
01699>                         SUM 09:Node2          9.51     .399    1.83  24.11    .000
01700>
01701>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01702>
01703> ------------------------------------------------------------------------------
01704> 001:0078------------------------------------------------------------------------
01705> *Catchment 102
01706> *This catchment refers to the north corner of the site
01707> *These lands ultimately enter the drain by Node 3
01708> ----------------------
01709> | DESIGN NASHYD      |   Area    (ha)=   16.14   Curve Number    (CN)=60.00
01710> | 03:102    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01711> ----------------------   U.H. Tp(hrs)=    .810
01712>
01713>      Unit Hyd Qpeak  (cms)=     .761
01714>
01715>      PEAK FLOW       (cms)=     .428 (i)
01716>      TIME TO PEAK    (hrs)=    2.417
01717>      RUNOFF VOLUME    (mm)=   23.430
01718>      TOTAL RAINFALL   (mm)=   77.284
01719>      RUNOFF COEFFICIENT   =     .303
01720>
01721>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01722>
01723> ------------------------------------------------------------------------------
01724> 001:0079------------------------------------------------------------------------
01725> *Catchment 103
01726> *This catchment refers to the northwest side of the site, existing golf course,
01727> *These land drain to Node 3 along the Black Drain
01728> ----------------------
01729> | DESIGN NASHYD      |   Area    (ha)=    7.09   Curve Number    (CN)=63.00
01730> | 04:103    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01731> ----------------------   U.H. Tp(hrs)=    .260
01732>
01733>      Unit Hyd Qpeak  (cms)=    1.042
01734>
01735>      PEAK FLOW       (cms)=     .439 (i)
01736>      TIME TO PEAK    (hrs)=    1.625
01737>      RUNOFF VOLUME    (mm)=   25.530
01738>      TOTAL RAINFALL   (mm)=   77.284
01739>      RUNOFF COEFFICIENT   =     .330
01740>
01741>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01742>
01743> ------------------------------------------------------------------------------
01744> 001:0080------------------------------------------------------------------------
01745> *Catchment 104
01746> *This catchment refers to the southeast corner of the site, existing golf course
01747> * and woods. These land drain to Node 3 along the Black Drain
01748> ----------------------
01749> | DESIGN NASHYD      |   Area    (ha)=    7.13   Curve Number    (CN)=61.00
01750> | 05:104    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01751> ----------------------   U.H. Tp(hrs)=    .620
01752>
01753>      Unit Hyd Qpeak  (cms)=     .439
01754>
01755>      PEAK FLOW       (cms)=     .233 (i)
01756>      TIME TO PEAK    (hrs)=    2.125
01757>      RUNOFF VOLUME    (mm)=   24.113
01758>      TOTAL RAINFALL   (mm)=   77.284
01759>      RUNOFF COEFFICIENT   =     .312
01760>
01761>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01762>
01763> ------------------------------------------------------------------------------
01764> 001:0081------------------------------------------------------------------------
01765> *Total Flow at Node 3, no external (101, 102, 103, 104)
01766> *Pond 1 Allowable Release Rate
01767> ------------------------
01768> | ADD HYD (Node3SITE ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01769> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
01770>                         ID1 02:101           1.58     .082    1.67  24.11    .000
01771>                        +ID2 03:102          16.14     .428    2.42  23.43    .000
01772>                        +ID3 04:103           7.09     .439    1.63  25.53    .000
01773>                        +ID4 05:104           7.13     .233    2.13  24.11    .000
01774>                         ============================================================
01775>                         SUM 09:Node3SITE     31.94     .929    1.88  24.08    .000
01776>
01777>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01778>
01779> ------------------------------------------------------------------------------
01780> 001:0082------------------------------------------------------------------------
01781> *Catchment EXT2
01782> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
01783> *This catchment drains to the golf course via a spill point and CB on south side
01784> *Wellington Road 19 and is directed to the Black Drain by Node 3
01785> ----------------------
01786> | DESIGN STANDHYD    |   Area    (ha)=     .34
01787> | 06:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
01788> ----------------------
01789>                                  IMPERVIOUS    PERVIOUS (i)
01790>      Surface Area      (ha)=          .17          .17
01791>      Dep. Storage      (mm)=          .80         1.50
01792>      Average Slope      (%)=          .50          .50
01793>      Length             (m)=       47.61        40.00
01794>      Mannings n            =         .013         .250
01795>
01796>      Max.eff.Inten.(mm/hr)=       282.59        55.49
01797>                 over (min)          2.50        15.00
01798>      Storage Coeff.  (min)=          1.33 (ii)   14.87 (ii)
01799>      Unit Hyd. Tpeak (min)=          2.50        15.00
01800>      Unit Hyd. peak  (cms)=           .58          .08
01801>                                                          *TOTALS*
01802>      PEAK FLOW       (cms)=           .09          .02          .099 (iii)
01803>      TIME TO PEAK    (hrs)=          1.33         1.54         1.333
01804>      RUNOFF VOLUME    (mm)=         76.48        26.72        44.633
01805>      TOTAL RAINFALL   (mm)=         77.28        77.28        77.284
01806>      RUNOFF COEFFICIENT   =           .99          .35          .578
01807>       *** WARNING: Storage Coefficient is smaller than DT!
01808>                   Use a smaller DT or a larger area.
01809>
01810>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
01811>            CN* =  58.0    Ia = Dep. Storage  (Above)
01812>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
01813>            THAN THE STORAGE COEFFICIENT.
01814>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01815>
01816> ------------------------------------------------------------------------------
01817> 001:0083------------------------------------------------------------------------
01818> *Catchment EXT3
01819> *External area - Wellington Road 19 and 3rd line and
01820> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
01821> *This catchment drains to the golf course via a DICB on west side of 3rd Line
01822> *and is directed to the Black Drain by Node 3
01823> ----------------------
01824> | DESIGN STANDHYD    |   Area    (ha)=    1.23
01825> | 07:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
01826> ----------------------
01827>                                  IMPERVIOUS    PERVIOUS (i)
01828>      Surface Area      (ha)=          .73          .50
01829>      Dep. Storage      (mm)=          .80         1.50
01830>      Average Slope      (%)=          .50          .50
01831>      Length             (m)=       90.55        40.00
01832>      Mannings n            =         .013         .250
01833>
01834>      Max.eff.Inten.(mm/hr)=       282.59        56.56
01835>                 over (min)          2.50        15.00
01836>      Storage Coeff.  (min)=          1.96 (ii)   15.39 (ii)
01837>      Unit Hyd. Tpeak (min)=          2.50        15.00
01838>      Unit Hyd. peak  (cms)=           .49          .07
01839>                                                          *TOTALS*
01840>      PEAK FLOW       (cms)=           .40          .05          .411 (iii)
01841>      TIME TO PEAK    (hrs)=          1.33         1.54         1.333
01842>      RUNOFF VOLUME    (mm)=         76.48        26.11        48.274
01843>      TOTAL RAINFALL   (mm)=         77.28        77.28        77.284
01844>      RUNOFF COEFFICIENT   =           .99          .34          .625
01845>       *** WARNING: Storage Coefficient is smaller than DT!
01846>                   Use a smaller DT or a larger area.
01847>
01848>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
01849>            CN* =  56.0    Ia = Dep. Storage  (Above)
01850>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
01851>            THAN THE STORAGE COEFFICIENT.
01852>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01853>
01854> ------------------------------------------------------------------------------
01855> 001:0084------------------------------------------------------------------------
01856> *Catchment EXT4
01857> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
01858> *This catchment spills to the golf course and is directed to the Black Drain by
01859> ----------------------
01860> | DESIGN STANDHYD    |   Area    (ha)=     .18
01861> | 08:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
01862> ----------------------
01863>                                  IMPERVIOUS    PERVIOUS (i)
01864>      Surface Area      (ha)=          .09          .09
01865>      Dep. Storage      (mm)=          .80         1.50
01866>      Average Slope      (%)=          .50          .50
01867>      Length             (m)=       34.64        40.00
01868>      Mannings n            =         .013         .250
01869>
01870>      Max.eff.Inten.(mm/hr)=       282.59        16.05
01871>                 over (min)          2.50        22.50
01872>      Storage Coeff.  (min)=          1.10 (ii)   23.33 (ii)
01873>      Unit Hyd. Tpeak (min)=          2.50        22.50
01874>      Unit Hyd. peak  (cms)=           .61          .05
01875>                                                          *TOTALS*
01876>      PEAK FLOW       (cms)=           .05          .00          .047 (iii)
01877>      TIME TO PEAK    (hrs)=          1.33         1.67         1.333
01878>      RUNOFF VOLUME    (mm)=         76.48        10.81        32.481
01879>      TOTAL RAINFALL   (mm)=         77.28        77.28        77.284
01880>      RUNOFF COEFFICIENT   =           .99          .14          .420
01881>       *** WARNING: Storage Coefficient is smaller than DT!
01882>                   Use a smaller DT or a larger area.
01883>
01884>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
01885>            CN* =  30.0    Ia = Dep. Storage  (Above)
01886>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
01887>            THAN THE STORAGE COEFFICIENT.
01888>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01889>
01890> ------------------------------------------------------------------------------
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01891> 001:0085-------------------------------------------------------------------------------
01892> *Catchment EXT5
01893> *External area on the south of the site, existing agricultural
01894> *flows to the Black Drain at Node 3
01895> ----------------------
01896> | DESIGN NASHYD      |   Area    (ha)=    8.51   Curve Number   (CN)=35.00
01897> | 03:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01898> ----------------------   U.H. Tp(hrs)=    .440
01899>
01900>      Unit Hyd Qpeak  (cms)=     .739
01901>
01902>      PEAK FLOW       (cms)=     .144 (i)
01903>      TIME TO PEAK    (hrs)=    1.875
01904>      RUNOFF VOLUME    (mm)=   10.490
01905>      TOTAL RAINFALL   (mm)=   77.284
01906>      RUNOFF COEFFICIENT   =     .136
01907>
01908>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01909>
01910> -------------------------------------------------------------------------------
01911> 001:0086-------------------------------------------------------------------------------
01912> *Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
01913> *Pond 1 Allowable Release Rate
01914> ------------------------
01915> | ADD HYD (Node3EXT  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01916> ------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
01917>                       ID1 01:EXT1          7.93     .325    1.88  24.11    .000
01918>                      +ID2 06:EXT2           .34     .099    1.33  44.63    .000
01919>                      +ID3 07:EXT3          1.23     .411    1.33  48.27    .000
01920>                      +ID4 08:EXT4           .18     .047    1.33  32.48    .000
01921>                      +ID5 03:EXT5          8.51     .144    1.88  10.49    .000
01922>                       ============================================================
01923>                       SUM 04:Node3EXT      18.19     .617    1.33  19.84    .000
01924>
01925>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01926>
01927> -------------------------------------------------------------------------------
01928> 001:0087-------------------------------------------------------------------------------
01929> *Total Flow at Node 3, with external
01930> *(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)
01931> ------------------------
01932> | ADD HYD (Node3Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01933> ------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
01934>                       ID1 09:Node3SITE     31.94     .929    1.88  24.08    .000
01935>                      +ID2 04:Node3EXT      18.19     .617    1.33  19.84    .000
01936>                       ============================================================
01937>                       SUM 03:Node3Tot      50.13    1.476    1.83  22.54    .000
01938>
01939>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01940>
01941> -------------------------------------------------------------------------------
01942> 001:0088-------------------------------------------------------------------------------
01943> *Catchment 105
01944> *This catchment refers to the southeast corner of the site, existing golf course
01945> *These land drain to Node 4 along the Black Drain
01946> *Pond 2 Allowable Release Rate
01947> ----------------------
01948> | DESIGN NASHYD      |   Area    (ha)=    7.91   Curve Number   (CN)=71.00
01949> | 06:105    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01950> ----------------------   U.H. Tp(hrs)=    .310
01951>
01952>      Unit Hyd Qpeak  (cms)=     .975
01953>
01954>      PEAK FLOW       (cms)=     .562 (i)
01955>      TIME TO PEAK    (hrs)=    1.667
01956>      RUNOFF VOLUME    (mm)=   31.990
01957>      TOTAL RAINFALL   (mm)=   77.284
01958>      RUNOFF COEFFICIENT   =     .414
01959>
01960>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01961>
01962> -------------------------------------------------------------------------------
01963> 001:0089-------------------------------------------------------------------------------
01964> *Catchment EXT6
01965> *External area on the south of the site, existing agricultural
01966> *flows to the Black Drain at Node 4
01967> ----------------------
01968> | DESIGN NASHYD      |   Area    (ha)=   15.73   Curve Number   (CN)=55.00
01969> | 07:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01970> ----------------------   U.H. Tp(hrs)=    .550
01971>
01972>      Unit Hyd Qpeak  (cms)=    1.092
01973>
01974>      PEAK FLOW       (cms)=     .461 (i)
01975>      TIME TO PEAK    (hrs)=    2.042
01976>      RUNOFF VOLUME    (mm)=   20.251
01977>      TOTAL RAINFALL   (mm)=   77.284
01978>      RUNOFF COEFFICIENT   =     .262
01979>
01980>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01981>
01982> -------------------------------------------------------------------------------
01983> 001:0090-------------------------------------------------------------------------------
01984> *Total Flow at Node 4, no external (101, 102, 103, 104, 105)
01985> ------------------------
01986> | ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01987> ------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
01988>                       ID1 06:105           7.91     .562    1.67  31.99    .000
01989>                      +ID2 09:Node3SITE     31.94     .929    1.88  24.08    .000
01990>                       ============================================================
01991>                       SUM 08:Node4         39.85    1.458    1.75  25.65    .000
01992>
01993>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01994>
01995> -------------------------------------------------------------------------------
01996> 001:0091-------------------------------------------------------------------------------
01997> *Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
01998> *103, 104, EXT5, 105, EXT6)
01999> ------------------------
02000> | ADD HYD (Node4Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02001> ------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
02002>                       ID1 03:Node3Tot      50.13    1.476    1.83  22.54    .000
02003>                      +ID2 06:105           7.91     .562    1.67  31.99    .000
02004>                      +ID3 07:EXT6          15.73     .461    2.04  20.25    .000
02005>                       ============================================================
02006>                       SUM 09:Node4Tot      73.77    2.414    1.83  23.07    .000
02007>
02008>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02009>
02010> -------------------------------------------------------------------------------
02011> 001:0092-------------------------------------------------------------------------------
02012> *100-Year
02013> --------------------
02014> | CHICAGO STORM    |    IDF curve parameters: A= 955.980
02015> | Ptotal= 85.70 mm |                          B=    .000
02016> --------------------                          C=    .693
02017>                       used in:   INTENSITY =  A / (t + B)^C
02018>
02019>                       Duration of storm  =  4.00 hrs
02020>                       Storm time step    =  5.00 min
02021>                       Time to peak ratio =   .33
02022>
02023>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
02024>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
02025>               .08   6.929 |   1.08  21.955 |   2.08  15.659 |   3.08   8.764
02026>               .17   7.273 |   1.17  29.950 |   2.17  14.573 |   3.17   8.488
02027>               .25   7.661 |   1.25  55.397 |   2.25  13.654 |   3.25   8.232
02028>               .33   8.105 |   1.33 313.369 |   2.33  12.866 |   3.33   7.994
02029>               .42   8.617 |   1.42  67.877 |   2.42  12.180 |   3.42   7.773
02030>               .50   9.216 |   1.50  42.973 |   2.50  11.577 |   3.50   7.566
02031>               .58   9.928 |   1.58  32.848 |   2.58  11.042 |   3.58   7.372
02032>               .67  10.792 |   1.67  27.103 |   2.67  10.564 |   3.67   7.189
02033>               .75  11.867 |   1.75  23.326 |   2.75  10.133 |   3.75   7.017
02034>               .83  13.247 |   1.83  20.623 |   2.83   9.743 |   3.83   6.855
02035>               .92  15.101 |   1.92  18.577 |   2.92   9.388 |   3.92   6.702
02036>              1.00  17.755 |   2.00  16.966 |   3.00   9.063 |   4.00   6.557
02037>
02038> -------------------------------------------------------------------------------
02039> 001:0093-------------------------------------------------------------------------------
02040> *Catchment EXT1
02041> *External area on the northwest of Wellington Road 19.
02042> *This catchment drains to the golf course via a culvert under Wellington Road 19
02043> *and forms the start of the Black Drain at NODE 1
02044> ----------------------
02045> | DESIGN NASHYD      |   Area    (ha)=    7.93   Curve Number   (CN)=61.00
02046> | 01:EXT1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02047> ----------------------   U.H. Tp(hrs)=    .440
02048>
02049>      Unit Hyd Qpeak  (cms)=     .688
02050>
02051>      PEAK FLOW       (cms)=     .390 (i)
02052>      TIME TO PEAK    (hrs)=    1.875
02053>      RUNOFF VOLUME    (mm)=   28.751
02054>      TOTAL RAINFALL   (mm)=   85.701
02055>      RUNOFF COEFFICIENT   =     .335
02056>
02057>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02058>
02059> -------------------------------------------------------------------------------
02060> 001:0094-------------------------------------------------------------------------------
02061> *Catchment 101
02062> *Drains to NODE 2
02063> ----------------------
02064> | DESIGN NASHYD      |   Area    (ha)=    1.58   Curve Number   (CN)=61.00
02065> | 02:101    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02066> ----------------------   U.H. Tp(hrs)=    .310
02067>
02068>      Unit Hyd Qpeak  (cms)=     .195
02069>
02070>      PEAK FLOW       (cms)=     .098 (i)
02071>      TIME TO PEAK    (hrs)=    1.667
02072>      RUNOFF VOLUME    (mm)=   28.751
02073>      TOTAL RAINFALL   (mm)=   85.701
02074>      RUNOFF COEFFICIENT   =     .335
02075>
02076>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02077>
02078> -------------------------------------------------------------------------------
02079> 001:0095-------------------------------------------------------------------------------
02080> *Total Flow at Node 2 (Catchment EXT1 & 101)
02081> ------------------------
02082> | ADD HYD (Node2     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02083> ------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
02084>                       ID1 01:EXT1           7.93     .390    1.88  28.75    .000
02085>                      +ID2 02:101            1.58     .098    1.67  28.75    .000
02086>                       ============================================================
02087>                       SUM 09:Node2          9.51     .479    1.83  28.75    .000
02088>
02089>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02090>
02091> -------------------------------------------------------------------------------
02092> 001:0096-------------------------------------------------------------------------------
02093> *Catchment 102
02094> *This catchment refers to the north corner of the site
02095> *These lands ultimately enter the drain by Node 3
02096> ----------------------
02097> | DESIGN NASHYD      |   Area    (ha)=   16.14   Curve Number   (CN)=60.00
02098> | 03:102    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02099> ----------------------   U.H. Tp(hrs)=    .810
02100>
02101>      Unit Hyd Qpeak  (cms)=     .761
02102>
02103>      PEAK FLOW       (cms)=     .513 (i)
02104>      TIME TO PEAK    (hrs)=    2.375
02105>      RUNOFF VOLUME    (mm)=   27.964
02106>      TOTAL RAINFALL   (mm)=   85.701
02107>      RUNOFF COEFFICIENT   =     .326
02108>
02109>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02110>
02111> -------------------------------------------------------------------------------
02112> 001:0097-------------------------------------------------------------------------------
02113> *Catchment 103
02114> *This catchment refers to the northwest side of the site, existing golf course,
02115> *These land drain to Node 3 along the Black Drain
02116> ----------------------
02117> | DESIGN NASHYD      |   Area    (ha)=    7.09   Curve Number   (CN)=63.00
02118> | 04:103    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02119> ----------------------   U.H. Tp(hrs)=    .260
02120>
02121>      Unit Hyd Qpeak  (cms)=    1.042
02122>
02123>      PEAK FLOW       (cms)=     .527 (i)
02124>      TIME TO PEAK    (hrs)=    1.625
02125>      RUNOFF VOLUME    (mm)=   30.379
02126>      TOTAL RAINFALL   (mm)=   85.701
02127>      RUNOFF COEFFICIENT   =     .354
02128>
02129>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02130>
02131> -------------------------------------------------------------------------------
02132> 001:0098-------------------------------------------------------------------------------
02133> *Catchment 104
02134> *This catchment refers to the southeast corner of the site, existing golf course
02135> * and woods. These land drain to Node 3 along the Black Drain
02136> ----------------------
02137> | DESIGN NASHYD      |   Area    (ha)=    7.13   Curve Number   (CN)=61.00
02138> | 05:104    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02139> ----------------------   U.H. Tp(hrs)=    .620
02140>
02141>      Unit Hyd Qpeak  (cms)=     .439
02142>
02143>      PEAK FLOW       (cms)=     .279 (i)
02144>      TIME TO PEAK    (hrs)=    2.125
02145>      RUNOFF VOLUME    (mm)=   28.751
02146>      TOTAL RAINFALL   (mm)=   85.701
02147>      RUNOFF COEFFICIENT   =     .335
02148>
02149>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02150>
02151> -------------------------------------------------------------------------------
02152> 001:0099-------------------------------------------------------------------------------
02153> *Total Flow at Node 3, no external (101, 102, 103, 104)
02154> *Pond 1 Allowable Release Rate
02155> ------------------------
02156> | ADD HYD (Node3SITE ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02157> ------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
02158>                       ID1 02:101            1.58     .098    1.67  28.75    .000
02159>                      +ID2 03:102           16.14     .513    2.38  27.96    .000
02160>                      +ID3 04:103            7.09     .527    1.63  30.38    .000
```

```
                    +ID4 05:104           7.13    .279    2.13  28.75    .000
                     ============================================================
                     SUM 09:Node3SITE     31.94    1.114    1.88  28.71    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------------
001:0100---------------------------------------------------------------------------
*Catchment EXT2
*External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
*This catchment drains to the golf course via a spill point and CB on south side
*Wellington Road 19 and is directed to the Black Drain by Node 3
----------------------
| DESIGN STANDHYD    |   Area    (ha)=     .34
| 06:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
----------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .17          .17
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      47.61        40.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=     313.37        74.37
                   over (min)       2.50        12.50
     Storage Coeff.  (min)=       1.28 (ii)   13.32 (ii)
     Unit Hyd. Tpeak (min)=       2.50        12.50
     Unit Hyd. peak  (cms)=        .58          .09
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .10          .02          .112 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50         1.333
     RUNOFF VOLUME    (mm)=      84.90        31.72        50.865
     TOTAL RAINFALL   (mm)=      85.70        85.70        85.701
     RUNOFF COEFFICIENT   =        .99          .37          .594
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  58.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------------
001:0101---------------------------------------------------------------------------
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment drains to the golf course via a DICB on west side of 3rd Line
*and is directed to the Black Drain by Node 3
----------------------
| DESIGN STANDHYD    |   Area    (ha)=    1.23
| 07:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
----------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .73          .50
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      90.55        40.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=     313.37        67.71
                   over (min)       2.50        15.00
     Storage Coeff.  (min)=       1.88 (ii)   14.38 (ii)
     Unit Hyd. Tpeak (min)=       2.50        15.00
     Unit Hyd. peak  (cms)=        .50          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .44          .06          .461 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.54         1.333
     RUNOFF VOLUME    (mm)=      84.90        31.02        54.729
     TOTAL RAINFALL   (mm)=      85.70        85.70        85.701
     RUNOFF COEFFICIENT   =        .99          .36          .639
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  56.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------------
001:0102---------------------------------------------------------------------------
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment spills to the golf course and is directed to the Black Drain by
----------------------
| DESIGN STANDHYD    |   Area    (ha)=     .18
| 08:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
----------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .09          .09
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      34.64        40.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=     313.37        19.57
                   over (min)       2.50        22.50
     Storage Coeff.  (min)=       1.05 (ii)   21.60 (ii)
     Unit Hyd. Tpeak (min)=       2.50        22.50
     Unit Hyd. peak  (cms)=        .62          .05
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .05          .00          .052 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.67         1.333
     RUNOFF VOLUME    (mm)=      84.90        13.12        36.810
     TOTAL RAINFALL   (mm)=      85.70        85.70        85.701
     RUNOFF COEFFICIENT   =        .99          .15          .430
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  30.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------------
001:0103---------------------------------------------------------------------------
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.51   Curve Number   (CN)=35.00
| 03:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .739

     PEAK FLOW       (cms)=     .176 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=   12.753
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .149

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

---------------------------------------------------------------------------------
001:0104---------------------------------------------------------------------------
*Total External Flow at Node 3 (EXT1, EXT2, EXT3, EXT4, EXT5)
*Pond 1 Allowable Release Rate
----------------------
| ADD HYD (Node3EXT  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 01:EXT1          7.93     .390    1.88  28.75    .000
                     +ID2 06:EXT2           .34     .112    1.33  50.87    .000
                     +ID3 07:EXT3          1.23     .461    1.33  54.73    .000
                     +ID4 08:EXT4           .18     .052    1.33  36.81    .000
                     +ID5 03:EXT5          8.51     .176    1.88  12.75    .000
                      ============================================================
                      SUM 04:Node3EXT     18.19     .700    1.33  23.52    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------------
001:0105---------------------------------------------------------------------------
*Total Flow at Node 3, with external
*(EXT1, 101, 102, 103, 104, EXT2, EXT3, EXT4, EXT5)
----------------------
| ADD HYD (Node3Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 09:Node3SITE    31.94    1.114    1.88  28.71    .000
                     +ID2 04:Node3EXT     18.19     .700    1.33  23.52    .000
                      ============================================================
                      SUM 03:Node3Tot     50.13    1.771    1.83  26.83    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------------
001:0106---------------------------------------------------------------------------
*Catchment 105
*This catchment refers to the southeast corner of the site, existing golf course
*These land drain to Node 4 along the Black Drain
*Pond 2 Allowable Release Rate
----------------------
| DESIGN NASHYD      |   Area    (ha)=    7.91   Curve Number   (CN)=71.00
| 06:105    DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .310

     Unit Hyd Qpeak  (cms)=     .975

     PEAK FLOW       (cms)=     .669 (i)
     TIME TO PEAK    (hrs)=    1.667
     RUNOFF VOLUME    (mm)=   37.722
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .440

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

---------------------------------------------------------------------------------
001:0107---------------------------------------------------------------------------
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD      |   Area    (ha)=   15.73   Curve Number   (CN)=55.00
| 07:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .550

     Unit Hyd Qpeak  (cms)=    1.092

     PEAK FLOW       (cms)=     .555 (i)
     TIME TO PEAK    (hrs)=    2.042
     RUNOFF VOLUME    (mm)=   24.278
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .283

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

---------------------------------------------------------------------------------
001:0108---------------------------------------------------------------------------
*Total Flow at Node 4, no external (101, 102, 103, 104, 105)
----------------------
| ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 06:105           7.91     .669    1.67  37.72    .000
                     +ID2 09:Node3SITE    31.94    1.114    1.88  28.71    .000
                      ============================================================
                      SUM 08:Node4        39.85    1.745    1.75  30.50    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

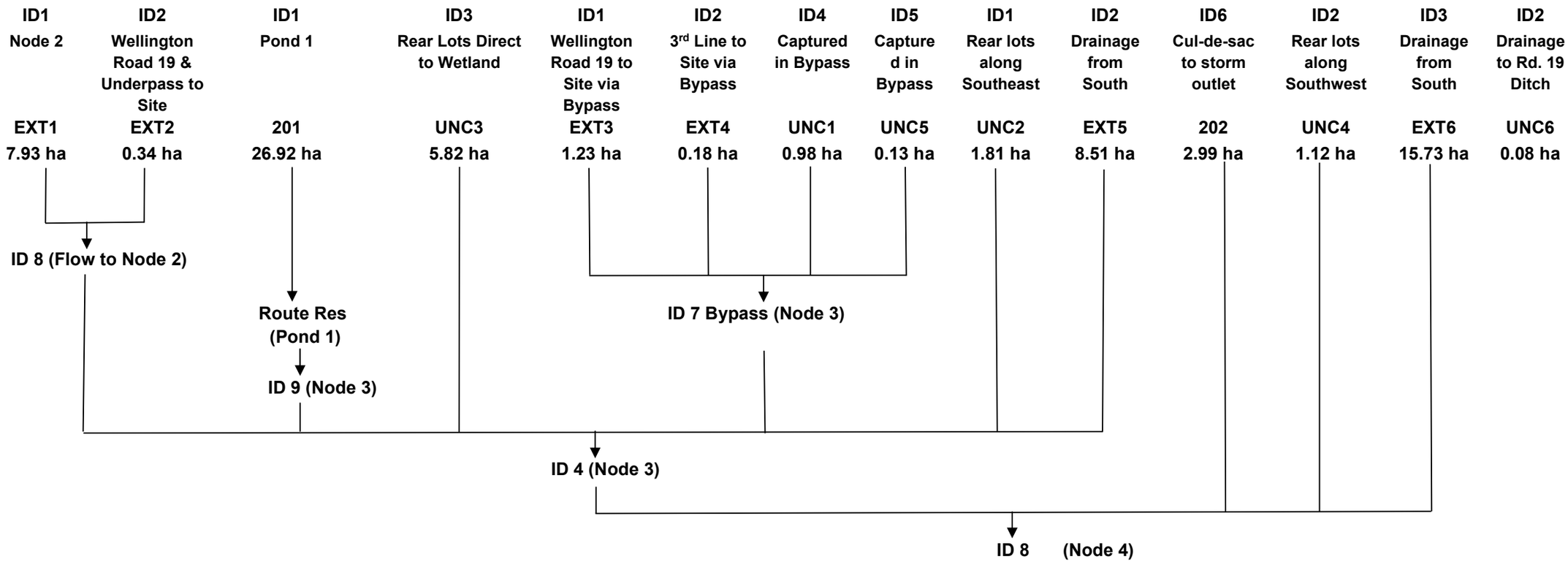
---------------------------------------------------------------------------------
001:0109---------------------------------------------------------------------------
*Total Flow at Node 4, with external (EXT1, 101, EXT2, EXT3, EXT4, 102,
*103, 104, EXT5, 105, EXT6)
----------------------
| ADD HYD (Node4Tot  ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 03:Node3Tot     50.13    1.771    1.83  26.83    .000
                     +ID2 06:105           7.91     .669    1.67  37.72    .000
                     +ID3 07:EXT6         15.73     .555    2.04  24.28    .000
                      ============================================================
                      SUM 09:Node4Tot     73.77    2.893    1.83  27.45    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---------------------------------------------------------------------------------
001:0110---------------------------------------------------------------------------
   FINISH
---------------------------------------------------------------------------------
*********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0010 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 001:0012 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 001:0028 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 001:0029 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 001:0030 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 001:0046 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 001:0047 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 001:0048 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 001:0064 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
```

```
02431>                    Use a smaller DT or a larger area.
02432>  001:0065 DESIGN STANDHYD
02433>       *** WARNING: Storage Coefficient is smaller than DT!
02434>                    Use a smaller DT or a larger area.
02435>  001:0066 DESIGN STANDHYD
02436>       *** WARNING: Storage Coefficient is smaller than DT!
02437>                    Use a smaller DT or a larger area.
02438>  001:0082 DESIGN STANDHYD
02439>       *** WARNING: Storage Coefficient is smaller than DT!
02440>                    Use a smaller DT or a larger area.
02441>  001:0083 DESIGN STANDHYD
02442>       *** WARNING: Storage Coefficient is smaller than DT!
02443>                    Use a smaller DT or a larger area.
02444>  001:0084 DESIGN STANDHYD
02445>       *** WARNING: Storage Coefficient is smaller than DT!
02446>                    Use a smaller DT or a larger area.
02447>  001:0100 DESIGN STANDHYD
02448>       *** WARNING: Storage Coefficient is smaller than DT!
02449>                    Use a smaller DT or a larger area.
02450>  001:0101 DESIGN STANDHYD
02451>       *** WARNING: Storage Coefficient is smaller than DT!
02452>                    Use a smaller DT or a larger area.
02453>  001:0102 DESIGN STANDHYD
02454>       *** WARNING: Storage Coefficient is smaller than DT!
02455>                    Use a smaller DT or a larger area.
02456>    Simulation ended on 2021-12-22     at 13:08:25
02457> ================================================================================
02458>
02459>
```

# Post-Development SWMHYMO Model Schematic




| | |
|---|---|
| **Project Name** | Fergus Golf Course |
| **Project No.** | 300052719.0000 |
| **Date** | September 24, 2021 |

BURNSIDE
[THE DIFFERENCE IS OUR PEOPLE]

```
2     Metric units
*#************************************************************************
*#  Project Name: [Fergus Golf Club] Project Number: [300052719]
*#  Date        : 09-28-2021
*#  Modeller    : [L.Garner]
*#  Company     : R.J. Burnside & Associates
*#  License #   :  3245976
*#************************************************************************
*%
*# *********************************************************************
*# Fergus Golf Club Post Development         *
*# *********************************************************************
*#
*%-----------------|-------------------------------------------------------------|
*%-----------------|-------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[0],  NRUN=[0]
*%                   [] <--storm filename
*%-----------------|-------------------------------------------------------------|
*% 25mm 4-hr Chicago
MASS STORM          PTOTAL=[25](mm), CSDT=[10](min),
                    CURVE_FILENAME=["4hr-chi.mst"]
*%-----------------|-------------------------------------------------------------|
*Catchment EXT1
*External area on the northwest of Wellington Road 19.
*This catchment drains to the golf course via a culvert which will be captured
*and enter a bypass pipe, entering the Black Drain at Node 2

DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
                    DWF=[0](cms), CN/C=[61], TP=[.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT2
*External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
*This will be captured via the Black Drain Bypass and enter the drain at Node 2

DESIGN STANDHYD     ID=[2], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
                    XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe

ADD HYD             IDsum=[8], NHYD=["Bypass1"], IDs to add=[1,2]
*%-----------------|-------------------------------------------------------------|
*Catchment 201
*Drainage Area to SWMF1

DESIGN STANDHYD     ID=[1], NHYD=["201"], DT=[2]min, AREA=[26.92](ha),
                    XIMP=[0.23], TIMP=[0.34], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
* Pond 1
ROUTE RESERVOIR     IDout=[9],   NHYD=["Pond1"],  IDin=[1],
                    RDT=[2](min),
                         TABLE of ( OUTFLOW-STORAGE ) values
                                    (cms) - (ha-m)
                                  [   0.0 ,  0.0 ]
                                  [   0.057, 0.331]
                                  [   0.32 , 0.950]
                                  [   -1   ,  -1  ]  (max twenty pts)
                         IDovf=[], NHYDovf=[overflow]
*%-----------------|-------------------------------------------------------------|
*Catchment UNC3
*Existing wetland/open space area to remain
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[3], NHYD=["UNC3"], DT=[2]min, AREA=[5.82](ha),
                    DWF=[0](cms), CN/C=[62], TP=[0.83]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment is collected in a bypass and is directed to the Black Drain by N

DESIGN STANDHYD     ID=[1], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
                    XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment is collected in a bypass and directed to the Black Drain by Node

DESIGN STANDHYD     ID=[2], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
                    XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC1
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3

DESIGN NASHYD       ID=[4], NHYD=["UNC1"], DT=[2]min, AREA=[0.98](ha),
                    DWF=[0](cms), CN/C=[61], TP=[0.04]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC5
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3

DESIGN NASHYD       ID=[5], NHYD=["UNC5"], DT=[2]min, AREA=[0.13](ha),
                    DWF=[0](cms), CN/C=[39], TP=[0.07]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi

ADD HYD             IDsum=[7], NHYD=["Bypass2"], IDs to add=[1,2,4,5]
*%-----------------|-------------------------------------------------------------|
*Catchment UNC2
*Rear lots on South side of property, collected in swale
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[1], NHYD=["UNC2"], DT=[2]min, AREA=[1.81](ha),
                    DWF=[0](cms), CN/C=[66], TP=[0.21]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[2], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
                    DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to Node 3 (Including External Areas)

ADD HYD             IDsum=[4], NHYD=["Node3"], IDs to add=[8,9,3,7,1,2]
*%-----------------|-------------------------------------------------------------|
*Catchment 202
*This catchment is the area draining Node 4 Outlet

DESIGN STANDHYD     ID=[6], NHYD=["202"], DT=[2]min, AREA=[2.99](ha),
                    XIMP=[0.18], TIMP=[0.28], DWF=[0](cms), LOSS=[2], CN=[74],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC4
*Uncontrolled rear yards, flows to the Black Drain at Node 4

DESIGN NASHYD       ID=[2], NHYD=["UNC4"], DT=[2]min, AREA=[1.12](ha),
                    DWF=[0](cms), CN/C=[64], TP=[0.05]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4

DESIGN NASHYD       ID=[3], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
                    DWF=[0](cms), CN/C=[55], TP=[0.55]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to to Node 4 (Including External Areas)

ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[4,6,2,3]
*%-----------------|-------------------------------------------------------------|
*Catchment UNC6
*Uncontrolled rear yards, flows to ditch along Road 19

DESIGN NASHYD       ID=[2], NHYD=["UNC6"], DT=[2]min, AREA=[0.08](ha),
                    DWF=[0](cms), CN/C=[74], TP=[0.05]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*%-----------------|-------------------------------------------------------------|
*2-Year
CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
                    ICASEcs=[1],
                     A=[400.29],  B=[0.0001], and C=[0.702],
*%-----------------|-------------------------------------------------------------|
*Catchment EXT1
*External area on the northwest of Wellington Road 19.
*This catchment drains to the golf course via a culvert which will be captured
*and enter a bypass pipe, entering the Black Drain at Node 2

DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
                    DWF=[0](cms), CN/C=[61], TP=[.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT2
*External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
*This will be captured via the Black Drain Bypass and enter the drain at Node 2

DESIGN STANDHYD     ID=[2], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
                    XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe

ADD HYD             IDsum=[8], NHYD=["Bypass1"], IDs to add=[1,2]
*%-----------------|-------------------------------------------------------------|
*Catchment 201
*Drainage Area to SWMF1

DESIGN STANDHYD     ID=[1], NHYD=["201"], DT=[2]min, AREA=[26.92](ha),
                    XIMP=[0.23], TIMP=[0.34], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
* Pond 1
ROUTE RESERVOIR     IDout=[9],   NHYD=["Pond1"],  IDin=[1],
                    RDT=[2](min),
                         TABLE of ( OUTFLOW-STORAGE ) values
                                    (cms) - (ha-m)
                                  [   0.0 ,  0.0 ]
                                  [   0.057, 0.331]
                                  [   0.32 , 0.950]
                                  [   -1   ,  -1  ]  (max twenty pts)
                         IDovf=[], NHYDovf=[overflow]
*%-----------------|-------------------------------------------------------------|
*Catchment UNC3
*Existing wetland/open space area to remain
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[3], NHYD=["UNC3"], DT=[2]min, AREA=[5.82](ha),
                    DWF=[0](cms), CN/C=[62], TP=[0.83]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment is collected in a bypass and is directed to the Black Drain by N

DESIGN STANDHYD     ID=[1], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
                    XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment is collected in a bypass and directed to the Black Drain by Node

DESIGN STANDHYD     ID=[2], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
                    XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC1
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3

DESIGN NASHYD       ID=[4], NHYD=["UNC1"], DT=[2]min, AREA=[0.98](ha),
                    DWF=[0](cms), CN/C=[61], TP=[0.04]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC5
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3

DESIGN NASHYD       ID=[5], NHYD=["UNC5"], DT=[2]min, AREA=[0.13](ha),
                    DWF=[0](cms), CN/C=[39], TP=[0.07]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi

ADD HYD             IDsum=[7], NHYD=["Bypass2"], IDs to add=[1,2,4,5]
*%-----------------|-------------------------------------------------------------|
*Catchment UNC2
*Rear lots on South side of property, collected in swale
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[1], NHYD=["UNC2"], DT=[2]min, AREA=[1.81](ha),
                    DWF=[0](cms), CN/C=[66], TP=[0.21]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[2], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
                    DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to Node 3 (Including External Areas)

ADD HYD             IDsum=[4], NHYD=["Node3"], IDs to add=[8,9,3,7,1,2]
*%-----------------|-------------------------------------------------------------|
*Catchment 202
```

```
00271> *This catchment is the area draining Node 4 Outlet
00272>
00273> DESIGN STANDHYD     ID=[6], NHYD=["202"], DT=[2]min, AREA=[2.99](ha),
00274>                     XIMP=[0.18], TIMP=[0.28], DWF=[0](cms), LOSS=[2], CN=[74],
00275>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00276> *%-----------------|-------------------------------------------------------------|
00277> *Catchment UNC4
00278> *Uncontrolled rear yards, flows to the Black Drain at Node 4
00279>
00280> DESIGN NASHYD       ID=[2], NHYD=["UNC4"], DT=[2]min, AREA=[1.12](ha),
00281>                     DWF=[0](cms), CN/C=[64], TP=[0.05]hrs,
00282>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00283> *%-----------------|-------------------------------------------------------------|
00284> *Catchment EXT6
00285> *External area on the south of the site, existing agricultural
00286> *flows to the Black Drain at Node 4
00287>
00288> DESIGN NASHYD       ID=[3], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
00289>                     DWF=[0](cms), CN/C=[55], TP=[0.55]hrs,
00290>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00291> *%-----------------|-------------------------------------------------------------|
00292> *Total Flow to to Node 4 (Including External Areas)
00293>
00294> ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[4,6,2,3]
00295> *%-----------------|-------------------------------------------------------------|
00296> *Catchment UNC6
00297> *Uncontrolled rear yards, flows to ditch along Road 19
00298>
00299> DESIGN NASHYD       ID=[2], NHYD=["UNC6"], DT=[2]min, AREA=[0.08](ha),
00300>                     DWF=[0](cms), CN/C=[74], TP=[0.05]hrs,
00301>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00302> *%-----------------|-------------------------------------------------------------|
00303> *%-----------------|-------------------------------------------------------------|
00304> *5-Year
00305> CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
00306>                     ICASEcs=[1],
00307>                      A=[550.60],  B=[0.0001], and C=[0.698],
00308> *%-----------------|-------------------------------------------------------------|
00309> *Catchment EXT1
00310> *External area on the northwest of Wellington Road 19.
00311> *This catchment drains to the golf course via a culvert which will be captured
00312> *and enter a bypass pipe, entering the Black Drain at Node 2
00313>
00314> DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
00315>                     DWF=[0](cms), CN/C=[61], TP=[.44]hrs,
00316>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00317> *%-----------------|-------------------------------------------------------------|
00318> *Catchment EXT2
00319> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
00320> *This will be captured via the Black Drain Bypass and enter the drain at Node 2
00321>
00322> DESIGN STANDHYD     ID=[2], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
00323>                     XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
00324>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00325> *%-----------------|-------------------------------------------------------------|
00326> *Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe
00327>
00328> ADD HYD             IDsum=[8], NHYD=["Bypass1"], IDs to add=[1,2]
00329> *%-----------------|-------------------------------------------------------------|
00330> *Catchment 201
00331> *Drainage Area to SWMF1
00332>
00333> DESIGN STANDHYD     ID=[1], NHYD=["201"], DT=[2]min, AREA=[26.92](ha),
00334>                     XIMP=[0.23], TIMP=[0.34], DWF=[0](cms), LOSS=[2], CN=[62],
00335>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00336> *%-----------------|-------------------------------------------------------------|
00337> * Pond 1
00338> ROUTE RESERVOIR     IDout=[9],   NHYD=["Pond1"],  IDin=[1],
00339>                     RDT=[2](min),
00340>                           TABLE of ( OUTFLOW-STORAGE ) values
00341>                                      (cms) - (ha-m)
00342>                                    [   0.0 ,  0.0 ]
00343>                                    [   0.057, 0.331]
00344>                                    [   0.32 , 0.950]
00345>                                    [   -1  ,  -1  ]  (max twenty pts)
00346>                           IDovf=[], NHYDovf=[overflow]
00347> *%-----------------|-------------------------------------------------------------|
00348> *Catchment UNC3
00349> *Existing wetland/open space area to remain
00350> *flows to the Black Drain at Node 3
00351>
00352> DESIGN NASHYD       ID=[3], NHYD=["UNC3"], DT=[2]min, AREA=[5.82](ha),
00353>                     DWF=[0](cms), CN/C=[62], TP=[0.83]hrs,
00354>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00355> *%-----------------|-------------------------------------------------------------|
00356> *Catchment EXT3
00357> *External area - Wellington Road 19 and 3rd line and
00358> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
00359> *This catchment is collected in a bypass and is directed to the Black Drain by N
00360>
00361> DESIGN STANDHYD     ID=[1], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
00362>                     XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
00363>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00364> *%-----------------|-------------------------------------------------------------|
00365> *Catchment EXT4
00366> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
00367> *This catchment is collected in a bypass and directed to the Black Drain by Node
00368>
00369> DESIGN STANDHYD     ID=[2], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
00370>                     XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
00371>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00372> *%-----------------|-------------------------------------------------------------|
00373> *Catchment UNC1
00374> *This catchment drains east towards 3rd Line and is collected in a bypass that
00375> *is directed to the Black Drain by Node 3
00376>
00377> DESIGN NASHYD       ID=[4], NHYD=["UNC1"], DT=[2]min, AREA=[0.98](ha),
00378>                     DWF=[0](cms), CN/C=[61], TP=[0.04]hrs,
00379>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00380> *%-----------------|-------------------------------------------------------------|
00381> *Catchment UNC5
00382> *This catchment drains east towards 3rd Line and is collected in a bypass that
00383> *is directed to the Black Drain by Node 3
00384>
00385> DESIGN NASHYD       ID=[5], NHYD=["UNC5"], DT=[2]min, AREA=[0.13](ha),
00386>                     DWF=[0](cms), CN/C=[39], TP=[0.07]hrs,
00387>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00388> *%-----------------|-------------------------------------------------------------|
00389> *Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
00390>
00391> ADD HYD             IDsum=[7], NHYD=["Bypass2"], IDs to add=[1,2,4,5]
00392> *%-----------------|-------------------------------------------------------------|
00393> *Catchment UNC2
00394> *Rear lots on South side of property, collected in swale
00395> *flows to the Black Drain at Node 3
00396>
00397> DESIGN NASHYD       ID=[1], NHYD=["UNC2"], DT=[2]min, AREA=[1.81](ha),
00398>                     DWF=[0](cms), CN/C=[66], TP=[0.21]hrs,
00399>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00400> *%-----------------|-------------------------------------------------------------|
00401> *Catchment EXT5
00402> *External area on the south of the site, existing agricultural
00403> *flows to the Black Drain at Node 3
00404>
00405> DESIGN NASHYD       ID=[2], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
00406>                     DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
00407>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00408> *%-----------------|-------------------------------------------------------------|
00409> *Total Flow to Node 3 (Including External Areas)
00410>
00411> ADD HYD             IDsum=[4], NHYD=["Node3"], IDs to add=[8,9,3,7,1,2]
00412> *%-----------------|-------------------------------------------------------------|
00413> *Catchment 202
00414> *This catchment is the area draining Node 4 Outlet
00415>
00416> DESIGN STANDHYD     ID=[6], NHYD=["202"], DT=[2]min, AREA=[2.99](ha),
00417>                     XIMP=[0.18], TIMP=[0.28], DWF=[0](cms), LOSS=[2], CN=[74],
00418>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00419> *%-----------------|-------------------------------------------------------------|
00420> *Catchment UNC4
00421> *Uncontrolled rear yards, flows to the Black Drain at Node 4
00422>
00423> DESIGN NASHYD       ID=[2], NHYD=["UNC4"], DT=[2]min, AREA=[1.12](ha),
00424>                     DWF=[0](cms), CN/C=[64], TP=[0.05]hrs,
00425>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00426> *%-----------------|-------------------------------------------------------------|
00427> *Catchment EXT6
00428> *External area on the south of the site, existing agricultural
00429> *flows to the Black Drain at Node 4
00430>
00431> DESIGN NASHYD       ID=[3], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
00432>                     DWF=[0](cms), CN/C=[55], TP=[0.55]hrs,
00433>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00434> *%-----------------|-------------------------------------------------------------|
00435> *Total Flow to to Node 4 (Including External Areas)
00436>
00437> ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[4,6,2,3]
00438> *%-----------------|-------------------------------------------------------------|
00439> *Catchment UNC6
00440> *Uncontrolled rear yards, flows to ditch along Road 19
00441>
00442> DESIGN NASHYD       ID=[2], NHYD=["UNC6"], DT=[2]min, AREA=[0.08](ha),
00443>                     DWF=[0](cms), CN/C=[74], TP=[0.05]hrs,
00444>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00445> *%-----------------|-------------------------------------------------------------|
00446> *%-----------------|-------------------------------------------------------------|
00447> *10-Year
00448> CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
00449>                     ICASEcs=[1],
00450>                      A=[648.07],  B=[0.0001], and C=[0.696],
00451> *%-----------------|-------------------------------------------------------------|
00452> *Catchment EXT1
00453> *External area on the northwest of Wellington Road 19.
00454> *This catchment drains to the golf course via a culvert which will be captured
00455> *and enter a bypass pipe, entering the Black Drain at Node 2
00456>
00457> DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
00458>                     DWF=[0](cms), CN/C=[61], TP=[.44]hrs,
00459>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00460> *%-----------------|-------------------------------------------------------------|
00461> *Catchment EXT2
00462> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
00463> *This will be captured via the Black Drain Bypass and enter the drain at Node 2
00464>
00465> DESIGN STANDHYD     ID=[2], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
00466>                     XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
00467>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00468> *%-----------------|-------------------------------------------------------------|
00469> *Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe
00470>
00471> ADD HYD             IDsum=[8], NHYD=["Bypass1"], IDs to add=[1,2]
00472> *%-----------------|-------------------------------------------------------------|
00473> *Catchment 201
00474> *Drainage Area to SWMF1
00475>
00476> DESIGN STANDHYD     ID=[1], NHYD=["201"], DT=[2]min, AREA=[26.92](ha),
00477>                     XIMP=[0.23], TIMP=[0.34], DWF=[0](cms), LOSS=[2], CN=[62],
00478>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00479> *%-----------------|-------------------------------------------------------------|
00480> * Pond 1
00481> ROUTE RESERVOIR     IDout=[9],   NHYD=["Pond1"],  IDin=[1],
00482>                     RDT=[2](min),
00483>                           TABLE of ( OUTFLOW-STORAGE ) values
00484>                                      (cms) - (ha-m)
00485>                                    [   0.0 ,  0.0 ]
00486>                                    [   0.057, 0.331]
00487>                                    [   0.32 , 0.950]
00488>                                    [   -1  ,  -1  ]  (max twenty pts)
00489>                           IDovf=[], NHYDovf=[overflow]
00490> *%-----------------|-------------------------------------------------------------|
00491> *Catchment UNC3
00492> *Existing wetland/open space area to remain
00493> *flows to the Black Drain at Node 3
00494>
00495> DESIGN NASHYD       ID=[3], NHYD=["UNC3"], DT=[2]min, AREA=[5.82](ha),
00496>                     DWF=[0](cms), CN/C=[62], TP=[0.83]hrs,
00497>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00498> *%-----------------|-------------------------------------------------------------|
00499> *Catchment EXT3
00500> *External area - Wellington Road 19 and 3rd line and
00501> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
00502> *This catchment is collected in a bypass and is directed to the Black Drain by N
00503>
00504> DESIGN STANDHYD     ID=[1], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
00505>                     XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
00506>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00507> *%-----------------|-------------------------------------------------------------|
00508> *Catchment EXT4
00509> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
00510> *This catchment is collected in a bypass and directed to the Black Drain by Node
00511>
00512> DESIGN STANDHYD     ID=[2], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
00513>                     XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
00514>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00515> *%-----------------|-------------------------------------------------------------|
00516> *Catchment UNC1
00517> *This catchment drains east towards 3rd Line and is collected in a bypass that
00518> *is directed to the Black Drain by Node 3
00519>
00520> DESIGN NASHYD       ID=[4], NHYD=["UNC1"], DT=[2]min, AREA=[0.98](ha),
00521>                     DWF=[0](cms), CN/C=[61], TP=[0.04]hrs,
00522>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00523> *%-----------------|-------------------------------------------------------------|
00524> *Catchment UNC5
00525> *This catchment drains east towards 3rd Line and is collected in a bypass that
00526> *is directed to the Black Drain by Node 3
00527>
00528> DESIGN NASHYD       ID=[5], NHYD=["UNC5"], DT=[2]min, AREA=[0.13](ha),
00529>                     DWF=[0](cms), CN/C=[39], TP=[0.07]hrs,
00530>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00531> *%-----------------|-------------------------------------------------------------|
00532> *Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
00533>
00534> ADD HYD             IDsum=[7], NHYD=["Bypass2"], IDs to add=[1,2,4,5]
00535> *%-----------------|-------------------------------------------------------------|
00536> *Catchment UNC2
00537> *Rear lots on South side of property, collected in swale
00538> *flows to the Black Drain at Node 3
00539>
00540> DESIGN NASHYD       ID=[1], NHYD=["UNC2"], DT=[2]min, AREA=[1.81](ha),
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                      DWF=[0](cms), CN/C=[66], TP=[0.21]hrs,
                      RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[2], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
                    DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to Node 3 (Including External Areas)

ADD HYD             IDsum=[4], NHYD=["Node3"], IDs to add=[8,9,3,7,1,2]
*%-----------------|-------------------------------------------------------------|
*Catchment 202
*This catchment is the area draining Node 4 Outlet

DESIGN STANDHYD     ID=[6], NHYD=["202"], DT=[2]min, AREA=[2.99](ha),
                    XIMP=[0.18], TIMP=[0.28], DWF=[0](cms), LOSS=[2], CN=[74],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC4
*Uncontrolled rear yards, flows to the Black Drain at Node 4

DESIGN NASHYD       ID=[2], NHYD=["UNC4"], DT=[2]min, AREA=[1.12](ha),
                    DWF=[0](cms), CN/C=[64], TP=[0.05]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4

DESIGN NASHYD       ID=[3], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
                    DWF=[0](cms), CN/C=[55], TP=[0.55]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to to Node 4 (Including External Areas)

ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[4,6,2,3]
*%-----------------|-------------------------------------------------------------|
*Catchment UNC6
*Uncontrolled rear yards, flows to ditch along Road 19

DESIGN NASHYD       ID=[2], NHYD=["UNC6"], DT=[2]min, AREA=[0.08](ha),
                    DWF=[0](cms), CN/C=[74], TP=[0.05]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*%-----------------|-------------------------------------------------------------|
*25-Year
CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
                    ICASEcs=[1],
                     A=[771.35],  B=[0.0001], and C=[0.694],
*%-----------------|-------------------------------------------------------------|
*Catchment EXT1
*External area on the northwest of Wellington Road 19.
*This catchment drains to the golf course via a culvert which will be captured
*and enter a bypass pipe, entering the Black Drain at Node 2

DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
                    DWF=[0](cms), CN/C=[61], TP=[.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT2
*External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
*This will be captured via the Black Drain Bypass and enter the drain at Node 2

DESIGN STANDHYD     ID=[2], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
                    XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe

ADD HYD             IDsum=[8], NHYD=["Bypass1"], IDs to add=[1,2]
*%-----------------|-------------------------------------------------------------|
*Catchment 201
*Drainage Area to SWMF1

DESIGN STANDHYD     ID=[1], NHYD=["201"], DT=[2]min, AREA=[26.92](ha),
                    XIMP=[0.23], TIMP=[0.34], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
* Pond 1
ROUTE RESERVOIR     IDout=[9],   NHYD=["Pond1"],  IDin=[1],
                    RDT=[2](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                [   0.0 ,  0.0 ]
                                [   0.057, 0.331]
                                [   0.32 , 0.950]
                                [   -1  ,  -1  ]  (max twenty pts)
                          IDovf=[], NHYDovf=[overflow]
*%-----------------|-------------------------------------------------------------|
*Catchment UNC3
*Existing wetland/open space area to remain
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[3], NHYD=["UNC3"], DT=[2]min, AREA=[5.82](ha),
                    DWF=[0](cms), CN/C=[62], TP=[0.83]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment is collected in a bypass and is directed to the Black Drain by N

DESIGN STANDHYD     ID=[1], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
                    XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment is collected in a bypass and directed to the Black Drain by Node

DESIGN STANDHYD     ID=[2], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
                    XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC1
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3

DESIGN NASHYD       ID=[4], NHYD=["UNC1"], DT=[2]min, AREA=[0.98](ha),
                    DWF=[0](cms), CN/C=[61], TP=[0.04]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC5
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3

DESIGN NASHYD       ID=[5], NHYD=["UNC5"], DT=[2]min, AREA=[0.13](ha),
                    DWF=[0](cms), CN/C=[39], TP=[0.07]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi

ADD HYD             IDsum=[7], NHYD=["Bypass2"], IDs to add=[1,2,4,5]
*%-----------------|-------------------------------------------------------------|
*Catchment UNC2
*Rear lots on South side of property, collected in swale
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[1], NHYD=["UNC2"], DT=[2]min, AREA=[1.81](ha),
                    DWF=[0](cms), CN/C=[66], TP=[0.21]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[2], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
                    DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to Node 3 (Including External Areas)

ADD HYD             IDsum=[4], NHYD=["Node3"], IDs to add=[8,9,3,7,1,2]
*%-----------------|-------------------------------------------------------------|
*Catchment 202
*This catchment is the area draining Node 4 Outlet

DESIGN STANDHYD     ID=[6], NHYD=["202"], DT=[2]min, AREA=[2.99](ha),
                    XIMP=[0.18], TIMP=[0.28], DWF=[0](cms), LOSS=[2], CN=[74],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC4
*Uncontrolled rear yards, flows to the Black Drain at Node 4

DESIGN NASHYD       ID=[2], NHYD=["UNC4"], DT=[2]min, AREA=[1.12](ha),
                    DWF=[0](cms), CN/C=[64], TP=[0.05]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4

DESIGN NASHYD       ID=[3], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
                    DWF=[0](cms), CN/C=[55], TP=[0.55]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to to Node 4 (Including External Areas)

ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[4,6,2,3]
*%-----------------|-------------------------------------------------------------|
*Catchment UNC6
*Uncontrolled rear yards, flows to ditch along Road 19

DESIGN NASHYD       ID=[2], NHYD=["UNC6"], DT=[2]min, AREA=[0.08](ha),
                    DWF=[0](cms), CN/C=[74], TP=[0.05]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*%-----------------|-------------------------------------------------------------|
*50-Year
CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
                    ICASEcs=[1],
                     A=[862.09],  B=[0.0001], and C=[0.693],
*%-----------------|-------------------------------------------------------------|
*Catchment EXT1
*External area on the northwest of Wellington Road 19.
*This catchment drains to the golf course via a culvert which will be captured
*and enter a bypass pipe, entering the Black Drain at Node 2

DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
                    DWF=[0](cms), CN/C=[61], TP=[.44]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT2
*External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
*This will be captured via the Black Drain Bypass and enter the drain at Node 2

DESIGN STANDHYD     ID=[2], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
                    XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe

ADD HYD             IDsum=[8], NHYD=["Bypass1"], IDs to add=[1,2]
*%-----------------|-------------------------------------------------------------|
*Catchment 201
*Drainage Area to SWMF1

DESIGN STANDHYD     ID=[1], NHYD=["201"], DT=[2]min, AREA=[26.92](ha),
                    XIMP=[0.23], TIMP=[0.34], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
* Pond 1
ROUTE RESERVOIR     IDout=[9],   NHYD=["Pond1"],  IDin=[1],
                    RDT=[2](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                [   0.0 ,  0.0 ]
                                [   0.057, 0.331]
                                [   0.32 , 0.950]
                                [   -1  ,  -1  ]  (max twenty pts)
                          IDovf=[], NHYDovf=[overflow]
*%-----------------|-------------------------------------------------------------|
*Catchment UNC3
*Existing wetland/open space area to remain
*flows to the Black Drain at Node 3

DESIGN NASHYD       ID=[3], NHYD=["UNC3"], DT=[2]min, AREA=[5.82](ha),
                    DWF=[0](cms), CN/C=[62], TP=[0.83]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment is collected in a bypass and is directed to the Black Drain by N

DESIGN STANDHYD     ID=[1], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
                    XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment is collected in a bypass and directed to the Black Drain by Node

DESIGN STANDHYD     ID=[2], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
                    XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
                    SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC1
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3

DESIGN NASHYD       ID=[4], NHYD=["UNC1"], DT=[2]min, AREA=[0.98](ha),
                    DWF=[0](cms), CN/C=[61], TP=[0.04]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------------|
*Catchment UNC5
```

```
00811> *This catchment drains east towards 3rd Line and is collected in a bypass that
00812> *is directed to the Black Drain by Node 3
00813>
00814> DESIGN NASHYD       ID=[5], NHYD=["UNC5"], DT=[2]min, AREA=[0.13](ha),
00815>                     DWF=[0](cms), CN/C=[39], TP=[0.07]hrs,
00816>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00817> *%-----------------|-------------------------------------------------------------|
00818> *Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
00819>
00820> ADD HYD             IDsum=[7], NHYD=["Bypass2"], IDs to add=[1,2,4,5]
00821> *%-----------------|-------------------------------------------------------------|
00822> *Catchment UNC2
00823> *Rear lots on South side of property, collected in swale
00824> *flows to the Black Drain at Node 3
00825>
00826> DESIGN NASHYD       ID=[1], NHYD=["UNC2"], DT=[2]min, AREA=[1.81](ha),
00827>                     DWF=[0](cms), CN/C=[66], TP=[0.21]hrs,
00828>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00829> *%-----------------|-------------------------------------------------------------|
00830> *Catchment EXT5
00831> *External area on the south of the site, existing agricultural
00832> *flows to the Black Drain at Node 3
00833>
00834> DESIGN NASHYD       ID=[2], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
00835>                     DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
00836>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00837> *%-----------------|-------------------------------------------------------------|
00838> *Total Flow to Node 3 (Including External Areas)
00839>
00840> ADD HYD             IDsum=[4], NHYD=["Node3"], IDs to add=[8,9,3,7,1,2]
00841> *%-----------------|-------------------------------------------------------------|
00842> *Catchment 202
00843> *This catchment is the area draining Node 4 Outlet
00844>
00845> DESIGN STANDHYD     ID=[6], NHYD=["202"], DT=[2]min, AREA=[2.99](ha),
00846>                     XIMP=[0.18], TIMP=[0.28], DWF=[0](cms), LOSS=[2], CN=[74],
00847>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00848> *%-----------------|-------------------------------------------------------------|
00849> *Catchment UNC4
00850> *Uncontrolled rear yards, flows to the Black Drain at Node 4
00851>
00852> DESIGN NASHYD       ID=[2], NHYD=["UNC4"], DT=[2]min, AREA=[1.12](ha),
00853>                     DWF=[0](cms), CN/C=[64], TP=[0.05]hrs,
00854>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00855> *%-----------------|-------------------------------------------------------------|
00856> *Catchment EXT6
00857> *External area on the south of the site, existing agricultural
00858> *flows to the Black Drain at Node 4
00859>
00860> DESIGN NASHYD       ID=[3], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
00861>                     DWF=[0](cms), CN/C=[55], TP=[0.55]hrs,
00862>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00863> *%-----------------|-------------------------------------------------------------|
00864> *Total Flow to to Node 4 (Including External Areas)
00865>
00866> ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[4,6,2,3]
00867> *%-----------------|-------------------------------------------------------------|
00868> *Catchment UNC6
00869> *Uncontrolled rear yards, flows to ditch along Road 19
00870>
00871> DESIGN NASHYD       ID=[2], NHYD=["UNC6"], DT=[2]min, AREA=[0.08](ha),
00872>                     DWF=[0](cms), CN/C=[74], TP=[0.05]hrs,
00873>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00874> *%-----------------|-------------------------------------------------------------|
00875> *%-----------------|-------------------------------------------------------------|
00876> *100-Year
00877> CHICAGO STORM       IUNITS=[2],  TD=[4](hrs), TPRAT=[0.333],  CSDT=[5](min),
00878>                     ICASEcs=[1],
00879>                      A=[955.98],  B=[0.0001], and C=[0.693],
00880> *%-----------------|-------------------------------------------------------------|
00881> *Catchment EXT1
00882> *External area on the northwest of Wellington Road 19.
00883> *This catchment drains to the golf course via a culvert which will be captured
00884> *and enter a bypass pipe, entering the Black Drain at Node 2
00885>
00886> DESIGN NASHYD       ID=[1], NHYD=["EXT1"], DT=[2]min, AREA=[7.93](ha),
00887>                     DWF=[0](cms), CN/C=[61], TP=[.44]hrs,
00888>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00889> *%-----------------|-------------------------------------------------------------|
00890> *Catchment EXT2
00891> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
00892> *This will be captured via the Black Drain Bypass and enter the drain at Node 2
00893>
00894> DESIGN STANDHYD     ID=[2], NHYD=["EXT2"], DT=[2]min, AREA=[0.34](ha),
00895>                     XIMP=[0.36], TIMP=[0.51], DWF=[0](cms), LOSS=[2], CN=[58],
00896>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00897> *%-----------------|-------------------------------------------------------------|
00898> *Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe
00899>
00900> ADD HYD             IDsum=[8], NHYD=["Bypass1"], IDs to add=[1,2]
00901> *%-----------------|-------------------------------------------------------------|
00902> *Catchment 201
00903> *Drainage Area to SWMF1
00904>
00905> DESIGN STANDHYD     ID=[1], NHYD=["201"], DT=[2]min, AREA=[26.92](ha),
00906>                     XIMP=[0.23], TIMP=[0.34], DWF=[0](cms), LOSS=[2], CN=[62],
00907>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00908> *%-----------------|-------------------------------------------------------------|
00909> * Pond 1
00910> ROUTE RESERVOIR     IDout=[9],   NHYD=["Pond1"],  IDin=[1],
00911>                     RDT=[2](min),
00912>                           TABLE of ( OUTFLOW-STORAGE ) values
00913>                                      (cms) - (ha-m)
00914>                                    [   0.0 ,  0.0 ]
00915>                                    [   0.057, 0.331]
00916>                                    [   0.32 , 0.950]
00917>                                    [   -1   ,  -1  ]  (max twenty pts)
00918>                           IDovf=[], NHYDovf=[overflow]
00919> *%-----------------|-------------------------------------------------------------|
00920> *Catchment UNC3
00921> *Existing wetland/open space area to remain
00922> *flows to the Black Drain at Node 3
00923>
00924> DESIGN NASHYD       ID=[3], NHYD=["UNC3"], DT=[2]min, AREA=[5.82](ha),
00925>                     DWF=[0](cms), CN/C=[62], TP=[0.83]hrs,
00926>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00927> *%-----------------|-------------------------------------------------------------|
00928> *Catchment EXT3
00929> *External area - Wellington Road 19 and 3rd line and
00930> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
00931> *This catchment is collected in a bypass and is directed to the Black Drain by N
00932>
00933> DESIGN STANDHYD     ID=[1], NHYD=["EXT3"], DT=[2]min, AREA=[1.23](ha),
00934>                     XIMP=[0.44], TIMP=[0.59], DWF=[0](cms), LOSS=[2], CN=[56],
00935>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00936> *%-----------------|-------------------------------------------------------------|
00937> *Catchment EXT4
00938> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
00939> *This catchment is collected in a bypass and directed to the Black Drain by Node
00940>
00941> DESIGN STANDHYD     ID=[2], NHYD=["EXT4"], DT=[2]min, AREA=[0.18](ha),
00942>                     XIMP=[0.33], TIMP=[0.48], DWF=[0](cms), LOSS=[2], CN=[30],
00943>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00944> *%-----------------|-------------------------------------------------------------|
00945> *Catchment UNC1
00946> *This catchment drains east towards 3rd Line and is collected in a bypass that
00947> *is directed to the Black Drain by Node 3
00948>
00949> DESIGN NASHYD       ID=[4], NHYD=["UNC1"], DT=[2]min, AREA=[0.98](ha),
00950>                     DWF=[0](cms), CN/C=[61], TP=[0.04]hrs,
00951>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00952> *%-----------------|-------------------------------------------------------------|
00953> *Catchment UNC5
00954> *This catchment drains east towards 3rd Line and is collected in a bypass that
00955> *is directed to the Black Drain by Node 3
00956>
00957> DESIGN NASHYD       ID=[5], NHYD=["UNC5"], DT=[2]min, AREA=[0.13](ha),
00958>                     DWF=[0](cms), CN/C=[39], TP=[0.07]hrs,
00959>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00960> *%-----------------|-------------------------------------------------------------|
00961> *Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
00962>
00963> ADD HYD             IDsum=[7], NHYD=["Bypass2"], IDs to add=[1,2,4,5]
00964> *%-----------------|-------------------------------------------------------------|
00965> *Catchment UNC2
00966> *Rear lots on South side of property, collected in swale
00967> *flows to the Black Drain at Node 3
00968>
00969> DESIGN NASHYD       ID=[1], NHYD=["UNC2"], DT=[2]min, AREA=[1.81](ha),
00970>                     DWF=[0](cms), CN/C=[66], TP=[0.21]hrs,
00971>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00972> *%-----------------|-------------------------------------------------------------|
00973> *Catchment EXT5
00974> *External area on the south of the site, existing agricultural
00975> *flows to the Black Drain at Node 3
00976>
00977> DESIGN NASHYD       ID=[2], NHYD=["EXT5"], DT=[2]min, AREA=[8.51](ha),
00978>                     DWF=[0](cms), CN/C=[35], TP=[0.44]hrs,
00979>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00980> *%-----------------|-------------------------------------------------------------|
00981> *Total Flow to Node 3 (Including External Areas)
00982>
00983> ADD HYD             IDsum=[4], NHYD=["Node3"], IDs to add=[8,9,3,7,1,2]
00984> *%-----------------|-------------------------------------------------------------|
00985> *Catchment 202
00986> *This catchment is the area draining Node 4 Outlet
00987>
00988> DESIGN STANDHYD     ID=[6], NHYD=["202"], DT=[2]min, AREA=[2.99](ha),
00989>                     XIMP=[0.18], TIMP=[0.28], DWF=[0](cms), LOSS=[2], CN=[74],
00990>                     SLOPE=[0.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
00991> *%-----------------|-------------------------------------------------------------|
00992> *Catchment UNC4
00993> *Uncontrolled rear yards, flows to the Black Drain at Node 4
00994>
00995> DESIGN NASHYD       ID=[2], NHYD=["UNC4"], DT=[2]min, AREA=[1.12](ha),
00996>                     DWF=[0](cms), CN/C=[64], TP=[0.05]hrs,
00997>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00998> *%-----------------|-------------------------------------------------------------|
00999> *Catchment EXT6
01000> *External area on the south of the site, existing agricultural
01001> *flows to the Black Drain at Node 4
01002>
01003> DESIGN NASHYD       ID=[3], NHYD=["EXT6"], DT=[2]min, AREA=[15.73](ha),
01004>                     DWF=[0](cms), CN/C=[55], TP=[0.55]hrs,
01005>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
01006> *%-----------------|-------------------------------------------------------------|
01007> *Total Flow to to Node 4 (Including External Areas)
01008>
01009> ADD HYD             IDsum=[8], NHYD=["Node4"], IDs to add=[4,6,2,3]
01010> *%-----------------|-------------------------------------------------------------|
01011> *Catchment UNC6
01012> *Uncontrolled rear yards, flows to ditch along Road 19
01013>
01014> DESIGN NASHYD       ID=[2], NHYD=["UNC6"], DT=[2]min, AREA=[0.08](ha),
01015>                     DWF=[0](cms), CN/C=[74], TP=[0.05]hrs,
01016>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
01017> *%-----------------|-------------------------------------------------------------|
01018> FINISH
01019>
01020>
01021>
01022>
01023>
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01025>
01026>
01027>
01028>
01029>
01030>
01031>
01032>
01033>
```

```
00001> ================================================================================
00002>
00003>    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO         999    999    =========
00004>    S      W W W  MM MM  H   H   Y Y   MM MM  O   O       9   9  9   9
00005>    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##   9   9  9   9   Ver  4.05
00006>        S  W W W  M   M  H   H    Y    M   M  O   O        9999   9999   Sept 2011
00007>    SSSSS  W W W  M   M  H   H    Y    M   M   OOO           9      9    =========
00008>                                                          9   9  9   9   # 3877524
00009>          StormWater Management HYdrologic Model          999    999    =========
00010>
00011>  ********************************************************************************
00012>  ***************************** SWMHYMO Ver/4.05  ********************************
00013>  *********  A single event and continuous hydrologic simulation model  *********
00014>  *********     based on the principles of HYMO and its successors      *********
00015>  *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
00016>  ********************************************************************************
00017>  ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
00018>  *********                  Ottawa,  Ontario: (613) 836-3884           *********
00019>  *********                  Gatineau, Quebec: (819) 243-6858           *********
00020>  *********                  E-Mail: swmhymo@jfsa.com                   *********
00021>  ********************************************************************************
00022>
00023>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++++ Licensed user: R.J. Burnside & Associates Ltd                +++++++++
00025>  +++++++++                Brampton                SERIAL#:3877524     +++++++++
00026>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
00030>  *********           Maximum value for ID numbers  :     10            *********
00031>  *********           Max. number of rainfall points: 105408            *********
00032>  *********           Max. number of flow points    : 105408            *********
00033>  ********************************************************************************
00034>
00035>
00036>  **********************   D E T A I L E D   O U T P U T   **********************
00037>  ********************************************************************************
00038>  *         DATE: 2021-12-22     TIME: 15:14:52     RUN COUNTER: 002540         *
00039>  ********************************************************************************
00040>  * Input   filename: C:\SWMHYM~1\FERGUS~1\POST.DAT                             *
00041>  * Output  filename: C:\SWMHYM~1\FERGUS~1\POST.out                             *
00042>  * Summary filename: C:\SWMHYM~1\FERGUS~1\POST.sum                             *
00043>  * User comments:                                                             *
00044>  * 1:_____________________________________________________________________    *
00045>  * 2:_____________________________________________________________________    *
00046>  * 3:_____________________________________________________________________    *
00047>  ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001--------------------------------------------------------------------------
00051> *#*************************************************************************
00052> *#  Project Name: [Fergus Golf Club] Project Number: [300052719]
00053> *#  Date        : 09-28-2021
00054> *#  Modeller    : [L.Garner]
00055> *#  Company     : R.J. Burnside & Associates
00056> *#  License #   :  3245976
00057> *#*************************************************************************
00058> *# ********************************************************************
00059> *# Fergus Golf Club Post Development         *
00060> *# ********************************************************************
00061> *#
00062> --------------------
00063> | START            |  Project  dir.: C:\SWMHYM~1\FERGUS~1\
00064> --------------------  Rainfall dir.: C:\SWMHYM~1\FERGUS~1\
00065>     TZERO =   .00 hrs on        0
00066>     METOUT=   2 (output = METRIC)
00067>     NRUN  = 001
00068>     NSTORM=   0
00069> --------------------------------------------------------------------------------
00070> 001:0002--------------------------------------------------------------------------
00071> --------------------
00072> | MASS STORM       |    Filename: C:\SWMHYM~1\FERGUS~1\4hr-chi.mst
00073> | Ptotal= 25.00 mm |    Comments: 4 Hour, Chicago Distribution with 10 min
00074> --------------------
00075>                          Duration of storm        =    4.17 hrs
00076>                          Mass curve time step     =   10.00 min
00077>                          Selected storm time step =   10.00 min
00078>                          Volume of derived storm  =   25.00 mm
00079>
00080>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00081>                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00082>                .17   1.500 |   1.33  36.300 |   2.50   2.850 |   3.67   1.500
00083>                .33   2.100 |   1.50  23.550 |   2.67   2.400 |   3.83   1.050
00084>                .50   2.250 |   1.67   9.900 |   2.83   2.250 |   4.00    .600
00085>                .67   2.550 |   1.83   6.300 |   3.00   2.100 |   4.17    .300
00086>                .83   4.050 |   2.00   4.800 |   3.17   1.800 |
00087>               1.00   7.500 |   2.17   3.900 |   3.33   1.650 |
00088>               1.17  24.000 |   2.33   3.150 |   3.50   1.650 |
00089>
00090> --------------------------------------------------------------------------------
00091> 001:0003--------------------------------------------------------------------------
00092> *Catchment EXT1
00093> *External area on the northwest of Wellington Road 19.
00094> *This catchment drains to the golf course via a culvert which will be captured
00095> *and enter a bypass pipe, entering the Black Drain at Node 2
00096> ----------------------
00097> | DESIGN NASHYD      |   Area    (ha)=    7.93   Curve Number   (CN)=61.00
00098> | 01:EXT1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00099> ----------------------   U.H. Tp(hrs)=    .440
00100>
00101>     Unit Hyd Qpeak  (cms)=     .688
00102>
00103>     PEAK FLOW       (cms)=     .043 (i)
00104>     TIME TO PEAK    (hrs)=    1.900
00105>     RUNOFF VOLUME    (mm)=    2.971
00106>     TOTAL RAINFALL   (mm)=   25.000
00107>     RUNOFF COEFFICIENT   =     .119
00108>
00109>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00110>
00111> --------------------------------------------------------------------------------
00112> 001:0004--------------------------------------------------------------------------
00113> *Catchment EXT2
00114> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
00115> *This will be captured via the Black Drain Bypass and enter the drain at Node 2
00116> ----------------------
00117> | DESIGN STANDHYD    |   Area    (ha)=    .34
00118> | 02:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
00119> ----------------------
00120>                              IMPERVIOUS    PERVIOUS (i)
00121>     Surface Area     (ha)=        .17          .17
00122>     Dep. Storage     (mm)=        .80         1.50
00123>     Average Slope     (%)=        .50          .50
00124>     Length            (m)=      47.61        40.00
00125>     Mannings n            =       .013         .250
00126>
00127>     Max.eff.Inten.(mm/hr)=      36.30         3.80
00128>               over (min)        4.00        42.00
00129>     Storage Coeff.  (min)=      3.02 (ii)   42.60 (ii)
00130>     Unit Hyd. Tpeak (min)=      4.00        42.00
00131>     Unit Hyd. peak  (cms)=       .33          .03
00132>                                                        *TOTALS*
00133>     PEAK FLOW       (cms)=       .01          .00          .012 (iii)
00134>     TIME TO PEAK    (hrs)=      1.33         2.13         1.333
00135>     RUNOFF VOLUME    (mm)=     24.20         3.45         10.923
00136>     TOTAL RAINFALL   (mm)=     25.00        25.00         25.000
00137>     RUNOFF COEFFICIENT   =       .97          .14          .437
00138>
00139>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00140>            CN* =  58.0    Ia = Dep. Storage  (Above)
00141>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00142>            THAN THE STORAGE COEFFICIENT.
00143>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00144>
00145> --------------------------------------------------------------------------------
00146> 001:0005--------------------------------------------------------------------------
00147> *Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe
00148> ------------------------
00149> | ADD HYD (Bypass1   ) | ID: NHYD         AREA    QPEAK   TPEAK   R.V.    DWF
00150> ------------------------                 (ha)     (cms)   (hrs)   (mm)    (cms)
00151>                       ID1 01:EXT1         7.93     .043    1.90   2.97     .000
00152>                      +ID2 02:EXT2          .34     .012    1.33  10.92     .000
00153>                       ========================================================
00154>                       SUM 08:Bypass1      8.27     .045    1.87   3.30     .000
00155>
00156>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00157>
00158> --------------------------------------------------------------------------------
00159> 001:0006--------------------------------------------------------------------------
00160> *Catchment 201
00161> *Drainage Area to SWMF1
00162> ----------------------
00163> | DESIGN STANDHYD    |   Area    (ha)=   26.92
00164> | 01:201    DT= 2.00 |   Total Imp(%)=   34.00   Dir. Conn.(%)=   23.00
00165> ----------------------
00166>                              IMPERVIOUS    PERVIOUS (i)
00167>     Surface Area     (ha)=       9.15        17.77
00168>     Dep. Storage     (mm)=        .80         1.50
00169>     Average Slope     (%)=        .50          .50
00170>     Length            (m)=     423.64        40.00
00171>     Mannings n            =       .013         .250
00172>
00173>     Max.eff.Inten.(mm/hr)=      34.25         3.05
00174>               over (min)       12.00        54.00
00175>     Storage Coeff.  (min)=     11.48 (ii)   54.67 (ii)
00176>     Unit Hyd. Tpeak (min)=      12.00        54.00
00177>     Unit Hyd. peak  (cms)=        .10          .02
00178>                                                        *TOTALS*
00179>     PEAK FLOW       (cms)=        .46          .09          .477 (iii)
00180>     TIME TO PEAK    (hrs)=       1.47         2.33         1.500
00181>     RUNOFF VOLUME    (mm)=      24.20         3.58         8.321
00182>     TOTAL RAINFALL   (mm)=      25.00        25.00        25.000
00183>     RUNOFF COEFFICIENT   =        .97          .14          .333
00184>
00185>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00186>            CN* =  62.0    Ia = Dep. Storage  (Above)
00187>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00188>            THAN THE STORAGE COEFFICIENT.
00189>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00190>
00191> --------------------------------------------------------------------------------
00192> 001:0007--------------------------------------------------------------------------
00193> * Pond 1
00194> ----------------------
00195> | ROUTE RESERVOIR    |    Requested routing time step =  2.0 min.
00196> |  IN>01:(201    )   |
00197> | OUT<09:(Pond1 )    |    =========  OUTFLOW STORAGE TABLE  =========
00198> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00199>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00200>                              .000  .0000E+00    |     .320  .9500E+00
00201>                              .057  .3310E+00    |     .000  .0000E+00
00202>
00203>     ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
00204>     ---------------              (ha)     (cms)     (hrs)       (mm)
00205>     INFLOW >01: (201    )      26.92      .477     1.500      8.321
00206>     OUTFLOW<09: (Pond1 )       26.92      .032     4.533      8.321
00207>
00208>                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=    6.659
00209>                   TIME SHIFT OF PEAK FLOW          (min)=   182.00
00210>                   MAXIMUM  STORAGE   USED       (ha.m.)=.1843E+00
00211>
00212> --------------------------------------------------------------------------------
00213> 001:0008--------------------------------------------------------------------------
00214> *Catchment UNC3
00215> *Existing wetland/open space area to remain
00216> *flows to the Black Drain at Node 3
00217> ----------------------
00218> | DESIGN NASHYD      |   Area    (ha)=    5.82   Curve Number   (CN)=62.00
00219> | 03:UNC3   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00220> ----------------------   U.H. Tp(hrs)=    .830
00221>
00222>     Unit Hyd Qpeak  (cms)=     .268
00223>
00224>     PEAK FLOW       (cms)=     .021 (i)
00225>     TIME TO PEAK    (hrs)=    2.433
00226>     RUNOFF VOLUME    (mm)=    3.082
00227>     TOTAL RAINFALL   (mm)=   25.000
00228>     RUNOFF COEFFICIENT   =     .123
00229>
00230>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00231>
00232> --------------------------------------------------------------------------------
00233> 001:0009--------------------------------------------------------------------------
00234> *Catchment EXT3
00235> *External area - Wellington Road 19 and 3rd line and
00236> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
00237> *This catchment is collected in a bypass and is directed to the Black Drain by N
00238> ----------------------
00239> | DESIGN STANDHYD    |   Area    (ha)=    1.23
00240> | 01:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
00241> ----------------------
00242>                              IMPERVIOUS    PERVIOUS (i)
00243>     Surface Area     (ha)=        .73          .50
00244>     Dep. Storage     (mm)=        .80         1.50
00245>     Average Slope     (%)=        .50          .50
00246>     Length            (m)=      90.55        40.00
00247>     Mannings n            =       .013         .250
00248>
00249>     Max.eff.Inten.(mm/hr)=      36.30         3.77
00250>               over (min)        4.00        44.00
00251>     Storage Coeff.  (min)=      4.44 (ii)   44.15 (ii)
00252>     Unit Hyd. Tpeak (min)=      4.00        44.00
00253>     Unit Hyd. peak  (cms)=       .26          .03
00254>                                                        *TOTALS*
00255>     PEAK FLOW       (cms)=       .05          .00          .052 (iii)
00256>     TIME TO PEAK    (hrs)=      1.33         2.17         1.333
00257>     RUNOFF VOLUME    (mm)=     24.20         3.36        12.530
00258>     TOTAL RAINFALL   (mm)=     25.00        25.00        25.000
00259>     RUNOFF COEFFICIENT   =       .97          .13          .501
00260>
00261>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00262>            CN* =  56.0    Ia = Dep. Storage  (Above)
00263>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00264>            THAN THE STORAGE COEFFICIENT.
00265>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00266>
00267> --------------------------------------------------------------------------------
00268> 001:0010--------------------------------------------------------------------------
00269> *Catchment EXT4
00270> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
```

```
*This catchment is collected in a bypass and directed to the Black Drain by Node
----------------------
| DESIGN STANDHYD    |   Area    (ha)=     .18
| 02:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .09          .09
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      34.64        40.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=      36.30          .92
                 over (min)        2.00        72.00
     Storage Coeff.  (min)=       2.50 (ii)   72.33 (ii)
     Unit Hyd. Tpeak (min)=       2.00        72.00
     Unit Hyd. peak  (cms)=        .47          .02
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .01          .00          .006 (iii)
     TIME TO PEAK    (hrs)=       1.33         2.67         1.333
     RUNOFF VOLUME    (mm)=      24.20         1.17         8.773
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.000
     RUNOFF COEFFICIENT   =        .97          .05          .351

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  30.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0011---------------------------------------------------------------------
*Catchment UNC1
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .98   Curve Number   (CN)=61.00
| 04:UNC1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .936

     PEAK FLOW       (cms)=     .011 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=    2.971
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .119

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0012---------------------------------------------------------------------
*Catchment UNC5
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .13   Curve Number   (CN)=39.00
| 05:UNC5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .070

     Unit Hyd Qpeak  (cms)=     .071

     PEAK FLOW       (cms)=     .001 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=    1.311
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .052

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

--------------------------------------------------------------------------------
001:0013---------------------------------------------------------------------
*Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
------------------------
| ADD HYD (Bypass2   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXT3          1.23      .052    1.33  12.53    .000
                     +ID2 02:EXT4           .18      .006    1.33   8.77    .000
                     +ID3 04:UNC1           .98      .011    1.33   2.97    .000
                     +ID4 05:UNC5           .13      .001    1.50   1.31    .000
                      ==========================================================
                      SUM 07:Bypass2       2.52      .070    1.33   7.97    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0014---------------------------------------------------------------------
*Catchment UNC2
*Rear lots on South side of property, collected in swale
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    1.81   Curve Number   (CN)=66.00
| 01:UNC2   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .210

     Unit Hyd Qpeak  (cms)=     .329

     PEAK FLOW       (cms)=     .018 (i)
     TIME TO PEAK    (hrs)=    1.600
     RUNOFF VOLUME    (mm)=    3.578
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .143

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

--------------------------------------------------------------------------------
001:0015---------------------------------------------------------------------
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.51   Curve Number   (CN)=35.00
| 02:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .739

     PEAK FLOW       (cms)=     .017 (i)
     TIME TO PEAK    (hrs)=    1.900
     RUNOFF VOLUME    (mm)=    1.115
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .045

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

--------------------------------------------------------------------------------
001:0016---------------------------------------------------------------------
*Total Flow to Node 3 (Including External Areas)
------------------------
| ADD HYD (Node3     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 08:Bypass1        8.27      .045    1.87   3.30    .000
                     +ID2 09:Pond1         26.92      .032    4.53   8.32    .000
                     +ID3 03:UNC3           5.82      .021    2.43   3.08    .000
                     +ID4 07:Bypass2        2.52      .070    1.33   7.97    .000
                     +ID5 01:UNC2           1.81      .018    1.60   3.58    .000
                     +ID6 02:EXT5           8.51      .017    1.90   1.12    .000
                      ==========================================================
                      SUM 04:Node3         53.85      .124    1.83   5.67    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0017---------------------------------------------------------------------
*Catchment 202
*This catchment is the area draining Node 4 Outlet
----------------------
| DESIGN STANDHYD    |   Area    (ha)=    2.99
| 06:202    DT= 2.00 |   Total Imp(%)=   28.00   Dir. Conn.(%)=   18.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .84         2.15
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=     141.19        40.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=      36.30         5.50
                 over (min)        6.00        40.00
     Storage Coeff.  (min)=       5.80 (ii)   39.92 (ii)
     Unit Hyd. Tpeak (min)=       6.00        40.00
     Unit Hyd. peak  (cms)=        .19          .03
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .05          .02          .051 (iii)
     TIME TO PEAK    (hrs)=       1.37         2.10         1.367
     RUNOFF VOLUME    (mm)=      24.20         5.50         8.863
     TOTAL RAINFALL   (mm)=      25.00        25.00        25.000
     RUNOFF COEFFICIENT   =        .97          .22          .355

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0018---------------------------------------------------------------------
*Catchment UNC4
*Uncontrolled rear yards, flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD      |   Area    (ha)=    1.12   Curve Number   (CN)=64.00
| 02:UNC4   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .856

     PEAK FLOW       (cms)=     .014 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=    3.319
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .133

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0019---------------------------------------------------------------------
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD      |   Area    (ha)=   15.73   Curve Number   (CN)=55.00
| 03:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .550

     Unit Hyd Qpeak  (cms)=    1.092

     PEAK FLOW       (cms)=     .059 (i)
     TIME TO PEAK    (hrs)=    2.067
     RUNOFF VOLUME    (mm)=    2.387
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .095

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

--------------------------------------------------------------------------------
001:0020---------------------------------------------------------------------
*Total Flow to to Node 4 (Including External Areas)
------------------------
| ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 04:Node3         53.85      .124    1.83   5.67    .000
                     +ID2 06:202            2.99      .051    1.37   8.86    .000
                     +ID3 02:UNC4           1.12      .014    1.33   3.32    .000
                     +ID4 03:EXT6          15.73      .059    2.07   2.39    .000
                      ==========================================================
                      SUM 08:Node4         73.69      .212    1.97   5.06    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0021---------------------------------------------------------------------
*Catchment UNC6
*Uncontrolled rear yards, flows to ditch along Road 19
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .08   Curve Number   (CN)=74.00
| 02:UNC6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .061

     PEAK FLOW       (cms)=     .001 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=    4.896
     TOTAL RAINFALL   (mm)=   25.000
     RUNOFF COEFFICIENT   =     .196

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0022---------------------------------------------------------------------
*2-Year
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 400.290
| Ptotal= 34.16 mm |                          B=    .000
--------------------                          C=    .702
                          used in:   INTENSITY =  A / (t + B)^C

                          Duration of storm  =  4.00 hrs
                          Storm time step    =  5.00 min
                          Time to peak ratio =   .33

              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .08   2.683 |   1.08   8.628 |   2.08   6.127 |   3.08   3.403
```

```
00541>               .17   2.817 |   1.17  11.819 |   2.17   5.697 |   3.17   3.295
00542>               .25   2.970 |   1.25  22.044 |   2.25   5.333 |   3.25   3.194
00543>               .33   3.144 |   1.33 129.328 |   2.33   5.021 |   3.33   3.101
00544>               .42   3.345 |   1.42  27.075 |   2.42   4.750 |   3.42   3.014
00545>               .50   3.581 |   1.50  17.037 |   2.50   4.512 |   3.50   2.932
00546>               .58   3.862 |   1.58  12.977 |   2.58   4.301 |   3.58   2.856
00547>               .67   4.202 |   1.67  10.680 |   2.67   4.112 |   3.67   2.785
00548>               .75   4.626 |   1.75   9.174 |   2.75   3.942 |   3.75   2.717
00549>               .83   5.172 |   1.83   8.098 |   2.83   3.789 |   3.83   2.654
00550>               .92   5.906 |   1.92   7.285 |   2.92   3.649 |   3.92   2.594
00551>              1.00   6.958 |   2.00   6.645 |   3.00   3.521 |   4.00   2.537
00552>
00553> ----------------------------------------------------------------------------
00554> 001:0023----------------------------------------------------------------------
00555> *Catchment EXT1
00556> *External area on the northwest of Wellington Road 19.
00557> *This catchment drains to the golf course via a culvert which will be captured
00558> *and enter a bypass pipe, entering the Black Drain at Node 2
00559> ----------------------
00560> | DESIGN NASHYD      |   Area    (ha)=    7.93   Curve Number   (CN)=61.00
00561> | 01:EXT1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00562> ----------------------   U.H. Tp(hrs)=    .440
00563>
00564>      Unit Hyd Qpeak  (cms)=     .688
00565>
00566>      PEAK FLOW       (cms)=     .071 (i)
00567>      TIME TO PEAK    (hrs)=    1.875
00568>      RUNOFF VOLUME    (mm)=    5.468
00569>      TOTAL RAINFALL   (mm)=   34.158
00570>      RUNOFF COEFFICIENT   =     .160
00571>
00572>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00573>
00574> ----------------------------------------------------------------------------
00575> 001:0024----------------------------------------------------------------------
00576> *Catchment EXT2
00577> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
00578> *This will be captured via the Black Drain Bypass and enter the drain at Node 2
00579> ----------------------
00580> | DESIGN STANDHYD    |   Area    (ha)=     .34
00581> | 02:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
00582> ----------------------
00583>                              IMPERVIOUS    PERVIOUS (i)
00584>      Surface Area     (ha)=        .17          .17
00585>      Dep. Storage     (mm)=        .80         1.50
00586>      Average Slope     (%)=        .50          .50
00587>      Length            (m)=      47.61        40.00
00588>      Mannings n             =      .013         .250
00589>
00590>      Max.eff.Inten.(mm/hr)=     129.33         7.75
00591>                   over (min)        2.50        32.50
00592>      Storage Coeff.  (min)=       1.82 (ii)   31.57 (ii)
00593>      Unit Hyd. Tpeak (min)=       2.50        32.50
00594>      Unit Hyd. peak  (cms)=        .51          .04
00595>                                                          *TOTALS*
00596>      PEAK FLOW       (cms)=        .04          .00          .042 (iii)
00597>      TIME TO PEAK    (hrs)=       1.33         1.88         1.333
00598>      RUNOFF VOLUME    (mm)=      33.36         6.27        16.020
00599>      TOTAL RAINFALL   (mm)=      34.16        34.16        34.158
00600>      RUNOFF COEFFICIENT   =        .98          .18          .469
00601>       *** WARNING: Storage Coefficient is smaller than DT!
00602>                    Use a smaller DT or a larger area.
00603>
00604>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00605>            CN* =  58.0    Ia = Dep. Storage  (Above)
00606>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00607>            THAN THE STORAGE COEFFICIENT.
00608>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00609>
00610> ----------------------------------------------------------------------------
00611> 001:0025----------------------------------------------------------------------
00612> *Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe
00613> ----------------------
00614> | ADD HYD (Bypass1   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00615> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00616>                        ID1 01:EXT1          7.93     .071   1.88   5.47    .000
00617>                       +ID2 02:EXT2           .34     .042   1.33  16.02    .000
00618>                        ============================================================
00619>                        SUM 08:Bypass1       8.27     .076   1.88   5.90    .000
00620>
00621>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00622>
00623> ----------------------------------------------------------------------------
00624> 001:0026----------------------------------------------------------------------
00625> *Catchment 201
00626> *Drainage Area to SWMF1
00627> ----------------------
00628> | DESIGN STANDHYD    |   Area    (ha)=   26.92
00629> | 01:201    DT= 2.00 |   Total Imp(%)=   34.00   Dir. Conn.(%)=   23.00
00630> ----------------------
00631>                              IMPERVIOUS    PERVIOUS (i)
00632>      Surface Area     (ha)=       9.15        17.77
00633>      Dep. Storage     (mm)=        .80         1.50
00634>      Average Slope     (%)=        .50          .50
00635>      Length            (m)=     423.64        40.00
00636>      Mannings n             =      .013         .250
00637>
00638>      Max.eff.Inten.(mm/hr)=      95.24         6.31
00639>                   over (min)        7.50        40.00
00640>      Storage Coeff.  (min)=       7.63 (ii)   39.93 (ii)
00641>      Unit Hyd. Tpeak (min)=       7.50        40.00
00642>      Unit Hyd. peak  (cms)=        .15          .03
00643>                                                          *TOTALS*
00644>      PEAK FLOW       (cms)=       1.05          .18         1.077 (iii)
00645>      TIME TO PEAK    (hrs)=       1.42         2.04         1.417
00646>      RUNOFF VOLUME    (mm)=      33.36         6.50        12.675
00647>      TOTAL RAINFALL   (mm)=      34.16        34.16        34.158
00648>      RUNOFF COEFFICIENT   =        .98          .19          .371
00649>
00650>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00651>            CN* =  62.0    Ia = Dep. Storage  (Above)
00652>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00653>            THAN THE STORAGE COEFFICIENT.
00654>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00655>
00656> ----------------------------------------------------------------------------
00657> 001:0027----------------------------------------------------------------------
00658> * Pond 1
00659> ----------------------
00660> | ROUTE RESERVOIR    |    Requested routing time step =  2.0 min.
00661> |  IN>01:(201    )   |
00662> | OUT<09:(Pond1 )    |    =========  OUTLFOW STORAGE TABLE  =========
00663> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00664>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00665>                              .000  .0000E+00    |     .320  .9500E+00
00666>                              .057  .3310E+00    |     .000  .0000E+00
00667>
00668>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00669>      --------------------        (ha)     (cms)     (hrs)       (mm)
00670>      INFLOW >01: (201   )      26.92     1.077     1.417     12.675
00671>      OUTFLOW<09: (Pond1 )      26.92      .049     4.583     12.675
00672>
00673>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=    4.548
00674>                     TIME SHIFT OF PEAK FLOW          (min)=   190.00
00675>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2845E+00
00676>
00677> ----------------------------------------------------------------------------
00678> 001:0028----------------------------------------------------------------------
00679> *Catchment UNC3
00680> *Existing wetland/open space area to remain
00681> *flows to the Black Drain at Node 3
00682> ----------------------
00683> | DESIGN NASHYD      |   Area    (ha)=    5.82   Curve Number   (CN)=62.00
00684> | 03:UNC3   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00685> ----------------------   U.H. Tp(hrs)=    .830
00686>
00687>      Unit Hyd Qpeak  (cms)=     .268
00688>
00689>      PEAK FLOW       (cms)=     .036 (i)
00690>      TIME TO PEAK    (hrs)=    2.458
00691>      RUNOFF VOLUME    (mm)=    5.663
00692>      TOTAL RAINFALL   (mm)=   34.158
00693>      RUNOFF COEFFICIENT   =     .166
00694>
00695>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00696>
00697> ----------------------------------------------------------------------------
00698> 001:0029----------------------------------------------------------------------
00699> *Catchment EXT3
00700> *External area - Wellington Road 19 and 3rd line and
00701> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
00702> *This catchment is collected in a bypass and is directed to the Black Drain by N
00703> ----------------------
00704> | DESIGN STANDHYD    |   Area    (ha)=    1.23
00705> | 01:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
00706> ----------------------
00707>                              IMPERVIOUS    PERVIOUS (i)
00708>      Surface Area     (ha)=        .73          .50
00709>      Dep. Storage     (mm)=        .80         1.50
00710>      Average Slope     (%)=        .50          .50
00711>      Length            (m)=      90.55        40.00
00712>      Mannings n             =      .013         .250
00713>
00714>      Max.eff.Inten.(mm/hr)=     129.33         7.88
00715>                   over (min)        2.50        32.50
00716>      Storage Coeff.  (min)=       2.67 (ii)   32.23 (ii)
00717>      Unit Hyd. Tpeak (min)=       2.50        32.50
00718>      Unit Hyd. peak  (cms)=        .41          .04
00719>                                                          *TOTALS*
00720>      PEAK FLOW       (cms)=        .17          .01          .170 (iii)
00721>      TIME TO PEAK    (hrs)=       1.33         1.88         1.333
00722>      RUNOFF VOLUME    (mm)=      33.36         6.10        18.093
00723>      TOTAL RAINFALL   (mm)=      34.16        34.16        34.158
00724>      RUNOFF COEFFICIENT   =        .98          .18          .530
00725>
00726>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00727>            CN* =  56.0    Ia = Dep. Storage  (Above)
00728>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00729>            THAN THE STORAGE COEFFICIENT.
00730>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00731>
00732> ----------------------------------------------------------------------------
00733> 001:0030----------------------------------------------------------------------
00734> *Catchment EXT4
00735> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
00736> *This catchment is collected in a bypass and directed to the Black Drain by Node
00737> ----------------------
00738> | DESIGN STANDHYD    |   Area    (ha)=     .18
00739> | 02:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
00740> ----------------------
00741>                              IMPERVIOUS    PERVIOUS (i)
00742>      Surface Area     (ha)=        .09          .09
00743>      Dep. Storage     (mm)=        .80         1.50
00744>      Average Slope     (%)=        .50          .50
00745>      Length            (m)=      34.64        40.00
00746>      Mannings n             =      .013         .250
00747>
00748>      Max.eff.Inten.(mm/hr)=     129.33         8.26
00749>                   over (min)        2.50        30.00
00750>      Storage Coeff.  (min)=       1.50 (ii)   30.51 (ii)
00751>      Unit Hyd. Tpeak (min)=       2.50        30.00
00752>      Unit Hyd. peak  (cms)=        .55          .04
00753>                                                          *TOTALS*
00754>      PEAK FLOW       (cms)=        .02          .00          .021 (iii)
00755>      TIME TO PEAK    (hrs)=       1.33         1.83         1.333
00756>      RUNOFF VOLUME    (mm)=      33.36         2.21        12.487
00757>      TOTAL RAINFALL   (mm)=      34.16        34.16        34.158
00758>      RUNOFF COEFFICIENT   =        .98          .06          .366
00759>       *** WARNING: Storage Coefficient is smaller than DT!
00760>                    Use a smaller DT or a larger area.
00761>
00762>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00763>            CN* =  30.0    Ia = Dep. Storage  (Above)
00764>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00765>            THAN THE STORAGE COEFFICIENT.
00766>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00767>
00768> ----------------------------------------------------------------------------
00769> 001:0031----------------------------------------------------------------------
00770> *Catchment UNC1
00771> *This catchment drains east towards 3rd Line and is collected in a bypass that
00772> *is directed to the Black Drain by Node 3
00773> ----------------------
00774> | DESIGN NASHYD      |   Area    (ha)=     .98   Curve Number   (CN)=61.00
00775> | 04:UNC1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00776> ----------------------   U.H. Tp(hrs)=    .040
00777>
00778>      Unit Hyd Qpeak  (cms)=     .936
00779>
00780>      PEAK FLOW       (cms)=     .043 (i)
00781>      TIME TO PEAK    (hrs)=    1.333
00782>      RUNOFF VOLUME    (mm)=    5.468
00783>      TOTAL RAINFALL   (mm)=   34.158
00784>      RUNOFF COEFFICIENT   =     .160
00785>
00786>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00787>
00788>       *** WARNING: Time step is too large for value of TP.
00789>                    R.V. may be ok.  Peak flow could be off.
00790> ----------------------------------------------------------------------------
00791> 001:0032----------------------------------------------------------------------
00792> *Catchment UNC5
00793> *This catchment drains east towards 3rd Line and is collected in a bypass that
00794> *is directed to the Black Drain by Node 3
00795> ----------------------
00796> | DESIGN NASHYD      |   Area    (ha)=     .13   Curve Number   (CN)=39.00
00797> | 05:UNC5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
00798> ----------------------   U.H. Tp(hrs)=    .070
00799>
00800>      Unit Hyd Qpeak  (cms)=     .071
00801>
00802>      PEAK FLOW       (cms)=     .002 (i)
00803>      TIME TO PEAK    (hrs)=    1.375
00804>      RUNOFF VOLUME    (mm)=    2.481
00805>      TOTAL RAINFALL   (mm)=   34.158
00806>      RUNOFF COEFFICIENT   =     .073
00807>
00808>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00809>
00810>       *** WARNING: Time step is too large for value of TP.
```

```
                    R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0033--------------------------------------------------------------------------
*Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
----------------------
| ADD HYD (Bypass2   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 01:EXT3          1.23     .170    1.33  18.09    .000
                     +ID2 02:EXT4           .18     .021    1.33  12.49    .000
                     +ID3 04:UNC1           .98     .043    1.33   5.47    .000
                     +ID4 05:UNC5           .13     .002    1.38   2.48    .000
                      ==========================================================
                      SUM 07:Bypass2       2.52     .236    1.33  11.98    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0034--------------------------------------------------------------------------
*Catchment UNC2
*Rear lots on South side of property, collected in swale
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    1.81   Curve Number   (CN)=66.00
| 01:UNC2   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .210

     Unit Hyd Qpeak  (cms)=     .329

     PEAK FLOW       (cms)=     .032 (i)
     TIME TO PEAK    (hrs)=    1.542
     RUNOFF VOLUME    (mm)=    6.523
     TOTAL RAINFALL   (mm)=   34.158
     RUNOFF COEFFICIENT   =     .191

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

--------------------------------------------------------------------------------
001:0035--------------------------------------------------------------------------
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.51   Curve Number   (CN)=35.00
| 02:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .739

     PEAK FLOW       (cms)=     .029 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=    2.115
     TOTAL RAINFALL   (mm)=   34.158
     RUNOFF COEFFICIENT   =     .062

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

--------------------------------------------------------------------------------
001:0036--------------------------------------------------------------------------
*Total Flow to Node 3 (Including External Areas)
----------------------
| ADD HYD (Node3     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 08:Bypass1       8.27     .076    1.88   5.90    .000
                     +ID2 09:Pond1        26.92     .049    4.58  12.68    .000
                     +ID3 03:UNC3          5.82     .036    2.46   5.66    .000
                     +ID4 07:Bypass2       2.52     .236    1.33  11.98    .000
                     +ID5 01:UNC2          1.81     .032    1.54   6.52    .000
                     +ID6 02:EXT5          8.51     .029    1.88   2.11    .000
                      ==========================================================
                      SUM 04:Node3        53.85     .306    1.33   8.97    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0037--------------------------------------------------------------------------
*Catchment 202
*This catchment is the area draining Node 4 Outlet
----------------------
| DESIGN STANDHYD    |   Area    (ha)=    2.99
| 06:202    DT= 2.00 |   Total Imp(%)=   28.00   Dir. Conn.(%)=   18.00
----------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .84          2.15
     Dep. Storage     (mm)=        .80          1.50
     Average Slope     (%)=        .50           .50
     Length            (m)=     141.19         40.00
     Mannings n             =      .013          .250

     Max.eff.Inten.(mm/hr)=     129.33         11.29
                   over (min)        2.50         30.00
     Storage Coeff.  (min)=       3.49 (ii)    29.09 (ii)
     Unit Hyd. Tpeak (min)=       2.50         30.00
     Unit Hyd. peak  (cms)=        .35           .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .15           .04          .159 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.79         1.333
     RUNOFF VOLUME    (mm)=      33.36          9.70        13.957
     TOTAL RAINFALL   (mm)=      34.16         34.16        34.158
     RUNOFF COEFFICIENT   =        .98           .28          .409

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0038--------------------------------------------------------------------------
*Catchment UNC4
*Uncontrolled rear yards, flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD      |   Area    (ha)=    1.12   Curve Number   (CN)=64.00
| 02:UNC4   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .856

     PEAK FLOW       (cms)=     .048 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=    6.076
     TOTAL RAINFALL   (mm)=   34.158
     RUNOFF COEFFICIENT   =     .178

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0039--------------------------------------------------------------------------
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD      |   Area    (ha)=   15.73   Curve Number   (CN)=55.00
| 03:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .550

     Unit Hyd Qpeak  (cms)=    1.092

     PEAK FLOW       (cms)=     .098 (i)
     TIME TO PEAK    (hrs)=    2.042
     RUNOFF VOLUME    (mm)=    4.435
     TOTAL RAINFALL   (mm)=   34.158
     RUNOFF COEFFICIENT   =     .130

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

--------------------------------------------------------------------------------
001:0040--------------------------------------------------------------------------
*Total Flow to to Node 4 (Including External Areas)
----------------------
| ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
                      ID1 04:Node3        53.85     .306    1.33   8.97    .000
                     +ID2 06:202           2.99     .159    1.33  13.96    .000
                     +ID3 02:UNC4          1.12     .048    1.33   6.08    .000
                     +ID4 03:EXT6         15.73     .098    2.04   4.44    .000
                      ==========================================================
                      SUM 08:Node4        73.69     .520    1.33   8.16    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0041--------------------------------------------------------------------------
*Catchment UNC6
*Uncontrolled rear yards, flows to ditch along Road 19
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .08   Curve Number   (CN)=74.00
| 02:UNC6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .061

     PEAK FLOW       (cms)=     .005 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=    8.749
     TOTAL RAINFALL   (mm)=   34.158
     RUNOFF COEFFICIENT   =     .256

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0042--------------------------------------------------------------------------
*5-Year
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 550.600
| Ptotal= 48.03 mm |                          B=    .000
--------------------                          C=    .698
                          used in:   INTENSITY =  A / (t + B)^C

                          Duration of storm  =  4.00 hrs
                          Storm time step    =  5.00 min
                          Time to peak ratio =   .33

              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .08   3.821 |   1.08  12.209 |   2.08   8.686 |   3.08   4.841
               .17   4.012 |   1.17  16.693 |   2.17   8.080 |   3.17   4.688
               .25   4.228 |   1.25  31.019 |   2.25   7.567 |   3.25   4.545
               .33   4.475 |   1.33 179.040 |   2.33   7.127 |   3.33   4.413
               .42   4.759 |   1.42  38.058 |   2.42   6.744 |   3.42   4.290
               .50   5.093 |   1.50  24.013 |   2.50   6.408 |   3.50   4.175
               .58   5.489 |   1.58  18.319 |   2.58   6.110 |   3.58   4.067
               .67   5.971 |   1.67  15.094 |   2.67   5.843 |   3.67   3.966
               .75   6.569 |   1.75  12.977 |   2.75   5.603 |   3.75   3.870
               .83   7.340 |   1.83  11.463 |   2.83   5.386 |   3.83   3.780
               .92   8.375 |   1.92  10.318 |   2.92   5.188 |   3.92   3.695
              1.00   9.858 |   2.00   9.417 |   3.00   5.007 |   4.00   3.615

--------------------------------------------------------------------------------
001:0043--------------------------------------------------------------------------
*Catchment EXT1
*External area on the northwest of Wellington Road 19.
*This catchment drains to the golf course via a culvert which will be captured
*and enter a bypass pipe, entering the Black Drain at Node 2
----------------------
| DESIGN NASHYD      |   Area    (ha)=    7.93   Curve Number   (CN)=61.00
| 01:EXT1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .688

     PEAK FLOW       (cms)=     .137 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=   10.361
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .216

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

--------------------------------------------------------------------------------
001:0044--------------------------------------------------------------------------
*Catchment EXT2
*External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
*This will be captured via the Black Drain Bypass and enter the drain at Node 2
----------------------
| DESIGN STANDHYD    |   Area    (ha)=     .34
| 02:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
----------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .17           .17
     Dep. Storage     (mm)=        .80          1.50
     Average Slope     (%)=        .50           .50
     Length            (m)=      47.61         40.00
     Mannings n             =      .013          .250

     Max.eff.Inten.(mm/hr)=     179.04         18.38
                   over (min)       2.50         22.50
     Storage Coeff.  (min)=       1.60 (ii)    22.66 (ii)
     Unit Hyd. Tpeak (min)=       2.50         22.50
     Unit Hyd. peak  (cms)=        .54           .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .06           .00          .060 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.67         1.333
     RUNOFF VOLUME    (mm)=      47.23         11.71        24.494
     TOTAL RAINFALL   (mm)=      48.03         48.03        48.025
     RUNOFF COEFFICIENT   =        .98           .24          .510
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  58.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0045--------------------------------------------------------------------------
```

```
*Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe
------------------------
| ADD HYD (Bypass1   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXT1          7.93     .137    1.88  10.36    .000
                     +ID2 02:EXT2           .34     .060    1.33  24.49    .000
                      ========================================================
                      SUM 08:Bypass1       8.27     .145    1.88  10.94    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0046------------------------------------------------------------------------
*Catchment 201
*Drainage Area to SWMF1
----------------------
| DESIGN STANDHYD    |   Area    (ha)=   26.92
| 01:201    DT= 2.00 |   Total Imp(%)=   34.00   Dir. Conn.(%)=   23.00
----------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.15        17.77
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=     423.64        40.00
     Mannings n             =     .013         .250

     Max.eff.Inten.(mm/hr)=     132.05        14.20
                   over (min)       7.50        30.00
     Storage Coeff.  (min)=       6.69 (ii)   30.05 (ii)
     Unit Hyd. Tpeak (min)=       7.50        30.00
     Unit Hyd. peak  (cms)=        .16          .04
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.53          .41          1.640 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.79          1.417
     RUNOFF VOLUME    (mm)=      47.23        12.12         20.198
     TOTAL RAINFALL   (mm)=      48.03        48.03         48.025
     RUNOFF COEFFICIENT   =        .98          .25           .421

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------
001:0047------------------------------------------------------------------------
* Pond 1
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  2.0 min.
|  IN>01:(201   )    |
| OUT<09:(Pond1 )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                             .000  .0000E+00   |     .320  .9500E+00
                             .057  .3310E+00   |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (201   )      26.92     1.640     1.417     20.198
     OUTFLOW<09: (Pond1 )      26.92      .106     4.292     20.198

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=    6.462
                    TIME SHIFT OF PEAK FLOW         (min)=   172.50
                    MAXIMUM  STORAGE   USED       (ha.m.)=.4463E+00

------------------------------------------------------------------------------
001:0048------------------------------------------------------------------------
*Catchment UNC3
*Existing wetland/open space area to remain
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    5.82   Curve Number   (CN)=62.00
| 03:UNC3   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .830

     Unit Hyd Qpeak  (cms)=     .268

     PEAK FLOW       (cms)=     .069 (i)
     TIME TO PEAK    (hrs)=    2.458
     RUNOFF VOLUME    (mm)=   10.705
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .223

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

------------------------------------------------------------------------------
001:0049------------------------------------------------------------------------
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment is collected in a bypass and is directed to the Black Drain by N
----------------------
| DESIGN STANDHYD    |   Area    (ha)=    1.23
| 01:EXT3    DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
----------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .73         .50
     Dep. Storage     (mm)=        .80        1.50
     Average Slope     (%)=        .50         .50
     Length            (m)=      90.55       40.00
     Mannings n             =     .013         .250

     Max.eff.Inten.(mm/hr)=     179.04       18.70
                   over (min)       2.50       22.50
     Storage Coeff.  (min)=       2.35 (ii)  23.27 (ii)
     Unit Hyd. Tpeak (min)=       2.50       22.50
     Unit Hyd. peak  (cms)=        .45         .05
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .24          .02          .245 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.67         1.333
     RUNOFF VOLUME    (mm)=      47.23        11.41        27.167
     TOTAL RAINFALL   (mm)=      48.03        48.03        48.025
     RUNOFF COEFFICIENT   =        .98          .24          .566
      *** WARNING: Storage Coefficient is smaller than DT!
                  Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  56.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------
001:0050------------------------------------------------------------------------
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment is collected in a bypass and directed to the Black Drain by Node
----------------------
| DESIGN STANDHYD    |   Area    (ha)=     .18
| 02:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
----------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .09         .09
     Dep. Storage     (mm)=        .80        1.50
     Average Slope     (%)=        .50         .50
     Length            (m)=      34.64       40.00
     Mannings n             =     .013         .250

     Max.eff.Inten.(mm/hr)=     179.04        4.69
                   over (min)       2.50       37.50
     Storage Coeff.  (min)=       1.32 (ii)  37.68 (ii)
     Unit Hyd. Tpeak (min)=       2.50       37.50
     Unit Hyd. peak  (cms)=        .58         .03
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .03         .00          .029 (iii)
     TIME TO PEAK    (hrs)=       1.33        2.00         1.333
     RUNOFF VOLUME    (mm)=      47.23        4.33        18.487
     TOTAL RAINFALL   (mm)=      48.03       48.03        48.025
     RUNOFF COEFFICIENT   =        .98         .09          .385
      *** WARNING: Storage Coefficient is smaller than DT!
                  Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  30.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------
001:0051------------------------------------------------------------------------
*Catchment UNC1
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .98   Curve Number   (CN)=61.00
| 04:UNC1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .936

     PEAK FLOW       (cms)=     .083 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=   10.361
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .216

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.

------------------------------------------------------------------------------
001:0052------------------------------------------------------------------------
*Catchment UNC5
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .13   Curve Number   (CN)=39.00
| 05:UNC5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .070

     Unit Hyd Qpeak  (cms)=     .071

     PEAK FLOW       (cms)=     .003 (i)
     TIME TO PEAK    (hrs)=    1.375
     RUNOFF VOLUME    (mm)=    4.877
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .102

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.

------------------------------------------------------------------------------
001:0053------------------------------------------------------------------------
*Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
------------------------
| ADD HYD (Bypass2   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXT3          1.23     .245    1.33  27.17    .000
                     +ID2 02:EXT4           .18     .029    1.33  18.49    .000
                     +ID3 04:UNC1           .98     .083    1.33  10.36    .000
                     +ID4 05:UNC5           .13     .003    1.38   4.88    .000
                      ========================================================
                      SUM 07:Bypass2       2.52     .360    1.33  18.86    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
001:0054------------------------------------------------------------------------
*Catchment UNC2
*Rear lots on South side of property, collected in swale
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    1.81   Curve Number   (CN)=66.00
| 01:UNC2   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .210

     Unit Hyd Qpeak  (cms)=     .329

     PEAK FLOW       (cms)=     .061 (i)
     TIME TO PEAK    (hrs)=    1.542
     RUNOFF VOLUME    (mm)=   12.203
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .254

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

------------------------------------------------------------------------------
001:0055------------------------------------------------------------------------
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.51   Curve Number   (CN)=35.00
| 02:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .739

     PEAK FLOW       (cms)=     .057 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=    4.177
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .087

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

------------------------------------------------------------------------------
001:0056------------------------------------------------------------------------
*Total Flow to Node 3 (Including External Areas)
------------------------
| ADD HYD (Node3     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 08:Bypass1       8.27     .145    1.88  10.94    .000
                     +ID2 09:Pond1        26.92     .106    4.29  20.20    .000
                     +ID3 03:UNC3          5.82     .069    2.46  10.71    .000
                     +ID4 07:Bypass2       2.52     .360    1.33  18.86    .000
                     +ID5 01:UNC2          1.81     .061    1.54  12.20    .000
                     +ID6 02:EXT5          8.51     .057    1.88   4.18    .000
                      ========================================================
```

```
                    SUM 04:Node3        53.85     .476    1.33  14.89    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0057----------------------------------------------------------------------
*Catchment 202
*This catchment is the area draining Node 4 Outlet
----------------------
| DESIGN STANDHYD     |   Area     (ha)=    2.99
| 06:202     DT= 2.00 |   Total Imp(%)=   28.00   Dir. Conn.(%)=   18.00
----------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .84         2.15
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=     141.19        40.00
     Mannings n             =      .013         .250

     Max.eff.Inten.(mm/hr)=     179.04        24.69
                  over (min)       2.50        22.50
     Storage Coeff.  (min)=       3.06 (ii)   21.78 (ii)
     Unit Hyd. Tpeak (min)=       2.50        22.50
     Unit Hyd. peak  (cms)=        .38         .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .22          .09          .240 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.67         1.333
     RUNOFF VOLUME    (mm)=      47.23        17.44        22.804
     TOTAL RAINFALL   (mm)=      48.03        48.03        48.025
     RUNOFF COEFFICIENT   =        .98          .36          .475

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0058----------------------------------------------------------------------
*Catchment UNC4
*Uncontrolled rear yards, flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD       |   Area     (ha)=    1.12   Curve Number    (CN)=64.00
| 02:UNC4    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .856

     PEAK FLOW       (cms)=     .091 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=   11.429
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .238

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.

001:0059----------------------------------------------------------------------
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD       |   Area     (ha)=   15.73   Curve Number    (CN)=55.00
| 03:EXT6    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .550

     Unit Hyd Qpeak  (cms)=    1.092

     PEAK FLOW       (cms)=     .191 (i)
     TIME TO PEAK    (hrs)=    2.042
     RUNOFF VOLUME    (mm)=    8.511
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .177

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

001:0060----------------------------------------------------------------------
*Total Flow to to Node 4 (Including External Areas)
------------------------
| ADD HYD (Node4     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 04:Node3         53.85     .476    1.33  14.89    .000
                     +ID2 06:202            2.99     .240    1.33  22.80    .000
                     +ID3 02:UNC4           1.12     .091    1.33  11.43    .000
                     +ID4 03:EXT6          15.73     .191    2.04   8.51    .000
                      ==========================================================
                      SUM 08:Node4         73.69     .822    1.33  13.79    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0061----------------------------------------------------------------------
*Catchment UNC6
*Uncontrolled rear yards, flows to ditch along Road 19
----------------------
| DESIGN NASHYD       |   Area     (ha)=    .08   Curve Number    (CN)=74.00
| 02:UNC6    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .061

     PEAK FLOW       (cms)=     .009 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=   15.943
     TOTAL RAINFALL   (mm)=   48.025
     RUNOFF COEFFICIENT   =     .332

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.

001:0062----------------------------------------------------------------------
*10-Year
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 648.070
| Ptotal= 57.15 mm |                          B=    .000
--------------------                          C=    .696
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  4.00 hrs
                         Storm time step    =  5.00 min
                         Time to peak ratio =   .33

              TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .08   4.577 |  1.08  14.574 |  2.08  10.379 |  3.08   5.794
               .17   4.805 |  1.17  19.908 |  2.17   9.656 |  3.17   5.611
               .25   5.063 |  1.25  36.926 |  2.25   9.045 |  3.25   5.441
               .33   5.357 |  1.33 211.414 |  2.33   8.520 |  3.33   5.283
               .42   5.697 |  1.42  45.280 |  2.42   8.064 |  3.42   5.136
               .50   6.095 |  1.50  28.609 |  2.50   7.663 |  3.50   4.999
               .58   6.568 |  1.58  21.843 |  2.58   7.308 |  3.58   4.870
               .67   7.142 |  1.67  18.007 |  2.67   6.990 |  3.67   4.749
               .75   7.856 |  1.75  15.488 |  2.75   6.704 |  3.75   4.635
               .83   8.774 |  1.83  13.686 |  2.83   6.445 |  3.83   4.528
               .92  10.008 |  1.92  12.323 |  2.92   6.209 |  3.92   4.426
              1.00  11.775 |  2.00  11.249 |  3.00   5.993 |  4.00   4.330

001:0063----------------------------------------------------------------------
*Catchment EXT1
*External area on the northwest of Wellington Road 19.
*This catchment drains to the golf course via a culvert which will be captured
*and enter a bypass pipe, entering the Black Drain at Node 2
----------------------
| DESIGN NASHYD       |   Area     (ha)=    7.93   Curve Number    (CN)=61.00
| 01:EXT1    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .688

     PEAK FLOW       (cms)=     .189 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=   14.203
     TOTAL RAINFALL   (mm)=   57.150
     RUNOFF COEFFICIENT   =     .249

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

001:0064----------------------------------------------------------------------
*Catchment EXT2
*External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
*This will be captured via the Black Drain Bypass and enter the drain at Node 2
----------------------
| DESIGN STANDHYD     |   Area     (ha)=     .34
| 02:EXT2    DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
----------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .17          .17
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      47.61        40.00
     Mannings n             =      .013         .250

     Max.eff.Inten.(mm/hr)=     211.41        27.15
                  over (min)       2.50        20.00
     Storage Coeff.  (min)=       1.49 (ii)   19.51 (ii)
     Unit Hyd. Tpeak (min)=       2.50        20.00
     Unit Hyd. peak  (cms)=        .55          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .07          .01          .071 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.63         1.333
     RUNOFF VOLUME    (mm)=      56.35        15.93        30.484
     TOTAL RAINFALL   (mm)=      57.15        57.15        57.150
     RUNOFF COEFFICIENT   =        .99          .28          .533
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  58.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0065----------------------------------------------------------------------
*Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe
------------------------
| ADD HYD (Bypass1    ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                     (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 01:EXT1            7.93     .189    1.88  14.20    .000
                     +ID2 02:EXT2             .34     .071    1.33  30.48    .000
                      ==========================================================
                      SUM 08:Bypass1         8.27     .199    1.83  14.87    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0066----------------------------------------------------------------------
*Catchment 201
*Drainage Area to SWMF1
----------------------
| DESIGN STANDHYD     |   Area     (ha)=   26.92
| 01:201     DT= 2.00 |   Total Imp(%)=   34.00   Dir. Conn.(%)=   23.00
----------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.15        17.77
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=     423.64        40.00
     Mannings n             =      .013         .250

     Max.eff.Inten.(mm/hr)=     211.41        21.79
                  over (min)       5.00        25.00
     Storage Coeff.  (min)=       5.54 (ii)   25.22 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .21          .05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.12          .63         2.271 (iii)
     TIME TO PEAK    (hrs)=       1.38         1.71         1.375
     RUNOFF VOLUME    (mm)=      56.35        16.49        25.655
     TOTAL RAINFALL   (mm)=      57.15        57.15        57.150
     RUNOFF COEFFICIENT   =        .99          .29          .449

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0067----------------------------------------------------------------------
* Pond 1
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  2.0 min.
|  IN>01:(201    )  |
| OUT<09:(Pond1 )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00     |     .320  .9500E+00
                          .057  .3310E+00     |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------           (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (201   )      26.92     2.271     1.375     25.655
     OUTFLOW<09: (Pond1 )      26.92      .152     4.167     25.654

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=    6.699
                    TIME SHIFT OF PEAK FLOW        (min)=   167.50
                    MAXIMUM  STORAGE   USED       (ha.m.)=.5550E+00

001:0068----------------------------------------------------------------------
*Catchment UNC3
*Existing wetland/open space area to remain
```

```
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    5.82   Curve Number   (CN)=62.00
| 03:UNC3   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .830

     Unit Hyd Qpeak  (cms)=     .268

     PEAK FLOW       (cms)=     .094 (i)
     TIME TO PEAK    (hrs)=    2.458
     RUNOFF VOLUME    (mm)=   14.655
     TOTAL RAINFALL   (mm)=   57.150
     RUNOFF COEFFICIENT   =     .256

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

--------------------------------------------------------------------------------
001:0069--------------------------------------------------------------------------
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment is collected in a bypass and is directed to the Black Drain by N
----------------------
| DESIGN STANDHYD    |   Area    (ha)=    1.23
| 01:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
----------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .73          .50
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=       .50          .50
     Length            (m)=     90.55        40.00
     Mannings n            =      .013         .250

     Max.eff.Inten.(mm/hr)=    211.41        27.64
                over (min)       2.50        20.00
     Storage Coeff.  (min)=      2.20 (ii)   20.09 (ii)
     Unit Hyd. Tpeak (min)=      2.50        20.00
     Unit Hyd. peak  (cms)=       .46          .06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       .29          .02          .295 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.63         1.333
     RUNOFF VOLUME    (mm)=     56.35        15.54        33.497
     TOTAL RAINFALL   (mm)=     57.15        57.15        57.150
     RUNOFF COEFFICIENT   =       .99          .27          .586
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  56.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0070--------------------------------------------------------------------------
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment is collected in a bypass and directed to the Black Drain by Node
----------------------
| DESIGN STANDHYD    |   Area    (ha)=     .18
| 02:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
----------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .09          .09
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=       .50          .50
     Length            (m)=     34.64        40.00
     Mannings n            =      .013         .250

     Max.eff.Inten.(mm/hr)=    211.41         7.18
                over (min)       2.50        32.50
     Storage Coeff.  (min)=      1.23 (ii)   31.91 (ii)
     Unit Hyd. Tpeak (min)=      2.50        32.50
     Unit Hyd. peak  (cms)=       .59          .04
                                                        *TOTALS*
     PEAK FLOW       (cms)=       .03          .00          .035 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.88         1.333
     RUNOFF VOLUME    (mm)=     56.35         6.07        22.666
     TOTAL RAINFALL   (mm)=     57.15        57.15        57.150
     RUNOFF COEFFICIENT   =       .99          .11          .397
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  30.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0071--------------------------------------------------------------------------
*Catchment UNC1
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .98   Curve Number   (CN)=61.00
| 04:UNC1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .936

     PEAK FLOW       (cms)=     .115 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=   14.203
     TOTAL RAINFALL   (mm)=   57.150
     RUNOFF COEFFICIENT   =     .249

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0072--------------------------------------------------------------------------
*Catchment UNC5
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=     .13   Curve Number   (CN)=39.00
| 05:UNC5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .070

     Unit Hyd Qpeak  (cms)=     .071

     PEAK FLOW       (cms)=     .005 (i)
     TIME TO PEAK    (hrs)=    1.375
     RUNOFF VOLUME    (mm)=    6.838
     TOTAL RAINFALL   (mm)=   57.150
     RUNOFF COEFFICIENT   =     .120

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0073--------------------------------------------------------------------------
*Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
------------------------
| ADD HYD (Bypass2   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 01:EXT3          1.23     .295    1.33  33.50    .000
                      +ID2 02:EXT4           .18     .035    1.33  22.67    .000
                      +ID3 04:UNC1           .98     .115    1.33  14.20    .000
                      +ID4 05:UNC5           .13     .005    1.38   6.84    .000
                       ==========================================================
                       SUM 07:Bypass2       2.52     .449    1.33  23.84    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0074--------------------------------------------------------------------------
*Catchment UNC2
*Rear lots on South side of property, collected in swale
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    1.81   Curve Number   (CN)=66.00
| 01:UNC2   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .210

     Unit Hyd Qpeak  (cms)=     .329

     PEAK FLOW       (cms)=     .084 (i)
     TIME TO PEAK    (hrs)=    1.542
     RUNOFF VOLUME    (mm)=   16.606
     TOTAL RAINFALL   (mm)=   57.150
     RUNOFF COEFFICIENT   =     .291

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

--------------------------------------------------------------------------------
001:0075--------------------------------------------------------------------------
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area    (ha)=    8.51   Curve Number   (CN)=35.00
| 02:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .739

     PEAK FLOW       (cms)=     .080 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=    5.872
     TOTAL RAINFALL   (mm)=   57.150
     RUNOFF COEFFICIENT   =     .103

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

--------------------------------------------------------------------------------
001:0076--------------------------------------------------------------------------
*Total Flow to Node 3 (Including External Areas)
------------------------
| ADD HYD (Node3     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                       ID1 08:Bypass1       8.27     .199    1.83  14.87    .000
                      +ID2 09:Pond1        26.92     .152    4.17  25.65    .000
                      +ID3 03:UNC3          5.82     .094    2.46  14.65    .000
                      +ID4 07:Bypass2       2.52     .449    1.33  23.84    .000
                      +ID5 01:UNC2          1.81     .084    1.54  16.61    .000
                      +ID6 02:EXT5          8.51     .080    1.88   5.87    .000
                       ==========================================================
                       SUM 04:Node3        53.85     .601    1.33  19.29    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0077--------------------------------------------------------------------------
*Catchment 202
*This catchment is the area draining Node 4 Outlet
----------------------
| DESIGN STANDHYD    |   Area    (ha)=    2.99
| 06:202    DT= 2.00 |   Total Imp(%)=   28.00   Dir. Conn.(%)=   18.00
----------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .84          2.15
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=       .50          .50
     Length            (m)=    141.19        40.00
     Mannings n            =      .013         .250

     Max.eff.Inten.(mm/hr)=    211.41        39.01
                over (min)       2.50        17.50
     Storage Coeff.  (min)=      2.87 (ii)   18.46 (ii)
     Unit Hyd. Tpeak (min)=      2.50        17.50
     Unit Hyd. peak  (cms)=       .40          .06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       .27          .14          .303 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.58         1.333
     RUNOFF VOLUME    (mm)=     56.35        23.23        29.192
     TOTAL RAINFALL   (mm)=     57.15        57.15        57.150
     RUNOFF COEFFICIENT   =       .99          .41          .511

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0078--------------------------------------------------------------------------
*Catchment UNC4
*Uncontrolled rear yards, flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD      |   Area    (ha)=    1.12   Curve Number   (CN)=64.00
| 02:UNC4   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .856

     PEAK FLOW       (cms)=     .125 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=   15.600
     TOTAL RAINFALL   (mm)=   57.150
     RUNOFF COEFFICIENT   =     .273

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0079--------------------------------------------------------------------------
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4
----------------------
| DESIGN NASHYD      |   Area    (ha)=   15.73   Curve Number   (CN)=55.00
| 03:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------  U.H. Tp(hrs)=    .550

     Unit Hyd Qpeak  (cms)=    1.092
```

```
01891>
01892>      PEAK FLOW       (cms)=     .264 (i)
01893>      TIME TO PEAK    (hrs)=    2.042
01894>      RUNOFF VOLUME    (mm)=   11.754
01895>      TOTAL RAINFALL   (mm)=   57.150
01896>      RUNOFF COEFFICIENT   =     .206
01897>
01898>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01899>
01900> ------------------------------------------------------------------------------
01901> 001:0080------------------------------------------------------------------------
01902> *Total Flow to to Node 4 (Including External Areas)
01903> ----------------------
01904> | ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
01905> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
01906>                       ID1 04:Node3        53.85     .601    1.33  19.29    .000
01907>                      +ID2 06:202           2.99     .303    1.33  29.19    .000
01908>                      +ID3 02:UNC4          1.12     .125    1.33  15.60    .000
01909>                      +ID4 03:EXT6         15.73     .264    2.04  11.75    .000
01910>                       ========================================================
01911>                       SUM 08:Node4        73.69    1.052    1.33  18.03    .000
01912>
01913>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
01914>
01915> ------------------------------------------------------------------------------
01916> 001:0081------------------------------------------------------------------------
01917> *Catchment UNC6
01918> *Uncontrolled rear yards, flows to ditch along Road 19
01919> ----------------------
01920> | DESIGN NASHYD      |   Area    (ha)=     .08   Curve Number   (CN)=74.00
01921> | 02:UNC6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01922> ----------------------   U.H. Tp(hrs)=    .050
01923>
01924>      Unit Hyd Qpeak  (cms)=     .061
01925>
01926>      PEAK FLOW       (cms)=     .013 (i)
01927>      TIME TO PEAK    (hrs)=    1.333
01928>      RUNOFF VOLUME    (mm)=   21.374
01929>      TOTAL RAINFALL   (mm)=   57.150
01930>      RUNOFF COEFFICIENT   =     .374
01931>
01932>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01933>
01934>       *** WARNING: Time step is too large for value of TP.
01935>                    R.V. may be ok.  Peak flow could be off.
01936> ------------------------------------------------------------------------------
01937> 001:0082------------------------------------------------------------------------
01938> *25-Year
01939> --------------------
01940> | CHICAGO STORM    |    IDF curve parameters: A= 771.350
01941> | Ptotal= 68.77 mm |                          B=    .000
01942> --------------------                          C=    .694
01943>                          used in:   INTENSITY =  A / (t + B)^C
01944>
01945>                          Duration of storm  =  4.00 hrs
01946>                          Storm time step    =  5.00 min
01947>                          Time to peak ratio =   .33
01948>
01949>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
01950>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
01951>               .08   5.543 |   1.08  17.591 |   2.08  12.540 |   3.08   7.012
01952>               .17   5.818 |   1.17  24.008 |   2.17  11.669 |   3.17   6.791
01953>               .25   6.129 |   1.25  44.448 |   2.25  10.933 |   3.25   6.586
01954>               .33   6.485 |   1.33 252.441 |   2.33  10.300 |   3.33   6.396
01955>               .42   6.895 |   1.42  54.475 |   2.42   9.751 |   3.42   6.219
01956>               .50   7.375 |   1.50  34.465 |   2.50   9.267 |   3.50   6.053
01957>               .58   7.946 |   1.58  26.335 |   2.58   8.839 |   3.58   5.897
01958>               .67   8.638 |   1.67  21.722 |   2.67   8.455 |   3.67   5.751
01959>               .75   9.500 |   1.75  18.692 |   2.75   8.110 |   3.75   5.613
01960>               .83  10.606 |   1.83  16.523 |   2.83   7.797 |   3.83   5.484
01961>               .92  12.093 |   1.92  14.881 |   2.92   7.513 |   3.92   5.361
01962>              1.00  14.222 |   2.00  13.589 |   3.00   7.252 |   4.00   5.245
01963>
01964> ------------------------------------------------------------------------------
01965> 001:0083------------------------------------------------------------------------
01966> *Catchment EXT1
01967> *External area on the northwest of Wellington Road 19.
01968> *This catchment drains to the golf course via a culvert which will be captured
01969> *and enter a bypass pipe, entering the Black Drain at Node 2
01970> ----------------------
01971> | DESIGN NASHYD      |   Area    (ha)=    7.93   Curve Number   (CN)=61.00
01972> | 01:EXT1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
01973> ----------------------   U.H. Tp(hrs)=    .440
01974>
01975>      Unit Hyd Qpeak  (cms)=     .688
01976>
01977>      PEAK FLOW       (cms)=     .264 (i)
01978>      TIME TO PEAK    (hrs)=    1.875
01979>      RUNOFF VOLUME    (mm)=   19.704
01980>      TOTAL RAINFALL   (mm)=   68.771
01981>      RUNOFF COEFFICIENT   =     .287
01982>
01983>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
01984>
01985> ------------------------------------------------------------------------------
01986> 001:0084------------------------------------------------------------------------
01987> *Catchment EXT2
01988> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
01989> *This will be captured via the Black Drain Bypass and enter the drain at Node 2
01990> ----------------------
01991> | DESIGN STANDHYD    |   Area    (ha)=     .34
01992> | 02:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
01993> ----------------------
01994>                              IMPERVIOUS    PERVIOUS (i)
01995>      Surface Area     (ha)=        .17          .17
01996>      Dep. Storage     (mm)=        .80         1.50
01997>      Average Slope     (%)=        .50          .50
01998>      Length            (m)=      47.61        40.00
01999>      Mannings n            =       .013         .250
02000>
02001>      Max.eff.Inten.(mm/hr)=     252.44        40.89
02002>                 over (min)        2.50        17.50
02003>      Storage Coeff.  (min)=       1.39 (ii)   16.69 (ii)
02004>      Unit Hyd. Tpeak (min)=       2.50        17.50
02005>      Unit Hyd. peak  (cms)=        .57          .07
02006>                                                      *TOTALS*
02007>      PEAK FLOW       (cms)=        .08          .01          .087 (iii)
02008>      TIME TO PEAK    (hrs)=       1.33         1.58         1.333
02009>      RUNOFF VOLUME    (mm)=      67.97        21.94        38.510
02010>      TOTAL RAINFALL   (mm)=      68.77        68.77        68.771
02011>      RUNOFF COEFFICIENT   =        .99          .32          .560
02012>       *** WARNING: Storage Coefficient is smaller than DT!
02013>                    Use a smaller DT or a larger area.
02014>
02015>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02016>            CN* =  58.0     Ia = Dep. Storage  (Above)
02017>         (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02018>              THAN THE STORAGE COEFFICIENT.
02019>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02020>
02021> ------------------------------------------------------------------------------
02022> 001:0085------------------------------------------------------------------------
02023> *Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe
02024> ----------------------
02025> | ADD HYD (Bypass1   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02026> ----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
02027>                       ID1 01:EXT1          7.93     .264    1.88  19.70    .000
02028>                      +ID2 02:EXT2           .34     .087    1.33  38.51    .000
02029>                       ========================================================
02030>                       SUM 08:Bypass1       8.27     .278    1.83  20.48    .000
02031>
02032>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02033>
02034> ------------------------------------------------------------------------------
02035> 001:0086------------------------------------------------------------------------
02036> *Catchment 201
02037> *Drainage Area to SWMF1
02038> ----------------------
02039> | DESIGN STANDHYD    |   Area    (ha)=   26.92
02040> | 01:201    DT= 2.00 |   Total Imp(%)=   34.00   Dir. Conn.(%)=   23.00
02041> ----------------------
02042>                              IMPERVIOUS    PERVIOUS (i)
02043>      Surface Area     (ha)=       9.15         17.77
02044>      Dep. Storage     (mm)=        .80          1.50
02045>      Average Slope     (%)=        .50           .50
02046>      Length            (m)=     423.64         40.00
02047>      Mannings n            =       .013          .250
02048>
02049>      Max.eff.Inten.(mm/hr)=     252.44         32.19
02050>                 over (min)        5.00         22.50
02051>      Storage Coeff.  (min)=       5.16 (ii)   22.00 (ii)
02052>      Unit Hyd. Tpeak (min)=       5.00         22.50
02053>      Unit Hyd. peak  (cms)=        .22           .05
02054>                                                      *TOTALS*
02055>      PEAK FLOW       (cms)=       2.60           .96          2.871 (iii)
02056>      TIME TO PEAK    (hrs)=       1.38          1.67          1.375
02057>      RUNOFF VOLUME    (mm)=      67.97         22.67         33.087
02058>      TOTAL RAINFALL   (mm)=      68.77         68.77         68.771
02059>      RUNOFF COEFFICIENT   =        .99           .33           .481
02060>
02061>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02062>            CN* =  62.0     Ia = Dep. Storage  (Above)
02063>         (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02064>              THAN THE STORAGE COEFFICIENT.
02065>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02066>
02067> ------------------------------------------------------------------------------
02068> 001:0087------------------------------------------------------------------------
02069> * Pond 1
02070> --------------------
02071> | ROUTE RESERVOIR   |    Requested routing time step =  2.0 min.
02072> |  IN>01:(201    )  |
02073> | OUT<09:(Pond1 )   |    =========  OUTLFOW STORAGE TABLE  =========
02074> --------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02075>                           (cms)     (ha.m.)   |    (cms)    (ha.m.)
02076>                           .000  .0000E+00   |     .320  .9500E+00
02077>                           .057  .3310E+00   |     .000  .0000E+00
02078>
02079>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02080>      --------------------        (ha)     (cms)     (hrs)       (mm)
02081>      INFLOW >01: (201   )       26.92     2.871     1.375     33.087
02082>      OUTFLOW<09: (Pond1 )       26.92      .214     4.125     33.086
02083>
02084>                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=    7.456
02085>                   TIME SHIFT OF PEAK FLOW          (min)=   165.00
02086>                   MAXIMUM  STORAGE   USED        (ha.m.)=.7007E+00
02087>
02088> ------------------------------------------------------------------------------
02089> 001:0088------------------------------------------------------------------------
02090> *Catchment UNC3
02091> *Existing wetland/open space area to remain
02092> *flows to the Black Drain at Node 3
02093> ----------------------
02094> | DESIGN NASHYD      |   Area    (ha)=    5.82   Curve Number   (CN)=62.00
02095> | 03:UNC3   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02096> ----------------------   U.H. Tp(hrs)=    .830
02097>
02098>      Unit Hyd Qpeak  (cms)=     .268
02099>
02100>      PEAK FLOW       (cms)=     .131 (i)
02101>      TIME TO PEAK    (hrs)=    2.417
02102>      RUNOFF VOLUME    (mm)=   20.298
02103>      TOTAL RAINFALL   (mm)=   68.771
02104>      RUNOFF COEFFICIENT   =     .295
02105>
02106>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02107>
02108> ------------------------------------------------------------------------------
02109> 001:0089------------------------------------------------------------------------
02110> *Catchment EXT3
02111> *External area - Wellington Road 19 and 3rd line and
02112> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
02113> *This catchment is collected in a bypass and is directed to the Black Drain by N
02114> ----------------------
02115> | DESIGN STANDHYD    |   Area    (ha)=    1.23
02116> | 01:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
02117> ----------------------
02118>                              IMPERVIOUS    PERVIOUS (i)
02119>      Surface Area     (ha)=        .73           .50
02120>      Dep. Storage     (mm)=        .80          1.50
02121>      Average Slope     (%)=        .50           .50
02122>      Length            (m)=      90.55         40.00
02123>      Mannings n            =       .013          .250
02124>
02125>      Max.eff.Inten.(mm/hr)=     252.44         41.66
02126>                 over (min)        2.50         17.50
02127>      Storage Coeff.  (min)=       2.05 (ii)   17.23 (ii)
02128>      Unit Hyd. Tpeak (min)=       2.50         17.50
02129>      Unit Hyd. peak  (cms)=        .48           .07
02130>                                                      *TOTALS*
02131>      PEAK FLOW       (cms)=        .35           .04          .361 (iii)
02132>      TIME TO PEAK    (hrs)=       1.33          1.58         1.333
02133>      RUNOFF VOLUME    (mm)=      67.97         21.42         41.903
02134>      TOTAL RAINFALL   (mm)=      68.77         68.77         68.771
02135>      RUNOFF COEFFICIENT   =        .99           .31           .609
02136>       *** WARNING: Storage Coefficient is smaller than DT!
02137>                    Use a smaller DT or a larger area.
02138>
02139>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02140>            CN* =  56.0     Ia = Dep. Storage  (Above)
02141>         (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02142>              THAN THE STORAGE COEFFICIENT.
02143>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02144>
02145> ------------------------------------------------------------------------------
02146> 001:0090------------------------------------------------------------------------
02147> *Catchment EXT4
02148> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
02149> *This catchment is collected in a bypass and directed to the Black Drain by Node
02150> ----------------------
02151> | DESIGN STANDHYD    |   Area    (ha)=     .18
02152> | 02:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
02153> ----------------------
02154>                              IMPERVIOUS    PERVIOUS (i)
02155>      Surface Area     (ha)=        .09           .09
02156>      Dep. Storage     (mm)=        .80          1.50
02157>      Average Slope     (%)=        .50           .50
02158>      Length            (m)=      34.64         40.00
02159>      Mannings n            =       .013          .250
02160>
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```
02161>      Max.eff.Inten.(mm/hr)=     252.44        11.35
02162>                  over (min)        2.50        27.50
02163>      Storage Coeff.  (min)=       1.15 (ii)   26.69 (ii)
02164>      Unit Hyd. Tpeak (min)=       2.50        27.50
02165>      Unit Hyd. peak  (cms)=        .60          .04
02166>                                                          *TOTALS*
02167>      PEAK FLOW       (cms)=        .04          .00          .041 (iii)
02168>      TIME TO PEAK    (hrs)=       1.33         1.75         1.333
02169>      RUNOFF VOLUME    (mm)=      67.97         8.66        28.235
02170>      TOTAL RAINFALL   (mm)=      68.77        68.77        68.771
02171>      RUNOFF COEFFICIENT   =        .99          .13          .411
02172>       *** WARNING: Storage Coefficient is smaller than DT!
02173>                    Use a smaller DT or a larger area.
02174>
02175>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02176>            CN* =  30.0    Ia = Dep. Storage  (Above)
02177>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02178>            THAN THE STORAGE COEFFICIENT.
02179>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02180>
02181> ---------------------------------------------------------------------------
02182> 001:0091----------------------------------------------------------------------
02183> *Catchment UNC1
02184> *This catchment drains east towards 3rd Line and is collected in a bypass that
02185> *is directed to the Black Drain by Node 3
02186> ----------------------
02187> | DESIGN NASHYD      |   Area    (ha)=     .98   Curve Number   (CN)=61.00
02188> | 04:UNC1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02189> ----------------------   U.H. Tp(hrs)=    .040
02190>
02191>      Unit Hyd Qpeak  (cms)=     .936
02192>
02193>      PEAK FLOW       (cms)=     .160 (i)
02194>      TIME TO PEAK    (hrs)=    1.333
02195>      RUNOFF VOLUME    (mm)=   19.704
02196>      TOTAL RAINFALL   (mm)=   68.771
02197>      RUNOFF COEFFICIENT   =     .287
02198>
02199>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02200>
02201>       *** WARNING: Time step is too large for value of TP.
02202>                    R.V. may be ok.  Peak flow could be off.
02203> ---------------------------------------------------------------------------
02204> 001:0092----------------------------------------------------------------------
02205> *Catchment UNC5
02206> *This catchment drains east towards 3rd Line and is collected in a bypass that
02207> *is directed to the Black Drain by Node 3
02208> ----------------------
02209> | DESIGN NASHYD      |   Area    (ha)=     .13   Curve Number   (CN)=39.00
02210> | 05:UNC5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02211> ----------------------   U.H. Tp(hrs)=    .070
02212>
02213>      Unit Hyd Qpeak  (cms)=     .071
02214>
02215>      PEAK FLOW       (cms)=     .007 (i)
02216>      TIME TO PEAK    (hrs)=    1.375
02217>      RUNOFF VOLUME    (mm)=    9.741
02218>      TOTAL RAINFALL   (mm)=   68.771
02219>      RUNOFF COEFFICIENT   =     .142
02220>
02221>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02222>
02223>       *** WARNING: Time step is too large for value of TP.
02224>                    R.V. may be ok.  Peak flow could be off.
02225> ---------------------------------------------------------------------------
02226> 001:0093----------------------------------------------------------------------
02227> *Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
02228> ------------------------
02229> | ADD HYD (Bypass2   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02230> ------------------------                 (ha)     (cms)   (hrs)   (mm)    (cms)
02231>                       ID1 01:EXT3          1.23     .361    1.33  41.90    .000
02232>                      +ID2 02:EXT4           .18     .041    1.33  28.23    .000
02233>                      +ID3 04:UNC1           .98     .160    1.33  19.70    .000
02234>                      +ID4 05:UNC5           .13     .007    1.38   9.74    .000
02235>                       ========================================================
02236>                       SUM 07:Bypass2        2.52     .568    1.33  30.63    .000
02237>
02238>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02239>
02240> ---------------------------------------------------------------------------
02241> 001:0094----------------------------------------------------------------------
02242> *Catchment UNC2
02243> *Rear lots on South side of property, collected in swale
02244> *flows to the Black Drain at Node 3
02245> ----------------------
02246> | DESIGN NASHYD      |   Area    (ha)=    1.81   Curve Number   (CN)=66.00
02247> | 01:UNC2   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02248> ----------------------   U.H. Tp(hrs)=    .210
02249>
02250>      Unit Hyd Qpeak  (cms)=     .329
02251>
02252>      PEAK FLOW       (cms)=     .116 (i)
02253>      TIME TO PEAK    (hrs)=    1.542
02254>      RUNOFF VOLUME    (mm)=   22.842
02255>      TOTAL RAINFALL   (mm)=   68.771
02256>      RUNOFF COEFFICIENT   =     .332
02257>
02258>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02259>
02260> ---------------------------------------------------------------------------
02261> 001:0095----------------------------------------------------------------------
02262> *Catchment EXT5
02263> *External area on the south of the site, existing agricultural
02264> *flows to the Black Drain at Node 3
02265> ----------------------
02266> | DESIGN NASHYD      |   Area    (ha)=    8.51   Curve Number   (CN)=35.00
02267> | 02:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02268> ----------------------   U.H. Tp(hrs)=    .440
02269>
02270>      Unit Hyd Qpeak  (cms)=     .739
02271>
02272>      PEAK FLOW       (cms)=     .115 (i)
02273>      TIME TO PEAK    (hrs)=    1.875
02274>      RUNOFF VOLUME    (mm)=    8.396
02275>      TOTAL RAINFALL   (mm)=   68.771
02276>      RUNOFF COEFFICIENT   =     .122
02277>
02278>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02279>
02280> ---------------------------------------------------------------------------
02281> 001:0096----------------------------------------------------------------------
02282> *Total Flow to Node 3 (Including External Areas)
02283> ------------------------
02284> | ADD HYD (Node3     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02285> ------------------------                 (ha)     (cms)   (hrs)   (mm)    (cms)
02286>                       ID1 08:Bypass1        8.27     .278    1.83  20.48    .000
02287>                      +ID2 09:Pond1         26.92     .214    4.13  33.09    .000
02288>                      +ID3 03:UNC3           5.82     .131    2.42  20.30    .000
02289>                      +ID4 07:Bypass2        2.52     .568    1.33  30.63    .000
02290>                      +ID5 01:UNC2           1.81     .116    1.54  22.84    .000
02291>                      +ID6 02:EXT5           8.51     .115    1.88   8.40    .000
02292>                       ========================================================
02293>                       SUM 04:Node3          53.85     .769    1.33  25.41    .000
02294>
02295>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02296>
02297> ---------------------------------------------------------------------------
02298> 001:0097----------------------------------------------------------------------
02299> *Catchment 202
02300> *This catchment is the area draining Node 4 Outlet
02301> ----------------------
02302> | DESIGN STANDHYD    |   Area    (ha)=    2.99
02303> | 06:202    DT= 2.00 |   Total Imp(%)=   28.00   Dir. Conn.(%)=   18.00
02304> ----------------------
02305>                                IMPERVIOUS    PERVIOUS (i)
02306>      Surface Area      (ha)=        .84          2.15
02307>      Dep. Storage      (mm)=        .80          1.50
02308>      Average Slope      (%)=        .50           .50
02309>      Length             (m)=     141.19         40.00
02310>      Mannings n            =       .013          .250
02311>
02312>      Max.eff.Inten.(mm/hr)=     252.44         58.67
02313>                  over (min)        2.50         15.00
02314>      Storage Coeff.  (min)=       2.67 (ii)    15.91 (ii)
02315>      Unit Hyd. Tpeak (min)=       2.50         15.00
02316>      Unit Hyd. peak  (cms)=        .41           .07
02317>                                                          *TOTALS*
02318>      PEAK FLOW       (cms)=        .33           .21          .389 (iii)
02319>      TIME TO PEAK    (hrs)=       1.33          1.54         1.333
02320>      RUNOFF VOLUME    (mm)=      67.97         31.20        37.822
02321>      TOTAL RAINFALL   (mm)=      68.77         68.77        68.771
02322>      RUNOFF COEFFICIENT   =        .99           .45          .550
02323>
02324>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02325>            CN* =  74.0    Ia = Dep. Storage  (Above)
02326>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02327>            THAN THE STORAGE COEFFICIENT.
02328>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02329>
02330> ---------------------------------------------------------------------------
02331> 001:0098----------------------------------------------------------------------
02332> *Catchment UNC4
02333> *Uncontrolled rear yards, flows to the Black Drain at Node 4
02334> ----------------------
02335> | DESIGN NASHYD      |   Area    (ha)=    1.12   Curve Number   (CN)=64.00
02336> | 02:UNC4   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02337> ----------------------   U.H. Tp(hrs)=    .050
02338>
02339>      Unit Hyd Qpeak  (cms)=     .856
02340>
02341>      PEAK FLOW       (cms)=     .175 (i)
02342>      TIME TO PEAK    (hrs)=    1.333
02343>      RUNOFF VOLUME    (mm)=   21.535
02344>      TOTAL RAINFALL   (mm)=   68.771
02345>      RUNOFF COEFFICIENT   =     .313
02346>
02347>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02348>
02349>       *** WARNING: Time step is too large for value of TP.
02350>                    R.V. may be ok.  Peak flow could be off.
02351> ---------------------------------------------------------------------------
02352> 001:0099----------------------------------------------------------------------
02353> *Catchment EXT6
02354> *External area on the south of the site, existing agricultural
02355> *flows to the Black Drain at Node 4
02356> ----------------------
02357> | DESIGN NASHYD      |   Area    (ha)=   15.73   Curve Number   (CN)=55.00
02358> | 03:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02359> ----------------------   U.H. Tp(hrs)=    .550
02360>
02361>      Unit Hyd Qpeak  (cms)=    1.092
02362>
02363>      PEAK FLOW       (cms)=     .372 (i)
02364>      TIME TO PEAK    (hrs)=    2.042
02365>      RUNOFF VOLUME    (mm)=   16.451
02366>      TOTAL RAINFALL   (mm)=   68.771
02367>      RUNOFF COEFFICIENT   =     .239
02368>
02369>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02370>
02371> ---------------------------------------------------------------------------
02372> 001:0100----------------------------------------------------------------------
02373> *Total Flow to to Node 4 (Including External Areas)
02374> ------------------------
02375> | ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02376> ------------------------                 (ha)     (cms)   (hrs)   (mm)    (cms)
02377>                       ID1 04:Node3         53.85     .769    1.33  25.41    .000
02378>                      +ID2 06:202            2.99     .389    1.33  37.82    .000
02379>                      +ID3 02:UNC4           1.12     .175    1.33  21.53    .000
02380>                      +ID4 03:EXT6          15.73     .372    2.04  16.45    .000
02381>                       ========================================================
02382>                       SUM 08:Node4         73.69    1.368    1.33  23.94    .000
02383>
02384>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02385>
02386> ---------------------------------------------------------------------------
02387> 001:0101----------------------------------------------------------------------
02388> *Catchment UNC6
02389> *Uncontrolled rear yards, flows to ditch along Road 19
02390> ----------------------
02391> | DESIGN NASHYD      |   Area    (ha)=     .08   Curve Number   (CN)=74.00
02392> | 02:UNC6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02393> ----------------------   U.H. Tp(hrs)=    .050
02394>
02395>      Unit Hyd Qpeak  (cms)=     .061
02396>
02397>      PEAK FLOW       (cms)=     .018 (i)
02398>      TIME TO PEAK    (hrs)=    1.333
02399>      RUNOFF VOLUME    (mm)=   28.914
02400>      TOTAL RAINFALL   (mm)=   68.771
02401>      RUNOFF COEFFICIENT   =     .420
02402>
02403>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02404>
02405>       *** WARNING: Time step is too large for value of TP.
02406>                    R.V. may be ok.  Peak flow could be off.
02407> ---------------------------------------------------------------------------
02408> 001:0102----------------------------------------------------------------------
02409> *50-Year
02410> ----------------------
02411> | CHICAGO STORM    |    IDF curve parameters: A= 862.090
02412> | Ptotal= 77.28 mm |                          B=    .000
02413> ----------------------                       C=    .693
02414>                          used in:   INTENSITY =  A / (t + B)^C
02415>
02416>                          Duration of storm   =  4.00 hrs
02417>                          Storm time step     =  5.00 min
02418>                          Time to peak ratio  =   .33
02419>
02420>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
02421>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
02422>               .08   6.249 |   1.08  19.799 |   2.08  14.121 |   3.08   7.903
02423>               .17   6.559 |   1.17  27.009 |   2.17  13.142 |   3.17   7.654
02424>               .25   6.909 |   1.25  49.956 |   2.25  12.313 |   3.25   7.423
02425>               .33   7.309 |   1.33 282.592 |   2.33  11.602 |   3.33   7.209
02426>               .42   7.771 |   1.42  61.210 |   2.42  10.984 |   3.42   7.009
02427>               .50   8.311 |   1.50  38.752 |   2.50  10.440 |   3.50   6.823
02428>               .58   8.953 |   1.58  29.622 |   2.58   9.958 |   3.58   6.648
02429>               .67   9.732 |   1.67  24.441 |   2.67   9.526 |   3.67   6.483
02430>               .75  10.701 |   1.75  21.035 |   2.75   9.138 |   3.75   6.328
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02431>               .83  11.946 |   1.83  18.598 |   2.83   8.786 |   3.83   6.182
02432>               .92  13.618 |   1.92  16.753 |   2.92   8.466 |   3.92   6.044
02433>              1.00  16.011 |   2.00  15.300 |   3.00   8.173 |   4.00   5.913
02434>
02435> --------------------------------------------------------------------------------
02436> 001:0103--------------------------------------------------------------------------
02437> *Catchment EXT1
02438> *External area on the northwest of Wellington Road 19.
02439> *This catchment drains to the golf course via a culvert which will be captured
02440> *and enter a bypass pipe, entering the Black Drain at Node 2
02441> ----------------------
02442> | DESIGN NASHYD     |   Area    (ha)=    7.93   Curve Number   (CN)=61.00
02443> | 01:EXT1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02444> ----------------------  U.H. Tp(hrs)=    .440
02445>
02446>      Unit Hyd Qpeak  (cms)=     .688
02447>
02448>      PEAK FLOW       (cms)=     .325 (i)
02449>      TIME TO PEAK    (hrs)=    1.875
02450>      RUNOFF VOLUME    (mm)=   24.113
02451>      TOTAL RAINFALL   (mm)=   77.284
02452>      RUNOFF COEFFICIENT   =     .312
02453>
02454>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02455>
02456> --------------------------------------------------------------------------------
02457> 001:0104--------------------------------------------------------------------------
02458> *Catchment EXT2
02459> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
02460> *This will be captured via the Black Drain Bypass and enter the drain at Node 2
02461> ----------------------
02462> | DESIGN STANDHYD    |   Area    (ha)=     .34
02463> | 02:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
02464> ----------------------
02465>                              IMPERVIOUS    PERVIOUS (i)
02466>      Surface Area     (ha)=        .17          .17
02467>      Dep. Storage     (mm)=        .80         1.50
02468>      Average Slope     (%)=        .50          .50
02469>      Length            (m)=      47.61        40.00
02470>      Mannings n            =       .013         .250
02471>
02472>      Max.eff.Inten.(mm/hr)=     282.59        55.49
02473>                    over (min)        2.50        15.00
02474>      Storage Coeff.  (min)=       1.33 (ii)   14.87 (ii)
02475>      Unit Hyd. Tpeak (min)=       2.50        15.00
02476>      Unit Hyd. peak  (cms)=        .58          .08
02477>                                                          *TOTALS*
02478>      PEAK FLOW       (cms)=        .09          .02          .099 (iii)
02479>      TIME TO PEAK    (hrs)=       1.33         1.54         1.333
02480>      RUNOFF VOLUME    (mm)=      76.48        26.72        44.633
02481>      TOTAL RAINFALL   (mm)=      77.28        77.28        77.284
02482>      RUNOFF COEFFICIENT   =        .99          .35          .578
02483>       *** WARNING: Storage Coefficient is smaller than DT!
02484>                    Use a smaller DT or a larger area.
02485>
02486>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02487>              CN* =  58.0    Ia = Dep. Storage  (Above)
02488>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02489>              THAN THE STORAGE COEFFICIENT.
02490>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02491>
02492> --------------------------------------------------------------------------------
02493> 001:0105--------------------------------------------------------------------------
02494> *Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe
02495> ------------------------
02496> | ADD HYD (Bypass1   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02497> ------------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
02498>                       ID1 01:EXT1          7.93      .325   1.88  24.11    .000
02499>                      +ID2 02:EXT2           .34      .099   1.33  44.63    .000
02500>                       ==========================================================
02501>                       SUM 08:Bypass1       8.27      .341   1.83  24.96    .000
02502>
02503>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02504>
02505> --------------------------------------------------------------------------------
02506> 001:0106--------------------------------------------------------------------------
02507> *Catchment 201
02508> *Drainage Area to SWMF1
02509> ----------------------
02510> | DESIGN STANDHYD    |   Area    (ha)=   26.92
02511> | 01:201    DT= 2.00 |   Total Imp(%)=   34.00   Dir. Conn.(%)=   23.00
02512> ----------------------
02513>                              IMPERVIOUS    PERVIOUS (i)
02514>      Surface Area     (ha)=       9.15        17.77
02515>      Dep. Storage     (mm)=        .80         1.50
02516>      Average Slope     (%)=        .50          .50
02517>      Length            (m)=     423.64        40.00
02518>      Mannings n            =       .013         .250
02519>
02520>      Max.eff.Inten.(mm/hr)=     282.59        42.55
02521>                    over (min)        5.00        20.00
02522>      Storage Coeff.  (min)=       4.94 (ii)   19.99 (ii)
02523>      Unit Hyd. Tpeak (min)=       5.00        20.00
02524>      Unit Hyd. peak  (cms)=        .23          .06
02525>                                                          *TOTALS*
02526>      PEAK FLOW       (cms)=       2.97         1.26         3.368 (iii)
02527>      TIME TO PEAK    (hrs)=       1.38         1.63         1.375
02528>      RUNOFF VOLUME    (mm)=      76.48        27.58        38.826
02529>      TOTAL RAINFALL   (mm)=      77.28        77.28        77.284
02530>      RUNOFF COEFFICIENT   =        .99          .36          .502
02531>
02532>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02533>              CN* =  62.0    Ia = Dep. Storage  (Above)
02534>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02535>              THAN THE STORAGE COEFFICIENT.
02536>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02537>
02538> --------------------------------------------------------------------------------
02539> 001:0107--------------------------------------------------------------------------
02540> * Pond 1
02541> ----------------------
02542> | ROUTE RESERVOIR   |    Requested routing time step =  2.0 min.
02543> |  IN>01:(201   )   |
02544> | OUT<09:(Pond1 )   |    =========  OUTLFOW STORAGE TABLE  =========
02545> ----------------------   OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
02546>                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
02547>                             .000  .0000E+00    |     .320  .9500E+00
02548>                             .057  .3310E+00    |     .000  .0000E+00
02549>
02550>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
02551>      --------------------        (ha)     (cms)     (hrs)       (mm)
02552>      INFLOW >01: (201   )       26.92     3.368     1.375     38.826
02553>      OUTFLOW<09: (Pond1 )       26.92      .262     4.083     38.825
02554>
02555>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=    7.773
02556>                     TIME SHIFT OF PEAK FLOW         (min)=   162.50
02557>                     MAXIMUM  STORAGE   USED       (ha.m.)=.8132E+00
02558>
02559> --------------------------------------------------------------------------------
02560> 001:0108--------------------------------------------------------------------------
02561> *Catchment UNC3
02562> *Existing wetland/open space area to remain
02563> *flows to the Black Drain at Node 3
02564> ----------------------
02565> | DESIGN NASHYD      |   Area    (ha)=    5.82   Curve Number   (CN)=62.00
02566> | 03:UNC3   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02567> ----------------------  U.H. Tp(hrs)=    .830
02568>
02569>      Unit Hyd Qpeak  (cms)=     .268
02570>
02571>      PEAK FLOW       (cms)=     .161 (i)
02572>      TIME TO PEAK    (hrs)=    2.417
02573>      RUNOFF VOLUME    (mm)=   24.813
02574>      TOTAL RAINFALL   (mm)=   77.284
02575>      RUNOFF COEFFICIENT   =     .321
02576>
02577>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02578>
02579> --------------------------------------------------------------------------------
02580> 001:0109--------------------------------------------------------------------------
02581> *Catchment EXT3
02582> *External area - Wellington Road 19 and 3rd line and
02583> *Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
02584> *This catchment is collected in a bypass and is directed to the Black Drain by N
02585> ----------------------
02586> | DESIGN STANDHYD    |   Area    (ha)=    1.23
02587> | 01:EXT3   DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
02588> ----------------------
02589>                              IMPERVIOUS    PERVIOUS (i)
02590>      Surface Area     (ha)=        .73          .50
02591>      Dep. Storage     (mm)=        .80         1.50
02592>      Average Slope     (%)=        .50          .50
02593>      Length            (m)=      90.55        40.00
02594>      Mannings n            =       .013         .250
02595>
02596>      Max.eff.Inten.(mm/hr)=     282.59        56.56
02597>                    over (min)        2.50        15.00
02598>      Storage Coeff.  (min)=       1.96 (ii)   15.39 (ii)
02599>      Unit Hyd. Tpeak (min)=       2.50        15.00
02600>      Unit Hyd. peak  (cms)=        .49          .07
02601>                                                          *TOTALS*
02602>      PEAK FLOW       (cms)=        .40          .05          .411 (iii)
02603>      TIME TO PEAK    (hrs)=       1.33         1.54         1.333
02604>      RUNOFF VOLUME    (mm)=      76.48        26.11        48.274
02605>      TOTAL RAINFALL   (mm)=      77.28        77.28        77.284
02606>      RUNOFF COEFFICIENT   =        .99          .34          .625
02607>       *** WARNING: Storage Coefficient is smaller than DT!
02608>                    Use a smaller DT or a larger area.
02609>
02610>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02611>              CN* =  56.0    Ia = Dep. Storage  (Above)
02612>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02613>              THAN THE STORAGE COEFFICIENT.
02614>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02615>
02616> --------------------------------------------------------------------------------
02617> 001:0110--------------------------------------------------------------------------
02618> *Catchment EXT4
02619> *External area - 3rd Line and Roadside ditch on west side of 3rd Line
02620> *This catchment is collected in a bypass and directed to the Black Drain by Node
02621> ----------------------
02622> | DESIGN STANDHYD    |   Area    (ha)=     .18
02623> | 02:EXT4   DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
02624> ----------------------
02625>                              IMPERVIOUS    PERVIOUS (i)
02626>      Surface Area     (ha)=        .09          .09
02627>      Dep. Storage     (mm)=        .80         1.50
02628>      Average Slope     (%)=        .50          .50
02629>      Length            (m)=      34.64        40.00
02630>      Mannings n            =       .013         .250
02631>
02632>      Max.eff.Inten.(mm/hr)=     282.59        16.05
02633>                    over (min)        2.50        22.50
02634>      Storage Coeff.  (min)=       1.10 (ii)   23.33 (ii)
02635>      Unit Hyd. Tpeak (min)=       2.50        22.50
02636>      Unit Hyd. peak  (cms)=        .61          .05
02637>                                                          *TOTALS*
02638>      PEAK FLOW       (cms)=        .05          .00          .047 (iii)
02639>      TIME TO PEAK    (hrs)=       1.33         1.67         1.333
02640>      RUNOFF VOLUME    (mm)=      76.48        10.81        32.481
02641>      TOTAL RAINFALL   (mm)=      77.28        77.28        77.284
02642>      RUNOFF COEFFICIENT   =        .99          .14          .420
02643>       *** WARNING: Storage Coefficient is smaller than DT!
02644>                    Use a smaller DT or a larger area.
02645>
02646>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02647>              CN* =  30.0    Ia = Dep. Storage  (Above)
02648>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02649>              THAN THE STORAGE COEFFICIENT.
02650>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02651>
02652> --------------------------------------------------------------------------------
02653> 001:0111--------------------------------------------------------------------------
02654> *Catchment UNC1
02655> *This catchment drains east towards 3rd Line and is collected in a bypass that
02656> *is directed to the Black Drain by Node 3
02657> ----------------------
02658> | DESIGN NASHYD      |   Area    (ha)=     .98   Curve Number   (CN)=61.00
02659> | 04:UNC1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02660> ----------------------  U.H. Tp(hrs)=    .040
02661>
02662>      Unit Hyd Qpeak  (cms)=     .936
02663>
02664>      PEAK FLOW       (cms)=     .197 (i)
02665>      TIME TO PEAK    (hrs)=    1.333
02666>      RUNOFF VOLUME    (mm)=   24.113
02667>      TOTAL RAINFALL   (mm)=   77.284
02668>      RUNOFF COEFFICIENT   =     .312
02669>
02670>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02671>
02672>       *** WARNING: Time step is too large for value of TP.
02673>                    R.V. may be ok.  Peak flow could be off.
02674> --------------------------------------------------------------------------------
02675> 001:0112--------------------------------------------------------------------------
02676> *Catchment UNC5
02677> *This catchment drains east towards 3rd Line and is collected in a bypass that
02678> *is directed to the Black Drain by Node 3
02679> ----------------------
02680> | DESIGN NASHYD      |   Area    (ha)=     .13   Curve Number   (CN)=39.00
02681> | 05:UNC5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02682> ----------------------  U.H. Tp(hrs)=    .070
02683>
02684>      Unit Hyd Qpeak  (cms)=     .071
02685>
02686>      PEAK FLOW       (cms)=     .008 (i)
02687>      TIME TO PEAK    (hrs)=    1.375
02688>      RUNOFF VOLUME    (mm)=   12.140
02689>      TOTAL RAINFALL   (mm)=   77.284
02690>      RUNOFF COEFFICIENT   =     .157
02691>
02692>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02693>
02694>       *** WARNING: Time step is too large for value of TP.
02695>                    R.V. may be ok.  Peak flow could be off.
02696> --------------------------------------------------------------------------------
02697> 001:0113--------------------------------------------------------------------------
02698> *Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
02699> ------------------------
02700> | ADD HYD (Bypass2   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
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02701> ------------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
02702>                       ID1 01:EXT3           1.23     .411    1.33  48.27    .000
02703>                      +ID2 02:EXT4            .18     .047    1.33  32.48    .000
02704>                      +ID3 04:UNC1            .98     .197    1.33  24.11    .000
02705>                      +ID4 05:UNC5            .13     .008    1.38  12.14    .000
02706>                       ============================================================
02707>                       SUM 07:Bypass2        2.52     .662    1.33  35.89    .000
02708>
02709>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02710>
02711> ---------------------------------------------------------------------------------
02712> 001:0114-----------------------------------------------------------------------
02713> *Catchment UNC2
02714> *Rear lots on South side of property, collected in swale
02715> *flows to the Black Drain at Node 3
02716> ----------------------
02717> | DESIGN NASHYD      |   Area    (ha)=    1.81   Curve Number   (CN)=66.00
02718> | 01:UNC2   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02719> ----------------------   U.H. Tp(hrs)=    .210
02720>
02721>      Unit Hyd Qpeak  (cms)=     .329
02722>
02723>      PEAK FLOW       (cms)=     .143 (i)
02724>      TIME TO PEAK    (hrs)=    1.542
02725>      RUNOFF VOLUME    (mm)=   27.794
02726>      TOTAL RAINFALL   (mm)=   77.284
02727>      RUNOFF COEFFICIENT   =     .360
02728>
02729>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02730>
02731> ---------------------------------------------------------------------------------
02732> 001:0115-----------------------------------------------------------------------
02733> *Catchment EXT5
02734> *External area on the south of the site, existing agricultural
02735> *flows to the Black Drain at Node 3
02736> ----------------------
02737> | DESIGN NASHYD      |   Area    (ha)=    8.51   Curve Number   (CN)=35.00
02738> | 02:EXT5   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02739> ----------------------   U.H. Tp(hrs)=    .440
02740>
02741>      Unit Hyd Qpeak  (cms)=     .739
02742>
02743>      PEAK FLOW       (cms)=     .144 (i)
02744>      TIME TO PEAK    (hrs)=    1.875
02745>      RUNOFF VOLUME    (mm)=   10.490
02746>      TOTAL RAINFALL   (mm)=   77.284
02747>      RUNOFF COEFFICIENT   =     .136
02748>
02749>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02750>
02751> ---------------------------------------------------------------------------------
02752> 001:0116-----------------------------------------------------------------------
02753> *Total Flow to Node 3 (Including External Areas)
02754> ------------------------
02755> | ADD HYD (Node3     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02756> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
02757>                       ID1 08:Bypass1       8.27     .341    1.83  24.96    .000
02758>                      +ID2 09:Pond1        26.92     .262    4.08  38.83    .000
02759>                      +ID3 03:UNC3          5.82     .161    2.42  24.81    .000
02760>                      +ID4 07:Bypass2       2.52     .662    1.33  35.89    .000
02761>                      +ID5 01:UNC2          1.81     .143    1.54  27.79    .000
02762>                      +ID6 02:EXT5          8.51     .144    1.88  10.49    .000
02763>                       ============================================================
02764>                       SUM 04:Node3         53.85     .905    1.92  30.19    .000
02765>
02766>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02767>
02768> ---------------------------------------------------------------------------------
02769> 001:0117-----------------------------------------------------------------------
02770> *Catchment 202
02771> *This catchment is the area draining Node 4 Outlet
02772> ----------------------
02773> | DESIGN STANDHYD    |   Area    (ha)=    2.99
02774> | 06:202    DT= 2.00 |   Total Imp(%)=   28.00   Dir. Conn.(%)=   18.00
02775> ----------------------
02776>                              IMPERVIOUS    PERVIOUS (i)
02777>      Surface Area     (ha)=        .84         2.15
02778>      Dep. Storage     (mm)=        .80         1.50
02779>      Average Slope     (%)=        .50          .50
02780>      Length            (m)=     141.19        40.00
02781>      Mannings n            =       .013         .250
02782>
02783>      Max.eff.Inten.(mm/hr)=     282.59        70.72
02784>                 over (min)        2.50        15.00
02785>      Storage Coeff.  (min)=       2.55 (ii)   14.84 (ii)
02786>      Unit Hyd. Tpeak (min)=       2.50        15.00
02787>      Unit Hyd. peak  (cms)=        .42          .08
02788>                                                          *TOTALS*
02789>      PEAK FLOW       (cms)=        .37          .26          .449 (iii)
02790>      TIME TO PEAK    (hrs)=       1.33         1.54         1.333
02791>      RUNOFF VOLUME    (mm)=      76.48        37.39        44.430
02792>      TOTAL RAINFALL   (mm)=      77.28        77.28        77.284
02793>      RUNOFF COEFFICIENT   =        .99          .48          .575
02794>
02795>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02796>            CN* =  74.0    Ia = Dep. Storage  (Above)
02797>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02798>            THAN THE STORAGE COEFFICIENT.
02799>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02800>
02801> ---------------------------------------------------------------------------------
02802> 001:0118-----------------------------------------------------------------------
02803> *Catchment UNC4
02804> *Uncontrolled rear yards, flows to the Black Drain at Node 4
02805> ----------------------
02806> | DESIGN NASHYD      |   Area    (ha)=    1.12   Curve Number   (CN)=64.00
02807> | 02:UNC4   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02808> ----------------------   U.H. Tp(hrs)=    .050
02809>
02810>      Unit Hyd Qpeak  (cms)=     .856
02811>
02812>      PEAK FLOW       (cms)=     .215 (i)
02813>      TIME TO PEAK    (hrs)=    1.333
02814>      RUNOFF VOLUME    (mm)=   26.265
02815>      TOTAL RAINFALL   (mm)=   77.284
02816>      RUNOFF COEFFICIENT   =     .340
02817>
02818>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02819>
02820>       *** WARNING: Time step is too large for value of TP.
02821>                    R.V. may be ok.  Peak flow could be off.
02822> ---------------------------------------------------------------------------------
02823> 001:0119-----------------------------------------------------------------------
02824> *Catchment EXT6
02825> *External area on the south of the site, existing agricultural
02826> *flows to the Black Drain at Node 4
02827> ----------------------
02828> | DESIGN NASHYD      |   Area    (ha)=   15.73   Curve Number   (CN)=55.00
02829> | 03:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02830> ----------------------   U.H. Tp(hrs)=    .550
02831>
02832>      Unit Hyd Qpeak  (cms)=    1.092
02833>
02834>      PEAK FLOW       (cms)=     .461 (i)
02835>      TIME TO PEAK    (hrs)=    2.042
02836>      RUNOFF VOLUME    (mm)=   20.251
02837>      TOTAL RAINFALL   (mm)=   77.284
02838>      RUNOFF COEFFICIENT   =     .262
02839>
02840>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02841>
02842> ---------------------------------------------------------------------------------
02843> 001:0120-----------------------------------------------------------------------
02844> *Total Flow to to Node 4 (Including External Areas)
02845> ------------------------
02846> | ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02847> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
02848>                       ID1 04:Node3        53.85     .905    1.92  30.19    .000
02849>                      +ID2 06:202           2.99     .449    1.33  44.43    .000
02850>                      +ID3 02:UNC4          1.12     .215    1.33  26.27    .000
02851>                      +ID4 03:EXT6         15.73     .461    2.04  20.25    .000
02852>                       ============================================================
02853>                       SUM 08:Node4        73.69    1.612    1.33  28.59    .000
02854>
02855>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
02856>
02857> ---------------------------------------------------------------------------------
02858> 001:0121-----------------------------------------------------------------------
02859> *Catchment UNC6
02860> *Uncontrolled rear yards, flows to ditch along Road 19
02861> ----------------------
02862> | DESIGN NASHYD      |   Area    (ha)=     .08   Curve Number   (CN)=74.00
02863> | 02:UNC6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02864> ----------------------   U.H. Tp(hrs)=    .050
02865>
02866>      Unit Hyd Qpeak  (cms)=     .061
02867>
02868>      PEAK FLOW       (cms)=     .021 (i)
02869>      TIME TO PEAK    (hrs)=    1.333
02870>      RUNOFF VOLUME    (mm)=   34.801
02871>      TOTAL RAINFALL   (mm)=   77.284
02872>      RUNOFF COEFFICIENT   =     .450
02873>
02874>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02875>
02876>       *** WARNING: Time step is too large for value of TP.
02877>                    R.V. may be ok.  Peak flow could be off.
02878> ---------------------------------------------------------------------------------
02879> 001:0122-----------------------------------------------------------------------
02880> *100-Year
02881> --------------------
02882> | CHICAGO STORM    |    IDF curve parameters: A= 955.980
02883> | Ptotal= 85.70 mm |                          B=    .000
02884> --------------------                          C=    .693
02885>                       used in:   INTENSITY =  A / (t + B)^C
02886>
02887>                       Duration of storm  =  4.00 hrs
02888>                       Storm time step    =  5.00 min
02889>                       Time to peak ratio =   .33
02890>
02891>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
02892>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
02893>               .08   6.929 |   1.08  21.955 |   2.08  15.659 |   3.08   8.764
02894>               .17   7.273 |   1.17  29.950 |   2.17  14.573 |   3.17   8.488
02895>               .25   7.661 |   1.25  55.397 |   2.25  13.654 |   3.25   8.232
02896>               .33   8.105 |  1.33 313.369 |   2.33  12.866 |   3.33   7.994
02897>               .42   8.617 |   1.42  67.877 |   2.42  12.180 |   3.42   7.773
02898>               .50   9.216 |   1.50  42.973 |   2.50  11.577 |   3.50   7.566
02899>               .58   9.928 |   1.58  32.848 |   2.58  11.042 |   3.58   7.372
02900>               .67  10.792 |   1.67  27.103 |   2.67  10.564 |   3.67   7.189
02901>               .75  11.867 |   1.75  23.326 |   2.75  10.133 |   3.75   7.017
02902>               .83  13.247 |   1.83  20.623 |   2.83   9.743 |   3.83   6.855
02903>               .92  15.101 |   1.92  18.577 |   2.92   9.388 |   3.92   6.702
02904>              1.00  17.755 |   2.00  16.966 |   3.00   9.063 |   4.00   6.557
02905>
02906> ---------------------------------------------------------------------------------
02907> 001:0123-----------------------------------------------------------------------
02908> *Catchment EXT1
02909> *External area on the northwest of Wellington Road 19.
02910> *This catchment drains to the golf course via a culvert which will be captured
02911> *and enter a bypass pipe, entering the Black Drain at Node 2
02912> ----------------------
02913> | DESIGN NASHYD      |   Area    (ha)=    7.93   Curve Number   (CN)=61.00
02914> | 01:EXT1   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
02915> ----------------------   U.H. Tp(hrs)=    .440
02916>
02917>      Unit Hyd Qpeak  (cms)=     .688
02918>
02919>      PEAK FLOW       (cms)=     .390 (i)
02920>      TIME TO PEAK    (hrs)=    1.875
02921>      RUNOFF VOLUME    (mm)=   28.751
02922>      TOTAL RAINFALL   (mm)=   85.701
02923>      RUNOFF COEFFICIENT   =     .335
02924>
02925>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02926>
02927> ---------------------------------------------------------------------------------
02928> 001:0124-----------------------------------------------------------------------
02929> *Catchment EXT2
02930> *External area - Wellington Road 19 and Roadside ditch on south side of Wellingt
02931> *This will be captured via the Black Drain Bypass and enter the drain at Node 2
02932> ----------------------
02933> | DESIGN STANDHYD    |   Area    (ha)=     .34
02934> | 02:EXT2   DT= 2.00 |   Total Imp(%)=   51.00   Dir. Conn.(%)=   36.00
02935> ----------------------
02936>                              IMPERVIOUS    PERVIOUS (i)
02937>      Surface Area     (ha)=        .17          .17
02938>      Dep. Storage     (mm)=        .80         1.50
02939>      Average Slope     (%)=        .50          .50
02940>      Length            (m)=      47.61        40.00
02941>      Mannings n            =       .013         .250
02942>
02943>      Max.eff.Inten.(mm/hr)=     313.37        74.37
02944>                 over (min)        2.50        12.50
02945>      Storage Coeff.  (min)=       1.28 (ii)   13.32 (ii)
02946>      Unit Hyd. Tpeak (min)=       2.50        12.50
02947>      Unit Hyd. peak  (cms)=        .58          .09
02948>                                                          *TOTALS*
02949>      PEAK FLOW       (cms)=        .10          .02          .112 (iii)
02950>      TIME TO PEAK    (hrs)=       1.33         1.50         1.333
02951>      RUNOFF VOLUME    (mm)=      84.90        31.72        50.865
02952>      TOTAL RAINFALL   (mm)=      85.70        85.70        85.701
02953>      RUNOFF COEFFICIENT   =        .99          .37          .594
02954>       *** WARNING: Storage Coefficient is smaller than DT!
02955>                    Use a smaller DT or a larger area.
02956>
02957>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
02958>            CN* =  58.0    Ia = Dep. Storage  (Above)
02959>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
02960>            THAN THE STORAGE COEFFICIENT.
02961>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
02962>
02963> ---------------------------------------------------------------------------------
02964> 001:0125-----------------------------------------------------------------------
02965> *Total Flow to Node 2 (EXT1 & EXT2) - Black Drain Bypass Pipe
02966> ------------------------
02967> | ADD HYD (Bypass1   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
02968> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
02969>                       ID1 01:EXT1           7.93     .390    1.88  28.75    .000
02970>                      +ID2 02:EXT2            .34     .112    1.33  50.87    .000
```

```
                    ============================================================
                    SUM 08:Bypass1        8.27    .408    1.83  29.66    .000
                    ============================================================

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0126--------------------------------------------------------------------------
*Catchment 201
*Drainage Area to SWMF1
----------------------
| DESIGN STANDHYD    |   Area     (ha)=   26.92
| 01:201     DT= 2.00 |   Total Imp(%)=   34.00   Dir. Conn.(%)=   23.00
----------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.15        17.77
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=     423.64        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     313.37        55.31
                   over (min)      5.00        17.50
     Storage Coeff.  (min)=      4.74 (ii)   18.29 (ii)
     Unit Hyd. Tpeak (min)=      5.00        17.50
     Unit Hyd. peak  (cms)=       .23          .06
                                                        *TOTALS*
     PEAK FLOW       (cms)=      3.34         1.62        3.935 (iii)
     TIME TO PEAK    (hrs)=      1.38         1.58        1.375
     RUNOFF VOLUME    (mm)=     84.90        32.71       44.713
     TOTAL RAINFALL   (mm)=     85.70        85.70       85.701
     RUNOFF COEFFICIENT   =       .99          .38         .522

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0127--------------------------------------------------------------------------
* Pond 1
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  2.0 min.
|  IN>01:(201    )   |
| OUT<09:(Pond1 )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW     STORAGE   |  OUTFLOW     STORAGE
                            (cms)      (ha.m.)   |    (cms)     (ha.m.)
                            .000  .0000E+00   |     .320  .9500E+00
                            .057  .3310E+00   |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK      R.V.
     ---------------            (ha)     (cms)     (hrs)      (mm)
     INFLOW >01: (201   )      26.92     3.935     1.375     44.713
     OUTFLOW<09: (Pond1 )      26.92      .311     4.083     44.713

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=    7.898
                    TIME SHIFT OF PEAK FLOW         (min)=   162.50
                    MAXIMUM  STORAGE   USED       (ha.m.)=.9283E+00

--------------------------------------------------------------------------------
001:0128--------------------------------------------------------------------------
*Catchment UNC3
*Existing wetland/open space area to remain
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area     (ha)=    5.82   Curve Number    (CN)=62.00
| 03:UNC3    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .830

     Unit Hyd Qpeak  (cms)=     .268

     PEAK FLOW       (cms)=     .193 (i)
     TIME TO PEAK    (hrs)=    2.417
     RUNOFF VOLUME    (mm)=   29.556
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .345

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

--------------------------------------------------------------------------------
001:0129--------------------------------------------------------------------------
*Catchment EXT3
*External area - Wellington Road 19 and 3rd line and
*Roadside ditch on south side of Wellington Road 19 and west side of 3rd Line.
*This catchment is collected in a bypass and is directed to the Black Drain by N
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    1.23
| 01:EXT3    DT= 2.00 |   Total Imp(%)=   59.00   Dir. Conn.(%)=   44.00
----------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .73          .50
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      90.55        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     313.37        67.71
                   over (min)      2.50        15.00
     Storage Coeff.  (min)=      1.88 (ii)   14.38 (ii)
     Unit Hyd. Tpeak (min)=      2.50        15.00
     Unit Hyd. peak  (cms)=       .50          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=       .44          .06         .461 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.54        1.333
     RUNOFF VOLUME    (mm)=     84.90        31.02       54.729
     TOTAL RAINFALL   (mm)=     85.70        85.70       85.701
     RUNOFF COEFFICIENT   =       .99          .36         .639
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  56.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0130--------------------------------------------------------------------------
*Catchment EXT4
*External area - 3rd Line and Roadside ditch on west side of 3rd Line
*This catchment is collected in a bypass and directed to the Black Drain by Node
----------------------
| DESIGN STANDHYD    |   Area     (ha)=     .18
| 02:EXT4    DT= 2.00 |   Total Imp(%)=   48.00   Dir. Conn.(%)=   33.00
----------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .09          .09
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=      34.64        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     313.37        19.57
                   over (min)      2.50        22.50
     Storage Coeff.  (min)=      1.05 (ii)   21.60 (ii)

     Unit Hyd. Tpeak (min)=      2.50        22.50
     Unit Hyd. peak  (cms)=       .62          .05
                                                        *TOTALS*
     PEAK FLOW       (cms)=       .05          .00          .052 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.67         1.333
     RUNOFF VOLUME    (mm)=     84.90        13.12        36.810
     TOTAL RAINFALL   (mm)=     85.70        85.70        85.701
     RUNOFF COEFFICIENT   =       .99          .15          .430
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  30.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0131--------------------------------------------------------------------------
*Catchment UNC1
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3
----------------------
| DESIGN NASHYD      |   Area     (ha)=    .98   Curve Number    (CN)=61.00
| 04:UNC1    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .936

     PEAK FLOW       (cms)=     .238 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=   28.751
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .335

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.

--------------------------------------------------------------------------------
001:0132--------------------------------------------------------------------------
*Catchment UNC5
*This catchment drains east towards 3rd Line and is collected in a bypass that
*is directed to the Black Drain by Node 3
----------------------
| DESIGN NASHYD      |   Area     (ha)=    .13   Curve Number    (CN)=39.00
| 05:UNC5    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .070

     Unit Hyd Qpeak  (cms)=     .071

     PEAK FLOW       (cms)=     .010 (i)
     TIME TO PEAK    (hrs)=    1.375
     RUNOFF VOLUME    (mm)=   14.725
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .172

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.

--------------------------------------------------------------------------------
001:0133--------------------------------------------------------------------------
*Total Flow to bypass to Node 3 (EXT3, EXT4, UNC1, UNC5) - Black Drain Bypass Pi
------------------------
| ADD HYD (Bypass2   ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 01:EXT3        1.23     .461    1.33  54.73    .000
                      +ID2 02:EXT4          .18     .052    1.33  36.81    .000
                      +ID3 04:UNC1          .98     .238    1.33  28.75    .000
                      +ID4 05:UNC5          .13     .010    1.38  14.72    .000
                       ============================================================
                       SUM 07:Bypass2       2.52     .759    1.33  41.28    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0134--------------------------------------------------------------------------
*Catchment UNC2
*Rear lots on South side of property, collected in swale
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area     (ha)=   1.81   Curve Number    (CN)=66.00
| 01:UNC2    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .210

     Unit Hyd Qpeak  (cms)=     .329

     PEAK FLOW       (cms)=     .171 (i)
     TIME TO PEAK    (hrs)=    1.542
     RUNOFF VOLUME    (mm)=   32.968
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .385

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

--------------------------------------------------------------------------------
001:0135--------------------------------------------------------------------------
*Catchment EXT5
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 3
----------------------
| DESIGN NASHYD      |   Area     (ha)=   8.51   Curve Number    (CN)=35.00
| 02:EXT5    DT= 2.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .440

     Unit Hyd Qpeak  (cms)=     .739

     PEAK FLOW       (cms)=     .176 (i)
     TIME TO PEAK    (hrs)=    1.875
     RUNOFF VOLUME    (mm)=   12.753
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .149

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

--------------------------------------------------------------------------------
001:0136--------------------------------------------------------------------------
*Total Flow to Node 3 (Including External Areas)
------------------------
| ADD HYD (Node3     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                        ID1 08:Bypass1     8.27     .408    1.83  29.66    .000
                      +ID2 09:Pond1       26.92     .311    4.08  44.71    .000
                      +ID3 03:UNC3         5.82     .238    2.42  29.56    .000
                      +ID4 07:Bypass2      2.52     .759    1.33  41.28    .000
                      +ID5 01:UNC2         1.81     .171    1.54  32.97    .000
                      +ID6 02:EXT5         8.51     .176    1.88  12.75    .000
                       ============================================================
                       SUM 04:Node3       53.85    1.096    1.92  35.16    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0137--------------------------------------------------------------------------
```

```
*Catchment 202
*This catchment is the area draining Node 4 Outlet
---------------------
| DESIGN STANDHYD    |   Area    (ha)=    2.99
| 06:202    DT= 2.00 |   Total Imp(%)=   28.00   Dir. Conn.(%)=   18.00
---------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .84         2.15
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=        .50          .50
     Length            (m)=     141.19        40.00
     Mannings n             =      .013         .250

     Max.eff.Inten.(mm/hr)=     313.37        93.75
                   over (min)        2.50        12.50
     Storage Coeff.  (min)=       2.45 (ii)   13.43 (ii)
     Unit Hyd. Tpeak (min)=       2.50        12.50
     Unit Hyd. peak  (cms)=        .43          .09
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .42          .33          .535 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50         1.333
     RUNOFF VOLUME    (mm)=      84.90        43.75        51.160
     TOTAL RAINFALL   (mm)=      85.70        85.70        85.701
     RUNOFF COEFFICIENT   =        .99          .51          .597
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0138--------------------------------------------------------------------------
*Catchment UNC4
*Uncontrolled rear yards, flows to the Black Drain at Node 4
---------------------
| DESIGN NASHYD      |   Area    (ha)=    1.12   Curve Number   (CN)=64.00
| 02:UNC4   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .856

     PEAK FLOW       (cms)=     .259 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=   31.222
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .364

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0139--------------------------------------------------------------------------
*Catchment EXT6
*External area on the south of the site, existing agricultural
*flows to the Black Drain at Node 4
---------------------
| DESIGN NASHYD      |   Area    (ha)=   15.73   Curve Number   (CN)=55.00
| 03:EXT6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=    .550

     Unit Hyd Qpeak  (cms)=    1.092

     PEAK FLOW       (cms)=     .555 (i)
     TIME TO PEAK    (hrs)=    2.042
     RUNOFF VOLUME    (mm)=   24.278
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .283

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

--------------------------------------------------------------------------------
001:0140--------------------------------------------------------------------------
*Total Flow to to Node 4 (Including External Areas)
------------------------
| ADD HYD (Node4     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 04:Node3       53.85    1.096   1.92   35.16    .000
                      +ID2 06:202          2.99     .535   1.33   51.16    .000
                      +ID3 02:UNC4         1.12     .259   1.33   31.22    .000
                      +ID4 03:EXT6        15.73     .555   2.04   24.28    .000
                       ============================================================
                       SUM 08:Node4       73.69    1.893   1.33   33.42    .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0141--------------------------------------------------------------------------
*Catchment UNC6
*Uncontrolled rear yards, flows to ditch along Road 19
---------------------
| DESIGN NASHYD      |   Area    (ha)=     .08   Curve Number   (CN)=74.00
| 02:UNC6   DT= 2.00 |   Ia      (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .061

     PEAK FLOW       (cms)=     .025 (i)
     TIME TO PEAK    (hrs)=    1.333
     RUNOFF VOLUME    (mm)=   40.876
     TOTAL RAINFALL   (mm)=   85.701
     RUNOFF COEFFICIENT   =     .477

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
--------------------------------------------------------------------------------
001:0142--------------------------------------------------------------------------
      FINISH
--------------------------------------------------------------------------------
********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
001:0011 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0018 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0021 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0024 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0030 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0031 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0032 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0038 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0041 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0044 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0049 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0050 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0051 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0052 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0058 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0061 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0064 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0069 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0070 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0071 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0072 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0078 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0081 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0084 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0089 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0090 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0091 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0092 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0098 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0101 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0104 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0109 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0110 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0111 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0112 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0118 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0121 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0124 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0129 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0130 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0131 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0132 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0137 DESIGN STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
001:0138 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
001:0141 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
   Simulation ended on 2021-12-22    at 15:14:57
================================================================================
```

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# Appendix C

# Black Drain Analysis

# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Dec 2 2021

## Pond 1 Outlet - NODE 3 - Black Drain Cross Section

**User-defined**

| | |
|---|---|
| Invert Elev (m) | = 425.5000 |
| Slope (%) | = 0.3900 |
| N-Value | = Composite |

**Calculations**

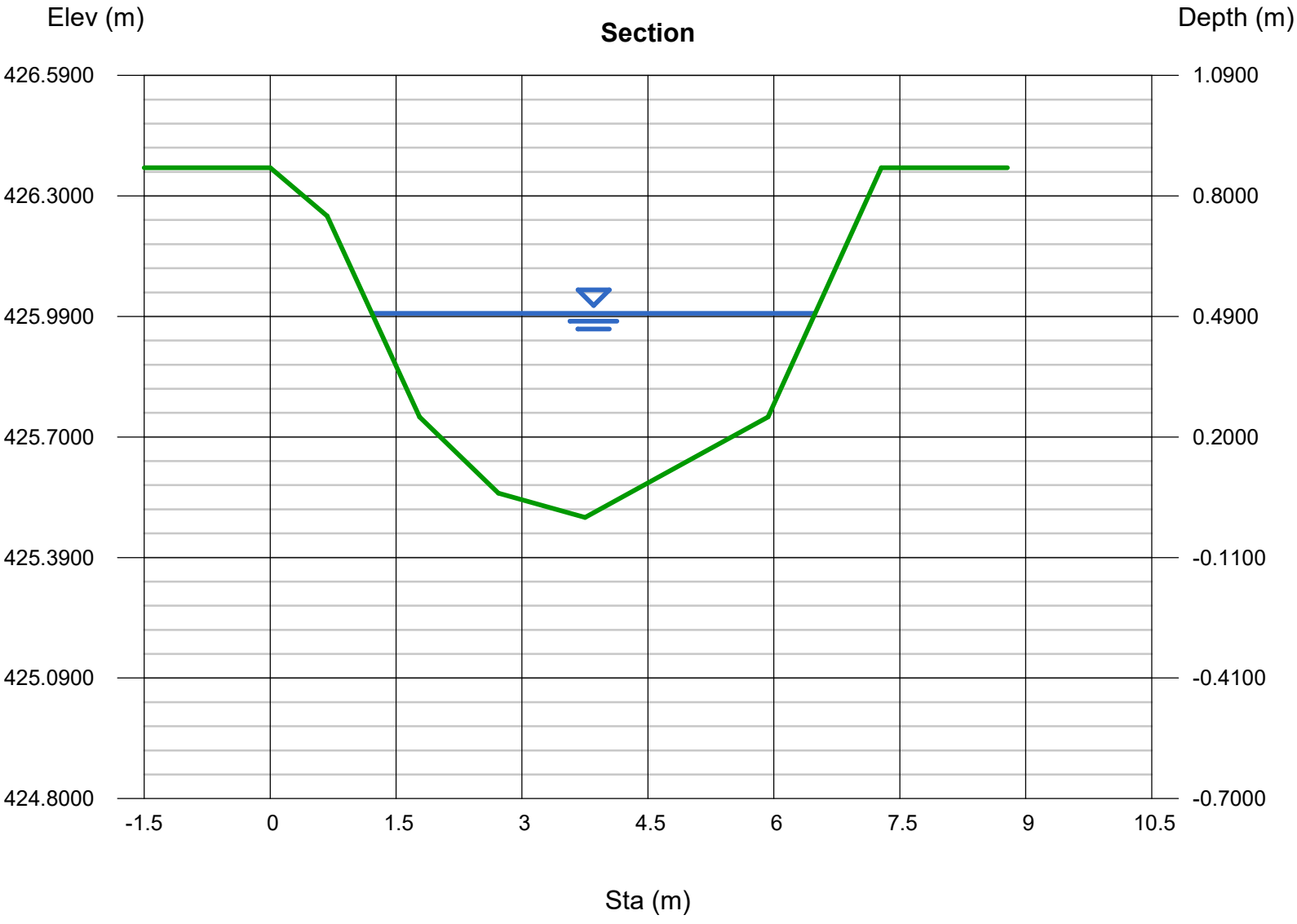
| | |
|---|---|
| Compute by: | Q vs Depth |
| No. Increments | = 48 |

**Highlighted**

| | |
|---|---|
| Depth (m) | = 0.5075 |
| Q (cms) | = 1.8028 |
| Area (sqm) | = 1.8021 |
| Velocity (m/s) | = 1.0004 |
| Wetted Perim (m) | = 5.4242 |
| Crit Depth, Yc (m) | = 0.3810 |
| Top Width (m) | = 5.2771 |
| EGL (m) | = 0.5586 |

**(Sta, El, n)-(Sta, El, n)...**

( 0.0000, 426.3700)-(0.6800, 426.2500, 0.030)-(1.7800, 425.7500, 0.030)-(2.7200, 425.5600, 0.030)-(3.7500, 425.5000, 0.030)-(5.9300, 425.7500, 0.030)-(7.2800, 4



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Dec 2 2021

## Storm Outlet - NODE 4 - Black Drain Cross Section

**User-defined**

| | |
|---|---|
| Invert Elev (m) | = 424.5000 |
| Slope (%) | = 0.3900 |
| N-Value | = Composite |

**Calculations**

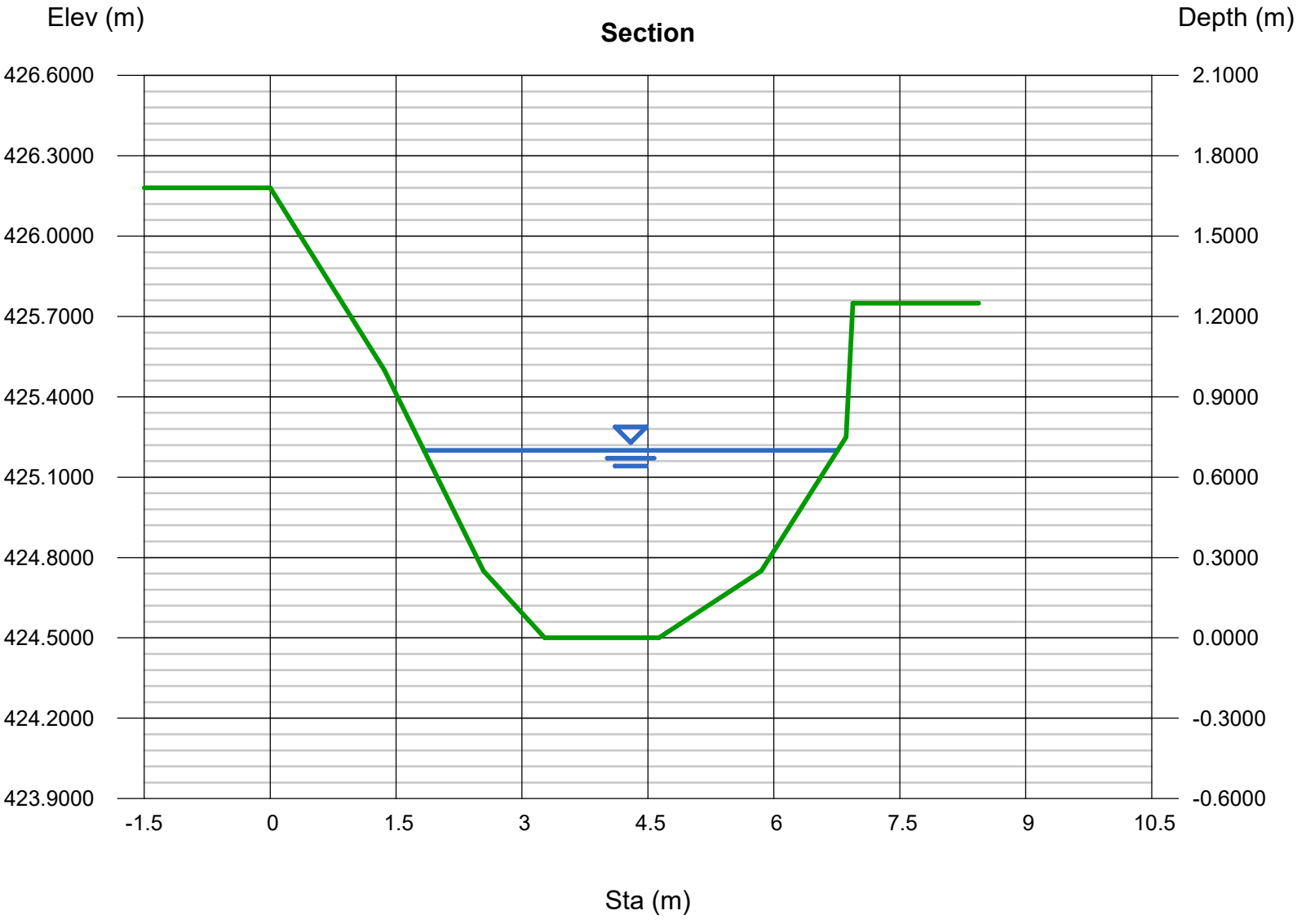
| | |
|---|---|
| Compute by: | Q vs Depth |
| No. Increments | = 48 |

**Highlighted**

| | |
|---|---|
| Depth (m) | = 0.7000 |
| Q (cms) | = 3.0550 |
| Area (sqm) | = 2.4370 |
| Velocity (m/s) | = 1.2536 |
| Wetted Perim (m) | = 5.2301 |
| Crit Depth, Yc (m) | = 0.5182 |
| Top Width (m) | = 4.9270 |
| EGL (m) | = 0.7801 |

**(Sta, El, n)-(Sta, El, n)...**

( 0.0000, 426.1800)-(1.3600, 425.5000, 0.030)-(2.5400, 424.7500, 0.030)-(3.2700, 424.5000, 0.030)-(4.6300, 424.5000, 0.030)-(5.8500, 424.7500, 0.030)-(6.8600, 4
-(6.9400, 425.7500, 0.030)



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# Appendix D

# Stormwater Management Design Calculations

**Project:** Fergus Golf Course
**File:** 300052719
**Designed by:** L.Garner
**Date:** 20-Dec-21

BURNSIDE

## Catchment 201 - SWMF1

**Total Drainage Area=** **269200** **m2** **or** **26.92** **ha**

**Roads (m2)**

| | |
|---|---|
| 41805.4 | Right-of-Ways |

Total Area= 4.18054 ha

| | | Area |
|---|---|---|
| TIMP | 65% | 2.72 ha |
| XIMP | 50% | 2.09 ha |

**High Density Residential (m2)**

Total Area 0 ha

| | | Area |
|---|---|---|
| TIMP | 80% | 0.00 |
| XIMP | 80% | 0.00 |

**Medium Density Residential (m2)**

Total Area 0.00 ha

| | | Area |
|---|---|---|
| TIMP | 70% | 0.00 ha |
| XIMP | 55% | 0.00 ha |

**SWM Block (m2)**

| | |
|---|---|
| 12700 | SWMF1 |

Total Area 1.27 ha

| | | Area |
|---|---|---|
| TIMP | 50% | 0.64 ha |
| XIMP | 50% | 0.64 ha |

**Low Density Residential (m2)**

| | |
|---|---|
| 227394.6 | Lots |

Total Area 22.74 ha

| | | Area |
|---|---|---|
| TIMP | 25% | 5.68 ha |
| XIMP | 15% | 3.41 ha |

**Park (m2)**

Total Area 0.00 ha

| | | Area |
|---|---|---|
| TIMP | 7% | 0.00 ha |
| XIMP | 5% | 0.00 ha |

Total Area (less Residential)= 5.45 ha
Total Residential Area(if not able to directly measure)= 21.47 ha

**Total Area (uncontrolled to pond)** **28.19 ha**

**TOTAL OVERALL DRAINGE AREA**

**Total TIMP= 9.04 ha** **Overall TIMP= 33.6 %**
**Total XIMP= 6.14 ha** **Overall XIMP= 22.8 %**

**Project:** Fergus Golf Course
**File:** 300052719
**Designed by:** L.Garner
**Date:** 20-Dec-21

BURNSIDE

## Catchment 202

**Total Drainage Area=** **29900** **m2** **or** **2.99** **ha**

**Roads (m2)**

| | |
|---|---|
| 2575 | |

Total Area= 0.2575 ha

| | | Area |
|---|---|---|
| TIMP | 65% | 0.17 ha |
| XIMP | 50% | 0.13 ha |

**High Density Residential (m2)**

Total Area 0 ha

| | | Area |
|---|---|---|
| TIMP | 80% | 0.00 |
| XIMP | 80% | 0.00 |

**Medium Density Residential (m2)**

Total Area 0.00 ha

| | | Area |
|---|---|---|
| TIMP | 70% | 0.00 ha |
| XIMP | 55% | 0.00 ha |

**SWM Block (m2)**

Total Area 0.00 ha

| | | Area |
|---|---|---|
| TIMP | 50% | 0.00 ha |
| XIMP | 50% | 0.00 ha |

**Low Density Residential (m2)**

| | |
|---|---|
| 27325 | remainder |

Total Area 2.73 ha

| | | Area |
|---|---|---|
| TIMP | 25% | 0.68 ha |
| XIMP | 15% | 0.41 ha |

**Parkland/Open Space Areas(m2)**

Total Area 0.00 ha

| | | Area |
|---|---|---|
| TIMP | 7% | 0.00 ha |
| XIMP | 5% | 0.00 ha |

**TOTAL OVERALL DRAINGE AREA**

| | | | |
|---|---|---|---|
| **Total TIMP=** | **0.85 ha** | **Overall TIMP=** | **28.4 %** |
| **Total XIMP=** | **0.54 ha** | **Overall XIMP=** | **18.0 %** |

**Project:** Fergus Golf Course
**File:** 300052719
**Designed** L.Garner
**Date:** 28-Sep-21

BURNSIDE

## External Catchments

**Area EXT2**

| | Area (ha) | % Imp | A x imp | Composite % Imp |
|---|---|---|---|---|
| Ditch (Landscape) = | 0.177 ha | 7% | 0.0124 | |
| Asphalt/Hardscape Area = | 0.163 ha | 100% | 0.1626 | |
| Total Area (EXT2) = | 0.340 ha | | 0.1750 | **51%** |

**Area EXT3**

| | Area (ha) | % Imp | A x imp | Composite % Imp |
|---|---|---|---|---|
| Landscape Area = | 0.552 ha | 7% | 0.0386 | |
| Hardscape Area = | 0.679 ha | 100% | 0.6785 | |
| Total Area (EXT3) = | 1.230 ha | | 0.7171 | **59%** |

**Area EXT4**

| | Area (ha) | % Imp | A x imp | Composite % Imp |
|---|---|---|---|---|
| Landscape Area = | 0.102 ha | 7% | 0.0071 | |
| Hardscape Area = | 0.078 ha | 100% | 0.0780 | |
| Total Area (EXT4) = | 0.180 ha | | 0.0851 | **48%** |

**Project:** Fergus Golf Course
**File:** 300052719
**Designed by:** L.Garner
**Date:** 20-Dec-21

BURNSIDE

## SWMF1 - Wet Pond Permament Pool Requirement

MOE Table 3.2 Water Quality Storage Requirements Based on Receiving Waters.

| | | |
|---|---|---|
| **IMPERVIOUSNESS** | 33.57 | % |
| **Protection Level (1, 2, or 3)** | 1 | |

NOTE - 40 cu.m/ha has been removed from MOE table values for Ex. Detention Portion

### Enhanced (Level 1) Protection

| x | y | Known (x) | Calc (y) | |
|---|---|---|---|---|
| Imperviousness (%) | Permanent Pool StorageVolume (cu.m./ha) | Imperviousness (%) | Permanent Pool StorageVolume (cu.m./ha) | Total Permanent Pool Required (cu.m) |
| 35 | 100 | 33.57 | 99.71 | 2684.22 |
| 55 | 150 | | | |
| 70 | 185 | | | |
| 85 | 210 | | | |
| **95.0** | **236** | **Extrapolated** | | |

### Normal (Level 2) Protection

| x | y | Known (x) | Calc (y) | |
|---|---|---|---|---|
| Imperviousness (%) | Permanent Pool StorageVolume (cu.m./ha) | Imperviousness (%) | Permanent Pool StorageVolume (cu.m./ha) | Total Permanent Pool Required (cu.m) |
| 35 | 50 | 33.57 | #N/A | #N/A |
| 55 | 70 | | | |
| 70 | 90 | | | |
| 85 | 110 | | | |
| **95.0** | **121** | **Extrapolated** | | |

### Basic (Level 3) Protection

| x | y | Known (x) | Calc (y) | |
|---|---|---|---|---|
| Imperviousness (%) | Permanent Pool StorageVolume (cu.m./ha) | Imperviousness (%) | Permanent Pool StorageVolume (cu.m./ha) | Total Permanent Pool Required (cu.m) |
| 35 | 20 | 33.57 | #N/A | #N/A |
| 55 | 35 | | | |
| 70 | 45 | | | |
| 85 | 55 | | | |
| **95.0** | **62** | **Extrapolated** | | |

## SEDIMENT FOREBAY SIZING

**Project:** Fergus Golf Course
**File:** 300052719
**Designed by:** L.Garner
**Date:** 20-Dec-21

**SWMF1 Forebay (Catchment 201)**
**Forebay Length: Two calculations (per MOE SWMP Manual, 2003)**

**1) Settling Calculations** **Dist = SQRT( r * Qp / Vs )**
(Equation 4.5, MOE 2003)

where:
Dist = Forebay length (m)
r = Length to width ratio of forebay
Qp = Peak flowrate from the pond during quality design storm (cms)
Vs = Settling velocity (m/s)

given:
r = 2
Qp = 0.05185 cms *see below
Vs = 0.0003 m/s

therefore:
Dist = 18.6 metres
Width= 9.3 metres

Peak quality flowrate (Qp) from pond based on release rate and volume of extended detention multiplied by a factor of 2.0 for peaking

Extended Detention Vol 2240 cu.m (extended det. volume)
Release Rate 24 hrs (typically 24 or 48)
Qp 0.05185 cms

**2) Dispersion Length** **Dist = (8 * Q) / (d * Vf)**
(Equation 4.6,MOE 2003)

where:
Dist = Forebay length (m)
Q = inlet flowrate (cms)
d = depth of permanent pool in forebay (m)
Vf = desired forebay velocity (m/s)

given:
Q = 1.64 cms *see below
d = 1 m
Vf = 0.5 m/s

therefore:
Dist = 26.2 metres
Width= 13.1 metres
Min Bottom Width= 3.3 metres *MOE equation 4.6
Pond Side Slopes: 5
Calc. Top Width= 13.28 metres
Calc. Top Length= 26.56 meters

Peak inflow rate calculated based on SMWHYMO output for 5 year storm (based of IDF parameters)

**Minimum Forebay Dimension:**

Length= 26.6 meters
Width= 13.3 meters

**Actual Forebay Design:**

Length= 41.0 meters
Width= 17.5 meters

Check Average velocity in forebay <= 0.15 m/s
Pond Side Slopes: 5 H : 1 V
Q = V x A Q = 1.64 A = 13 sq.metres

therefore: V = 0.1312 m/s
Design: **OK**

| | |
|---|---|
| Location: | Fergus Golf Course |
| Project #: | 300052719 |
| Date: | L.Garner |
| Updated: | 20-Dec-21 |

# Extended Detention

25mm over 24 hours

**SWMF1**

Drainage Area: 26.92

| | | |
|---|---|---|
| 8.321mm* x 26.92 ha x 10 = | 2240.01 | $m^3$ |
| 2240 $m^3$/24/3600 x 1.5 = | 0.039 | $m^3/s$ |

*8.321mm is the runoff volume from SWMHYMO based on the total and directly connected impervious

| | |
|---|---|
| Location: | Fergus Golf Course |
| Project #: | 300052719 |
| Date: | L.Garner |
| Updated: | 20-Dec-21 |

# SWMF1 Storage Calculations

## INPUT AREA

| | |
|---|---|
| Drainage Area: | 26.92 |
| Percent Impervious: | 34% |
| Base of Pond: | 424.60 |
| N.W.L.: | 426.10 |
| Required Permanent Pool Volume: | 2684 |
| Permanent Pool Volume Provided: | 3546 |

## ELEVATION / STORAGE INFORMATION

| | Elevation | Stage | Cumulative Storage | Cumulative Storage above Permanent Pool |
|---|---|---|---|---|
| | (m) | (m) | (m3) | (m3) |
| Base of Pond : | 424.60 | 0.00 | 0.00 | 0.00 |
| | 425.10 | 0.50 | 706.36 | 0.00 |
| | 425.60 | 1.00 | 1898.91 | 0.00 |
| NWL : | 426.10 | 1.50 | 3545.56 | 0.00 |
| | 426.60 | 2.00 | 5744.95 | 2199.39 |
| | 427.10 | 2.50 | 8451.97 | 4906.41 |
| | 427.60 | 3.00 | 11667.24 | 8121.68 |
| HWL: | 427.80 | 3.20 | 13098.77 | 9553.21 |
| Top of Pond: | 428.10 | 3.50 | 15405.50 | 11859.94 |

2.00 Active Storage Depth

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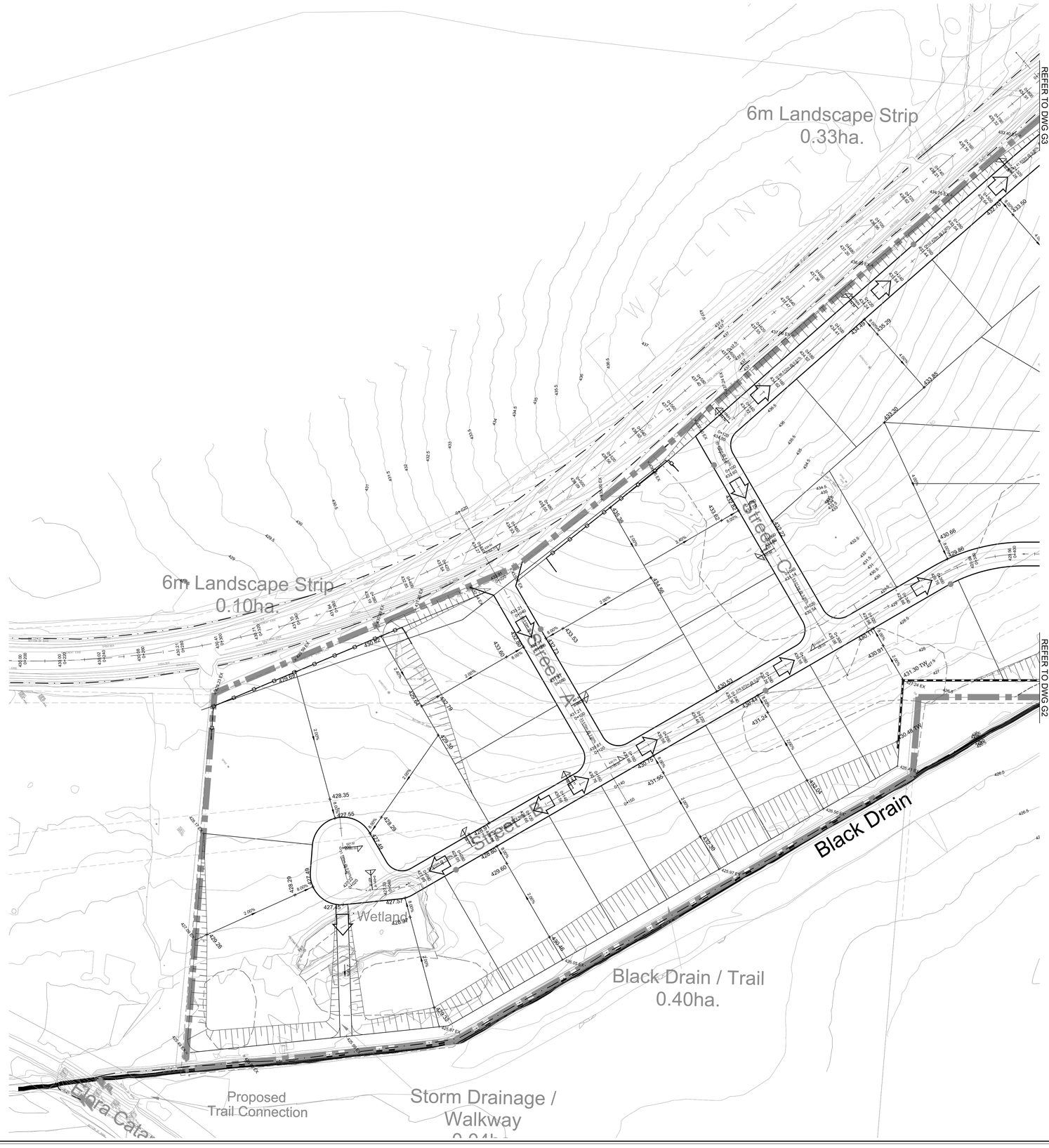
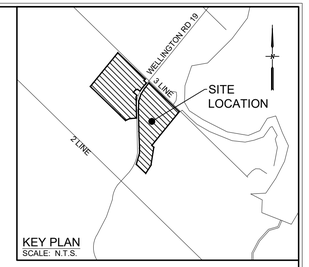
# Drawings




LEGEND

- PROPERTY BOUNDARY
- EASEMENT
- EXISTING CONTOUR
- EXISTING ELEVATION
- PROPOSED ELEVATION
- PROPOSED SLOPE
- PROPOSED OVERLAND FLOW DIRECTION
- MAX. 3:1 SIDE SLOPES
- PROPOSED RETAINING WALL
- PROPOSED NOISE WALL (BY OTHERS)
- PROPOSED SWALE

LOT TYPES:

- F — FRONT DRAINAGE
- S — SPLIT DRAINAGE
- WO — WALK OUT LOT
- LO — LOOK OUT LOT

0 40 80 120 160
Metres

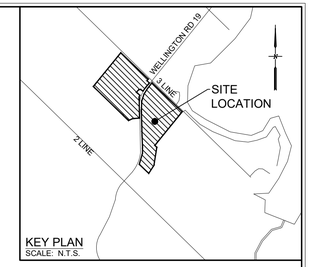
BURNSIDE

Client
**FERGUS DEVELOPMENT INC.**

Figure Title
**FERGUS GOLF COURSE**

GRADING PLAN

| Drawn | Checked | Date | Figure No. |
|---|---|---|---|
| BF | DN | 22/01/21 | G1 |
| Scale | | Project No. | |
| 1:1000 | | 300052719 | |




REFER TO DWG G3

REFER TO DWG G1

Open Space
5.31ha.

Wetland

Former Trail

SWM
1.27ha

Sanitary
Pumping Stn
(20mx20m)

Open Space
1.04ha.

Street B

Street H

Rennie B

EXTENT OF DITCH REGRADING

EXTENT OF DITCH REGRADING

LEGEND

- PROPERTY BOUNDARY
- EASEMENT
- EXISTING CONTOUR
- EXISTING ELEVATION
- PROPOSED ELEVATION
- PROPOSED SLOPE
- PROPOSED OVERLAND FLOW DIRECTION
- MAX. 3:1 SIDE SLOPES
- PROPOSED RETAINING WALL
- PROPOSED NOISE WALL (BY OTHERS)
- PROPOSED SWALE

LOT TYPES:

- F — FRONT DRAINAGE
- S — SPLIT DRAINAGE
- WO — WALK OUT LOT
- LO — LOOK OUT LOT

0 40 80 120 160
Metres

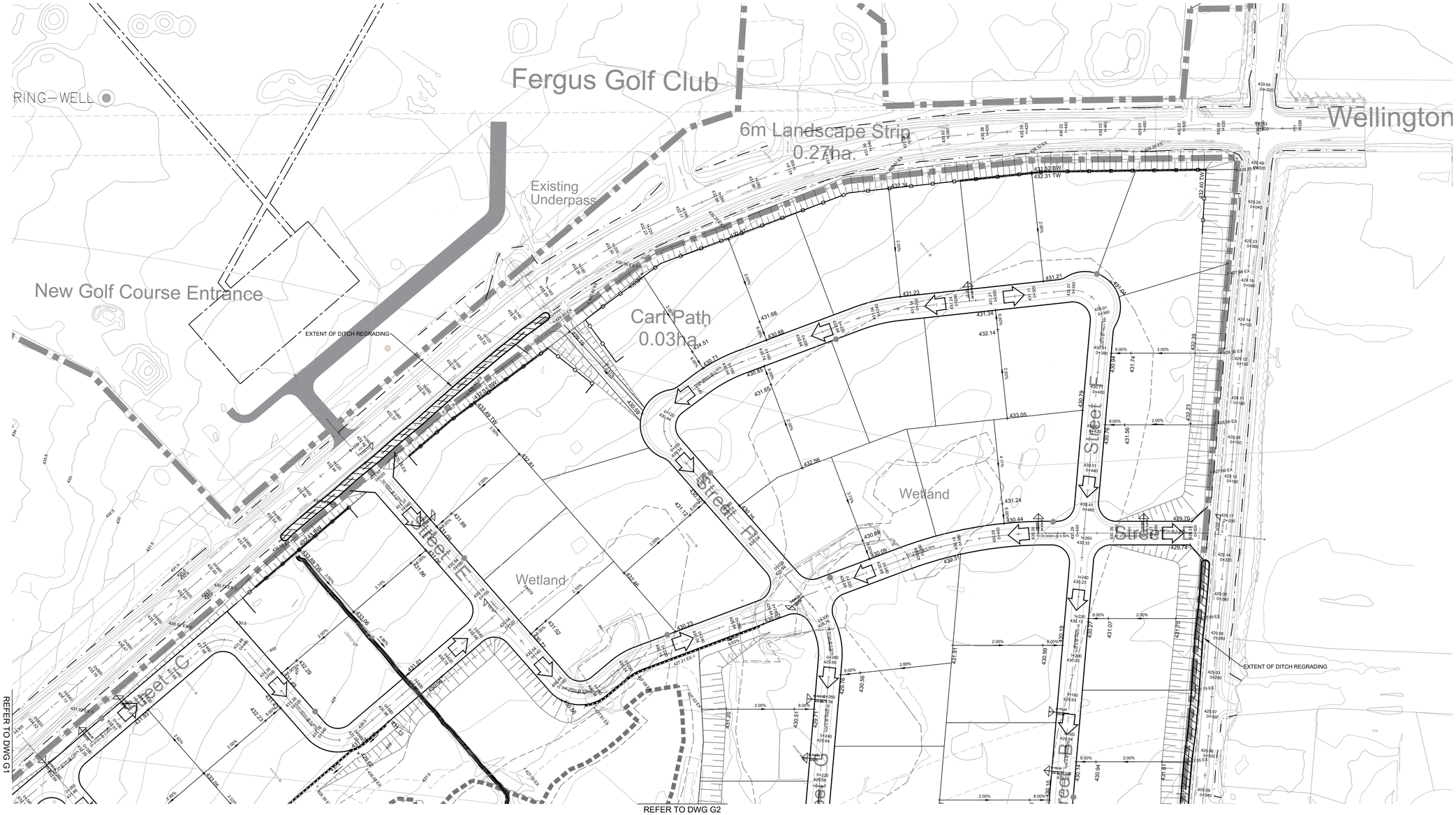
BURNSIDE

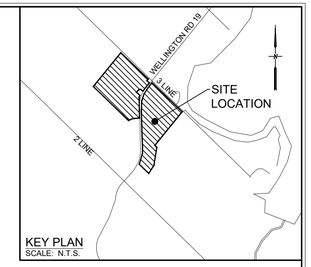
Client
**FERGUS DEVELOPMENT INC.**

Figure Title
**FERGUS GOLF COURSE**

GRADING PLAN

| Drawn | Checked | Date | Figure No. |
|---|---|---|---|
| BF | DN | 22/01/21 | G2 |
| Scale | | Project No. | |
| 1:1000 | | 300052719 | |




KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPERTY BOUNDARY
- EASEMENT
- EXISTING CONTOUR
- ×319.36 EX — EXISTING ELEVATION
- ×326.26 — PROPOSED ELEVATION
- 2.00% — PROPOSED SLOPE
- PROPOSED OVERLAND FLOW DIRECTION
- MAX. 3:1 SIDE SLOPES
- PROPOSED RETAINING WALL
- PROPOSED NOISE WALL (BY OTHERS)
- PROPOSED SWALE

LOT TYPES:

- F — FRONT DRAINAGE
- S — SPLIT DRAINAGE
- WO — WALK OUT LOT
- LO — LOOK OUT LOT

0 40 80 120 160
Metres

BURNSIDE

Client
**FERGUS DEVELOPMENT INC.**

Figure Title
**FERGUS GOLF COURSE**
GRADING PLAN

| Drawn | Checked | Date | Figure No. |
|---|---|---|---|
| BF | DN | 22/01/21 | G3 |
| Scale | | Project No. | |
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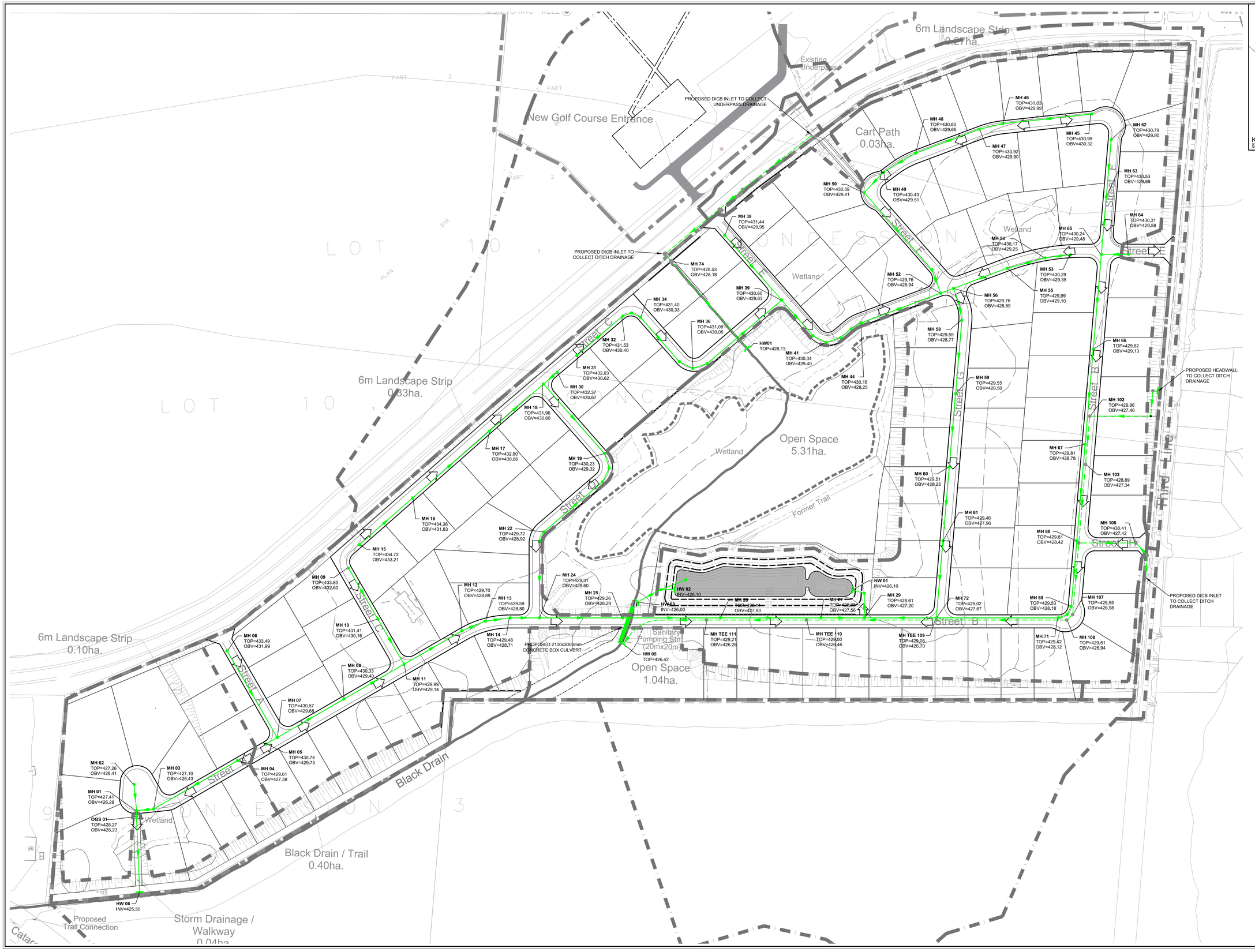


BURNSIDE

Client: **FERGUS DEVELOPMENT INC.**

Figure Title: **FERGUS GOLF COURSE**

PRELIMINARY STORM SERVICING PLAN

| Drawn | Checked | Date | Figure No. |
|---|---|---|---|
| BF | DN | 22/01/21 | **STM1** |
| Scale | | Project No. | |
| 1:1500 | | 300052719 | |

R.J. Burnside & Associates Limited