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FUNCTIONAL SERVICING REPORT

McLEOD MEADOWS City of Niagara Falls November 2024

INTRODUCTION

The proposed development of McLeod Meadows is located in the western limits of the City of Niagara Falls. The subject lands are located on the property known municipally as 9304 McLeod Road and includes the adjacent property located immediately west that does not have a municipal address. The subject property is situated south of McLeod Road, east of Beechwood Road, and west of a recently constructed development known as Forestview Estates. There is a tributary to Thompson Creek that traverses along the east boundary of the subject lands and separates the subject lands from the neighboring property (Forestview Estates) to the east.

The proposed 22.92 hectare development shall consist of approximately 149 single family lots, 201 street town units, 108 back to back town units and 86 reverse frontage street towns. The proposed development will be provided with full urban services including sanitary and storm sewers, watermain, asphalt road with concrete curb and gutters.

The objectives of this study are as follows:

- 1. Identify domestic water service needs for the site.
- 2. Identify sanitary servicing needs for the site.
- 3. Identify stormwater management needs for the site.

WATER SERVICING

There is an existing a 500mm diameter Regional watermain on north side of the McLeod Road and a 300mm diameter PVC Municipal watermain on south side of McLeod Road that extends to the entrance to the Forestview Estates Development on McLeod Road.

It is proposed to extend the existing 300mm diameter municipal watermain on McLeod Road westerly to the western limit of the site and construct an internal 200mm diameter watermain loop within the site with local 150mm diameter watermains off the proposed loop to provide both domestic water supply and fire protection for the proposed development. It is proposed to construct fire hydrants within the proposed development to provide adequate fire protection for the proposed units. The spacing and location of the proposed fire hydrants will be determined through detailed design.



SANITARY SERVICING

There is an existing 250mm dia. sanitary sewer stub located at the southeast limits of the subject lands that was designed and constructed as part of the construction of the Forestview Estates Development to service the subject lands. The existing sanitary sewer conveys the sanitary flows easterly through the Forestview Estates Development through a 300mm diameter sanitary sewer to an existing 375mm diameter sanitary sewer on the east side of Garner Road flowing southerly, and ultimately to a 525mm diameter trunk sanitary sewer flowing easterly from the intersection of Garner Road and Warren Woods Avenue to the Garner Road South West Pumping Station. It is proposed to construct a sanitary sewer network within subject lands to convey future sanitary flows from the proposed development to the existing 250mm diameter sanitary stub.

An Overall Sanitary Drainage Area Plan and Design Sheet was created as part of the submission for the Development of Forestview Estates to assess the available capacity in the 525mm diameter trunk sewer located at the intersection of Garner Road and Warren Woods Avenue and has been included in Appendix A. The subject lands were included in Drainage Area N1 and N2, as shown on the Drainage Area Plan as a mix of residential and industrial land use. However, the subject lands shall consist of entirely residential development. Therefore, the drainage area plan and design sheet have been revised to reflect the current draft plan of subdivision within the subject lands and have been included in Appendix B.

Drainage Area N2 has been revised to include the 24.12 ha Drainage Area from the subject lands, and a population of 1360 persons. Drainage Area N1 has been revised to include the remaining area of industrial land use on the west side of Beechwood Road.

The revised peak sanitary flow from areas N1 and N2 will be approximately 29.24 L/s, see Appendix B for the revised Sanitary Sewer Design Sheet. Therefore, the existing sanitary sewers shall have adequate capacity for the proposed development. A wet and dry weather flow analysis is required by the Region of Niagara to ensure the system has adequate capacity throughout the sanitary sewer's lifecycle. Table 1 shows the corresponding wet and dry weather sanitary flows generated from the site.



Table 1. Wet and Dry Weather Flow Analysis								
Residential Dry Weather Flow								
320 L/cap/day - 1360 persons	435,200 L/day							
Allowable Initial Leakage per OPSS.MUNI 410								
0.075 L/mm diameter/100m of sewer/hour - 250 mm dia, 720m total sewer length	3240 L/day							
Maximum End of Life Infiltration Allowance as Provided by the City of Niagara Falls								
0.286 L/s/ha – 24.12 <i>ha</i>	596,015 L/day							

STORMWATER MANAGEMENT

A separate Stormwater Management Plan has been prepared by Upper Canada Consultants (UCC) and has been enclosed in Appendix C for reference.



CONCLUSION AND RECOMMENDATIONS

Therefore, based on the above comments and design calculations provided for this site, the following summarizes the serving for this site:

- 1. The existing 300mm diameter municipal watermain on the McLeod Road will be extended to the west boundary of the site and will have sufficient capacity to provide both domestic and fire protection water supply.
- 2. The existing down stream sanitary sewer network will have adequate capacity for the proposed development.
- 3. Stormwater quantity and erosion controls can be provided by the proposed wetland facility up to and including 100 year design storm event.
- 4. Major overland flows are directed to the proposed Stormwater Management Facility.
- 5. Stormwater quality controls can be provided to MECP Enhanced protections levels (80% TSS Removal) by the proposed wetland facility.

Based on the above and the accompanying calculations, there exists adequate municipal servicing for this development. We trust the above comments and enclosed calculations are satisfactory for approval. If you have any questions or require additional information, please do not hesitate to contact our office.

Prepared By:

Zach Barber, E.I.T. November 5, 2024



Reviewed By:

al

Brendan Kapteyn, P. Eng. November 5, 2024

APPENDICES

APPENDIX A Existing Overall Sanitary Sewer Drainage Areas Existing Overall Sanitary Sewer Design Sheet



DESIGN FLOWS

RESIDENTIAL HEAVY INDUSTRIAL LIGHT INDUSTRIAL INFILTRATION RATE POPULATION PER UNIT

320 L/Capita/Day (NIAGARA FALLS AVERAGE DAILY FLOW)

3

15000 L/Hectare/Day (GARNER/SOUTHWEST SANITARY SERVICE AREA MUNICIPAL CLASS EA (ASSOCIATED ENGINEERING, 2005)) 12500 L/Hectare/Day (GARNER/SOUTHWEST SANITARY SERVICE AREA MUNICIPAL CLASS EA (ASSOCIATED ENGINEERING, 2005)) 0.18 L/s/Hectare (MOE FLOW ALLOWANCE IS BETWEEN 0.10 & 0.28 l/S/ha)

MUNICIPALITY: CITY OF NIAGARA FALLS **PROJECT:** GARNER ROAD RECONSTRUCTION

SANITARY SEWER DESIGN SHEET

			RESID	DENTIAL FL	OWS			INDUSTRIAL FLOWS				ACCUM	ULATED	PEAK FLOW		Ľ	DESIGN F	LOW			
		INCREMT	ACCUM				INC. HEAVY	ACC. HEAVY		INC. LIGHT	ACC. LIGHT			INFILT.	TOTAL	PIPE	PIPE	PIPE	FULL FLOW	FULL FLOW	
		RES.	RES.	INCREMT	TOTAL	PEAK	INDUSTRIAL	INDUSTRIAL	PEAK	INDUSTRIAL	INDUSTRIAL	PEAK	FLOW	FLOW	PEAK FLOW	LENGTH	DIAMETER	SLOPE	VELOCITY	CAPACITY	PERCENT
AREA ID	DESCRIPTION	AREA	AREA	(persons)	(persons)	FACTOR	AREA	AREA	FACTOR	AREA	AREA	FACTOR	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	(L/s)	CAPACITY
	Proposed Flow at Governing 525 Diameter Sanitary Sewer																				
N1	NORTH GARNER ROAD SAN									10.13	10.13	4.26	6.25	1.82	8.07		450	0.12	0.6	103.07	7.8%
N2	NORTH GARNER ROAD SAN	16.41	16.41	985	985	4.50					10.13	4.26	22.67	4.78	27.44		450	0.12	0.6	103.07	26.6%
N3	NORTH GARNER ROAD SAN	2.38	2.38	143	143	4.50							2.38	0.43	2.81		450	0.12	0.6	103.07	2.7%
N4	FORESTVIEW + EX DWELLINGS	20.98	39.77	755	1883	4.41					10.13	4.26	36.97	8.98	45.95		450	0.12	0.6	103.07	44.6%
S1	SOUTH GARNER ROAD SAN									34.46	34.46	3.48	17.37	6.20	23.57		300	0.22	0.6	47.34	49.8%
S2	SOUTH GARNER ROAD SAN						28.20	28.20	3.23		34.46	3.48	33.18	11.28	44.46		375	0.15	0.6	70.87	62.7%
S3	SOUTH GARNER ROAD SAN							28.20	3.23	7.78	42.24	3.35	36.31	12.68	48.99		375	0.15	0.6	70.87	69.1%
S4	SOUTH GARNER ROAD SAN									6.40	6.40	4.56	4.22	1.15	5.37		375	0.15	0.6	70.87	7.6%
S5	SOUTH GARNER ROAD SAN	0.90	0.90	6	6	4.50							0.10	0.16	0.26		375	0.15	0.6	70.87	0.4%
S6	SOUTH GARNER ROAD SAN		0.90		6	4.50				8.58	14.98	4.01	8.80	2.86	11.66		375	0.15	0.6	70.87	16.5%
W5	WARREN WOODS PH 5	18.97	59.64	1473	3362	3.92		28.20	3.23		67.35	3.06	94.45	27.93	122.38						
W3	WARREN WOODS PH 3	16.15	75.79	954	4316	3.73		28.20	3.23		67.35	3.06	105.25	30.84	136.09						
EX1	FUTURE EXTERNAL AREA	28.11	28.11	2574	2574	4.14							39.45	5.06	44.51						
W1+2	WARREN WOODS PH 1+2	21.37	49.48	957	3531	3.88							50.81	8.91	59.71						
W4-1	WARREN WOODS PH 4 STAGE 1	10.39	59.87	666	4197	3.75							58.34	10.78	69.12						
			135.66		8513	3.26		28.20	3.23		67.35	3.06	148.32	41.62	189.94		525	0.20	0.9	200.72	94.6%
																	525	0.14	0.8	167.94	113.1%

RESIDENTIAL PEAK FACTOR = $5/P^{0.2}$

where P = Populaton/1000and maximum peak factor is 4.5 INDUSTRIAL PEAK FACTORS DETERMINED USING THE MOE GUIDELINES

FROM THE DESIGN OF SANITARY SEWAGE SYSTEMS MANUAL (MOE, 1985)

APPENDIX B Future Overall Sanitary Sewer Drainage Areas Future Overall Sanitary Sewer Design Sheet



DESIGN FLOWS

RESIDENTIAL HEAVY INDUSTRIAL LIGHT INDUSTRIAL INFILTRATION RATE POPULATION PER UNIT

320 L/Capita/Day (NIAGARA FALLS AVERAGE DAILY FLOW) 15000 L/Hectare/Day (GARNER/SOUTHWEST SANITARY SERVICE AREA MUNICIPAL CLASS EA (ASSOCIATED ENGINEERING, 2005)) 12500 L/Hectare/Day (GARNER/SOUTHWEST SANITARY SERVICE AREA MUNICIPAL CLASS EA (ASSOCIATED ENGINEERING, 2005)) 0.18 L/s/Hectare (MOE FLOW ALLOWANCE IS BETWEEN 0.10 & 0.28 l/S/ha)

MUNICIPALITY: CITY OF NIAGARA FALLS **PROJECT:** 9304 MCLEOD ROAD

2.5

SANITARY SEWER DESIGN SHEET

			RESID	DENTIAL FL	OWS				INDUSTRI	AL FLOWS			ACCUM	ULATED I	PEAK FLOW		D	ESIGN FI	LOW		
		INCREMT	ACCUM				INC. HEAVY	ACC. HEAVY		INC. LIGHT	ACC. LIGHT			INFILT.	TOTAL	PIPE	PIPE	PIPE	FULL FLOW	FULL FLOW	
		RES.	RES.	INCREMT	TOTAL	PEAK	INDUSTRIAL	INDUSTRIAL	PEAK	INDUSTRIAL	INDUSTRIAL	PEAK	FLOW	FLOW	PEAK FLOW	LENGTH	DIAMETER	SLOPE	VELOCITY	CAPACITY	PERCENT
AREA ID	DESCRIPTION	AREA	AREA	(persons)	(persons)	FACTOR	AREA	AREA	FACTOR	AREA	AREA	FACTOR	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	(L/s)	CAPACITY
	Proposed Flow at Governing 525 Diameter Sanitary Sewer																				
N1	NORTH GARNER ROAD SAN									2.40	2.40	5.18	1.80	0.43	2.23		200	0.40	0.7	21.65	10.3%
N2	NORTH GARNER ROAD SAN	24.12	24.12	1360	1360	4.50					2.40	5.18	24.47	4.77	29.24		250	0.28	0.6	32.84	89.0%
N3	NORTH GARNER ROAD SAN	2.38	2.38	143	143	4.50						0.00	2.38	0.43	2.81		200	0.60	0.8	26.51	10.6%
N4	FORESTVIEW + EX DWELLINGS	20.98	47.48	630	2133	4.30					2.40	5.18	35.74	8.98	44.72		375	0.15	0.6	70.87	63.1%
S1	SOUTH GARNER ROAD SAN									34.46	34.46	3.48	17.37	6.20	23.57		250	0.28	0.6	32.84	71.8%
S2	SOUTH GARNER ROAD SAN						28.20	28.20	3.23			0.00	15.81	5.08	20.88		375	0.15	0.6	70.87	29.5%
S3	SOUTH GARNER ROAD SAN							28.20	3.23	7.78	7.78	4.43	20.80	6.48	27.27		375	0.15	0.6	70.87	38.5%
S4	SOUTH GARNER ROAD SAN									6.40	6.40	4.56	4.22	1.15	5.37		375	0.15	0.6	70.87	7.6%
S5	SOUTH GARNER ROAD SAN	0.90	0.90	6	6	4.50							0.10	0.16	0.26		375	0.15	0.6	70.87	0.4%
S6	SOUTH GARNER ROAD SAN		0.90		6	4.50				8.58	14.98	4.01	8.80	2.86	11.66		375	0.15	0.6	70.87	16.5%
W5	WARREN WOODS PH 5	18.97	67.35	1228	3367	3.92		28.20	3.23		25.16	3.68	78.13	21.73	99.86						
W3	WARREN WOODS PH 3	16.15	83.50	795	4162	3.76		28.20	3.23		25.16	3.68	87.17	24.63	111.80						
EX1	FUTURE EXTERNAL AREA	28.11	28.11	1406	1406	4.50							23.43	5.06	28.49						
W1+2	WARREN WOODS PH 1+2	21.37	49.48	798	2204	4.27							34.85	8.91	43.75						
W4-1	WARREN WOODS PH 4 STAGE 1	10.39	59.87	555	2759	4.08							41.71	10.78	52.48						
			143.37		6921	3.40		28.20	3.23		25.16	3.68	116.26	35.41	151.67		525	0.20	0.9	200.72	75.6%

RESIDENTIAL PEAK FACTOR = $5/P^{0.2}$

where P = Populaton/1000and maximum peak factor is 4.5 INDUSTRIAL PEAK FACTORS DETERMINED USING THE MOE GUIDELINES

FROM THE DESIGN OF SANITARY SEWAGE SYSTEMS MANUAL (MOE, 1985)

APPENDIX C Stormwater Management Plan. McLeod Meadows (UCC, 2024)

STORMWATER MANAGEMENT PLAN

McLEOD MEADOWS

CITY OF NIAGARA FALLS

Prepared by:

Upper Canada Consultants 30 Hannover Drive, Unit 3 St. Catharines, Ontario L2W 1A3

November 2024

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- Appendix B MIDUSS Output Files

REFERENCES

- 1. Stormwater Management Planning and Design Manual Ontario Ministry of Environment and Energy (March 2003)
- 2. Stormwater Quality Best Management Practices Ontario Ministry of Environment and Energy (June 1991)
- 3. MTO Drainage Management Technical Guidelines Ontario Ministry of Transportation (November 1989)
- 4. Engineering Design Guidelines Manual City of Niagara Falls (Amended January 2012)

STORMWATER MANAGEMENT PLAN

McLeod Meadows

CITY OF NIAGARA FALLS

1.0 INTRODUCTION

1.1 Study Area

The proposed development of McLeod Meadows is located in the western limits of the City of Niagara Falls. The subject lands are located on the property known municipally as 9304 McLeod Road and includes the adjacent property located immediately west that does not have a municipal address. As shown in Figure 1, Site Location Plan, the subject property is situated south of McLeod Road, east of Beechwood Road, and west of a recently constructed development known as Forestview Estates. There is a tributary to Thompson Creek that traverses along the east boundary of the subject lands and separates the subject lands from the neighboring property (Forestview Estates) to the east.

The approximately 22.92ha property will include associated asphalt roads, concrete curb, catch basins, storm sewers, sanitary sewers and watermain. The stormwater drainage areas evaluated in this Stormwater Management Plan consist primarily of the subject lands and an external area located north of the subject lands. All existing and future stormwater flows from the site outlet to Thompson Creek.

1.2 Objectives

The objectives of this study are as follows:

- 1. Establish specific criteria for the management of stormwater from this site.
- 2. Determine the impact of this development on the peak flows of from this site.
- 3. Investigate alternatives for controlling the quantity and quality of stormwater from this site.
- 4. Establish land requirements as part of the Draft Plan of Subdivision application for the subject lands.



1.3 Existing and Future Conditions

a) **Existing Conditions**

The site is presently vacant agricultural lands and historically contained a single residential family dwelling that has been demolished. The topography of the site conveys flows overland from north to south with three drainage outlets located at the southern portion of the property. Flows from the three drainage outlets ultimately converge and convey flows overland to Thompson Creek.

The native soils in the development areas of the subject lands consist mainly of lacustrine heavy clays. This soil type in the development and valley areas are classified as imperfectly drained and variably drained, respectively. This soil is classified in the Soil Conservation Service (SCS) classification method as belonging to hydrologic soil group C.

b) <u>Future Conditions</u>

This stormwater management plan will consider the proposed development under fully developed conditions. The proposed 22.92 hectare development shall consist of approximately 149 single family lots, 201 street town units, 108 back to back town units and 86 reverse frontage street towns. An existing reach of Thompson Creek is located along the east boundary of the subject lands. The proposed development will be provided with full urban services including sanitary and storm sewers, watermains, and asphalt roads with concrete curb and gutters.

2.0 STORMWATER MANAGEMENT CRITERIA

New developments are required to provide stormwater management in accordance with provincial and municipal policies including:

- Stormwater Quality Guidelines for New Development (MECP/MNR, May 1991)
- Stormwater Management Planning and Design Manual (MECP, March 2003)

The site currently outlets to three different outlets located on the southern boundary of the subject property, which convey flows south to Thompson Creek and ultimately the Welland River. The Welland River is classified as a Type 1 fish habitat where Thompson Creek outlets. Based on this fish habitat, the corresponding MECP Level of Protection for stormwater management quality practices is Enhanced.

Based on the above policies and site specific considerations, the following stormwater management criteria have been established for this site.

- a. Stormwater **quality** controls are to be provided for the more frequent storm events to provide Enhanced Protection in accordance with MECP guidelines.
- b. Stormwater **quantity** controls are to be provided as follows:
 - i. Erosion controls to be provided in accordance with MECP guidelines. The guidelines require the storm runoff from a 25mm rainfall event to be detained for 24 hours.
 - ii. Quantity controls will be provided to control future site peak flows to existing levels at the existing outlet for various storm events up to the 100 year design storm event.

3.0 STORMWATER ANALYSIS

Stormwater flows and volumes for the existing and future conditions were estimated using the MIDUSS computer modelling program. This program was selected because it is applicable to an urban drainage area like the study area. This program is relatively easy to use and modify for the future drainage conditions and control facilities, and it readily allows for the use of design storm hyetographs for the various return periods being investigated.

3.1 Design Storms

Design storm hyetographs were developed using a 4 hour Chicago distribution based on the City of Niagara Falls Intensity-Duration Frequency (IDF) Curves. The 25mm rainfall data is a generic design storm for the purpose of generating 25mm of rainfall over a 4 hour Chicago distribution. Table 1 summarizes the rainfall data.

Table 1. Rainfall Data									
Design Storm (Return	Dis	ers							
	Chicago	Duration (minutes)							
Period)	a	b	c						
25mm	512.00	6.00	0.800	240					
5 Year	719.50	6.34	0.769	240					
100 Year	1264.60	7.72	0.781	240					

Existing Conditions

The existing conditions were modelled to establish the stormwater peak flows and volumes prior to any development in this subwatershed. The existing stormwater drainage areas for this site are shown on Figure 2. There is an external drainage area EX1 located north of the subject lands which is comprised primarily of farm land that conveys flows overland southerly to the existing roadside ditches on McLeod Road. Flows from drainage area EX1 combine with the flows from Drainage Area A1 and flow through Thompson Creek to the southeastern limit of the site (Outlet A). Existing drainage area B1 flows through a series of local drainage ditches within the subject lands and outlets through a central ditch at the southern portion of the site (Outlet B). Existing Drainage Area C1 outlets to the existing road side ditch on the east side of Beechwood Road (Outlet C). Flows from all three outlets ultimately converge at Brown Road and continue to flow southerly as part of the Thompson Creek watercourse. Input parameters for the computer model for the existing conditions are shown in Table 2. Table 3 shows the stormwater peak flows and volumes generated by the various design storm events.

Proposed Conditions

It is proposed to convey overland stormwater flows from the proposed development to the existing ditch at the southern limits of the property and ultimately outlet to Outlet A. The proposed drainage areas for the development shown in Figure 3, were modelled to establish the stormwater peak flows and volumes once development has been completed.

External Drainage EX1 will continue to flow through Thompson Creek along the eastern limits of the subject lands. Flows from Drainage Area A10 will drain to Thompson Creek uncontrolled and will combine with the flows from the External Drainage Area EX1. Drainage Area A11 represents a majority of the proposed development. A conservatively assumed imperviousness value of 60% has been assumed for the future residential development. Drainage Area A11 will flow through the internal storm sewer system and outlet to the proposed Stormwater Management Facility (SWMF) (Block 215) located at the southern limits of the subject lands. Drainage Area A12 represents the proposed park block and SWMF block. Flows from Drainage Area A11 and A12 will combine with the flows from Drainage Areas EX1 and A10 and outlet at Outlet A. Drainage Area C10 represents flows from the proposed development that will continue to outlet to Beechwood Road uncontrolled (Outlet C).

	Table 2. Hydrologic Parameters											
Subcatchment No.	Area (ha)	Length (m)	Slope (%)	Impervious (%)	SCS CN							
	Existing Conditions											
EX1	54.29	605.0	1.0	3.0	74							
A1	15.89	325.5	1.0	1.5	74							
B1	5.72	195.3	1.0	1.0	74							
C1	2.29	123.6	1.0	4.4	74							
	78.19	Total Area										
		Future	Conditions									
EX1	55.61	610.0	1.0	4.0	74							
A10	2.46	130.0	1.0	10.0	74							
A11	16.32	330.0	1.0	60.0	74							
A12	2.96	140.0	1.0	10.0	74							
C10	0.84	123.6	1.0	18.0	74							
	78.19 Total Area											

Input parameters for the computer model for proposed development conditions are shown in Table 2. The results of this modelling are shown in Table 3 for the various design storm events.

Table 3. Peak Flow and Volume Comparisons											
Design	Pe	eak Flow (m	³ /s)	Volume (m ³)							
Storm	Existing	Future	Change	Existing	Future	Change					
Outlet A											
5 Year	0.356	1.947	+447%	6690	10246	+3556					
100 Year	1.378	3.499	+154%	17359	23235	+5876					
			Outlet B								
5 Year	0.047	0	-100%	519	0	-519					
100 Year	0.182	0	-100%	1377	0	-1377					
Outlet C											
5 Year	0.024	0.024	+0%	228	114	-114					
100 Year	0.091	0.046	-49%	581	257	-324					

As seen in Table 3, the future stormwater flows at Outlet B will be directed to Outlet A. Therefore, there will be no future stormwater flows from the proposed development outletting to Outlet B. However, there will be increased stormwater flows at Outlet A. As shown in Table 3, the future peak flows to Outlet A are increased above existing levels in the 5 and 100 year design storm event. Therefore, stormwater management quantity controls are required for the future stormwater flows discharging from the site to Outlet A. Future peak flows to Outlet C are reduced below existing levels and does not require quantity controls. The detailed MIDUSS modelling output files have been enclosed in Appendix B for reference.



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4.0 STORMWATER MANAGEMENT ALTERNATIVES

4.1 Screening of Stormwater Management Alternatives

A variety of stormwater management alternatives are available to control the quality of stormwater, most of which are described in the Stormwater Management Planning and Design Manual (MECP, March 2003). Alternatives for the proposed and ultimate developments were considered in the following broad categories: lot level, vegetative, infiltration, and end-of-pipe controls. General comments on each category are provided below. Individual alternatives for the proposed development are listed in Table 4 with comments on their effectiveness and applicability to the proposed outlet.

a) Lot Level Controls

Lot level controls are not generally suitable as the primary control facility for quality control. They are generally used to enhance stormwater quality in conjunction with other types of control facilities.

b) <u>Vegetative Alternatives</u>

Vegetative stormwater management practices are not generally suitable as the primary control facility for quality control. They are generally used enhance stormwater quality in conjunction with other types of control facilities.

c) <u>Infiltration Alternatives</u>

Where soils are suitable, infiltration techniques can be very effective in providing quantity and quality control. However, the very small amount of surface area on this site dedicated to permeable surfaces such as greenspace and landscaping make this an impractical option. Therefore, infiltration techniques will not be considered for this development.

d) End-of-Pipe Alternatives

Surface storage techniques can be very effective in providing quality and quantity control. Dry facilities are effective practices for stormwater erosion and flood control for large drainage areas.

Wet facilities are effective practices for stormwater erosion, quality and quantity control for large drainage areas.

Table 4. Evaluation of Stormwater Management Practices										
		Criteria fo Stormwater Man	or Implementation o agement Practices (of SWMP)						
McLeod Meadows	Topography	Soils	Bedrock	Groundwater	Area	Technical	Recommend			
	Variable	Silty Sand	At Considerable	At Considerable	Ħ	Effectiveness	Implementation			
Site Conditions	1 to 3%	±13.3mm/hr	Depth	Depth	19.28ha	(10 high)	Yes / No	Comments		
Lot Level Controls										
Lot Grading	<5%	nlc	nlc	nlc	nlc	2	Yes	Quality/quantity benefits		
Roof Leaders to Surface	nlc	nlc	nlc	nlc	nlc	2	Yes	Quality/quantity benefits		
Roof Ldrs.to Soakaway Pits	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 0.5 ha	6	No	Unsuitable site conditions		
Sump Pump Fdtn.	nla	nla	nla	nla	nla	2	No	Unquitable site conditions		
Drains	nic	nic	nic	nic	nic	Z	INO	Unsuitable site conditions		
Vegetative										
Grassed Swales	< 5 %	nlc	nlc	nlc	nlc	7	Yes	Quality/quantity benefits		
Filter Strips(Veg.										
Buffer)	< 10 %	nlc	nlc	>.5m Below Bottom	< 2 ha	5	No	Unsuitable site conditions		
Infiltration										
Infiltration Basins	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 5 ha	2	No	Unsuitable site conditions		
Infiltration Trench	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 2 ha	4	No	Unsuitable site conditions		
Rear Yard Infiltration	< 2.0 %	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 0.5 ha	7	No	Unsuitable site conditions		
Perforated Pipes	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	nlc	4	No	Unsuitable site conditions		
Pervious Catch basins	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	nlc	3	No	Unsuitable site conditions		
Sand Filters	nlc	nlc	nlc	>.5m Below Bottom	< 5 ha	5	No	High maintenance/poor aesthetics		
Surface Storage										
Dry Ponds	nlc	nlc	nlc	nlc	> 5 ha	7	No	No quality control		
Wet Ponds	nlc	nlc	nlc	nlc	> 5 ha	9	No	Very effective quality control		
Wetlands	nlc	nlc	nlc	nlc	> 5 ha	9	Yes	Very effective quality control		
Other										
Oil/Grit Separator	nlc	nlc	nlc	nlc	<2 ha	3	No	Limited benefit/area too large		

Reference: Stormwater Management Practices Planning and Design Manual - 1994 nlc - No Limiting Criteria

4.2 Selection of Stormwater Management Alternatives

Stormwater management alternatives were screened based on technical effectiveness, physical suitability for this site, and their ability to meet the stormwater management criteria established for proposed and future development areas. The following stormwater management alternatives are recommended for implementation on the proposed development:

- Lot grading to be kept as flat as practical in order to slow down stormwater and encourage infiltration.
- **Roof leaders to be discharged to the ground surface** in order to slow down stormwater and encourage infiltration.
- **Grassed swales** to be used to collect rear lot drainage. Grassed swales tend to filter sediments and slow down the rate of stormwater.
- A wetland facility is proposed to be constructed to provide stormwater quality enhancement for frequent storms and quantity controls up to and including the 100 year design storm event.

5.0 STORMWATER MANAGEMENT PLAN

5.1 Proposed Stormwater Management Facility

5.1.1 Stormwater Quality

The stormwater drainage outlet for the proposed development is Thompson Creek and ultimately the Welland River which has been identified by the Ministry of Natural Resources watercourse evaluation as Type 1 fish habitat. Therefore, the minimum level of protection from the subjects lands is Enhanced protection (80% TSS Removal).

Based on Table 3.2 of SWMP & Design Manual, the water quality storage requirement is approximately $101m^3$ /ha for wetland facilities providing *Enhanced* protection for developments with 52% impervious areas. The drainage area requiring stormwater quality improvement draining to the proposed facility is 19.28 hectares. The storage volumes required for this proposed facility are shown in Table 5.

Table 5. Stormwater Quality Volume Calculations								
Total Water Quality VolumeReference: Table 3.2, SWMP & Design Manual= 19.28 ha x 101 m³/ha(MECP 2003)= 1947 m³								
Permanent Pool Volume = $19.28 \text{ ha x } 61 \text{ m}^3/\text{ha}$ = 1176 m^3	Extended Detention Volume = $19.28 \text{ ha x } 40 \text{ m}^3/\text{ha}$ = 771 m^3							

5.1.2 Stormwater Quantity Control

As shown in the previous Table 3, stormwater management quantity controls are required to reduce future peak flows from the development area to existing levels up to and including the 100-year design storm event. The stormwater peak flows from the proposed development shall be reduced to the existing levels by providing stormwater quantity storage. It is proposed to construct a control structure outlet to reduce the peak stormwater flows outletting from the proposed wetland facility.

5.1.3 Stormwater Management Facility Configuration

It is proposed to construct a two-stage outlet to provide the required stormwater quantity controls. The first stage of control consists of a reverse slope pipe acting as an orifice to control future stormwater flows generated from frequent storm events. The second stage of control consists of an outlet weir which provides an outlet for flows exceeding the required extended detention volume. An emergency spillway will provide an outlet for major storm events.

The top of the permanent pool is at an elevation of 179.50m and the bottom of the permeant pool is at an elevation of 179.20m for a depth of 0.3m. At the proposed outlet, a 1.0m deep pool is also provided (Bottom of the deep pool is 178.20m). The area of the deep pool is $1,100m^2$, which is 22% of the total permanent pool area $(5,053m^2)$ and less than the maximum permissible area of 25%. The configuration of the facility provides $2,313m^3$ of permanent pool volume, which is more than the required $1,176m^3$. The proposed top of pond is at an elevation of 181.00m, providing a total active storage volume of $12,977m^3$.

Based on the proposed configuration of the proposed facility, it was determined that a 100mm diameter reverse slope pipe, functioning as an orifice with an invert of 179.50m within the ditch inlet, provides 92.2 hours of detention which is greater than the minimum 24 hours required in accordance with MECP guidelines. The ditch inlet catch basin will be located at an elevation of 180.80m and a 450mm diameter outlet pipe within the ditch inlet catch basin will have an invert of 179.50m and will outlet to Thompson Creek. An overflow spillway at an elevation of 180.85 will provide an outlet during extreme storm events. A stage-storage-discharge relationship was determined for the facility and is included in Appendix A.

Overland flows from the subject lands shall be directed to the proposed stormwater management facility through the proposed internal roadways. The preliminary foot print of the proposed wet pond facility is shown in Figure 4.

A sediment forebay was designed to minimize the transport of heavy sediment through the facility to Thompson Creek and to localize future maintenance activities. Calculations for the forebay sizing follow MECP Guidelines and are shown in Table 6.

Ta	ble 6. S	tormv	vater Man	agement	t Facility F	Forebay Sizing
a) Forebay Settling Lengt	h (MOE	SWN	IP&D, Equ	ation 4.5	j)	
			r =	3.5	:1	(Length:Width Ratio)
Settling Length = $\sqrt{\left(\frac{r}{r}\right)}$	$\frac{Y \times Q}{V}$		$Q_p =$	0.01	m^3/s	(25mm Storm Pond Discharge)
	v_s /		$V_s =$	0.0003	m/s	(Settling Velocity)
Settling Length =	10.87	m				
b) Dispersion Length (MO	OE SWN	ИР&D	, Equation	4.6)		
	0 × 0		Q =	1.601	m ³ /s	(5 Yr Stm Sew Design Inflow)
Dispersion Length =	$\frac{0 \times Q}{D \times V_c}$		D =	1.50	m	(Depth of Forebay)
	$D \land V_f$		$V_{f} =$	0.5	m/s	(Desired Velocity)
Dispersion Length =	17.08	m				
c) Minimum Forebay Dee	ep Zone	Botto	m Width (N	AOE SW	MP&D), E	Equation 4.7)
Min. Foreba	ay Leng	th				
$W tath = \frac{8}{8}$			17.08	m	(minimum required length)	
Width =	2.13	m	(minimum	required	l width)	
d) Average Velocity of Fl	low					
			Q =	0.907	m^3/s	(25mm Storm Design Inflow)
	0		A =	24.30	m^2	(Cross Sectional Area)
Average Velocity = -	$\frac{Q}{A}$		D =	1.50	m	(Depth of Forebay)
			W =	11.70	m	(Proposed Bottom Width)
			SS =	3	:1	(Side Slopes - Minimum)
Average Velocity =	0.04	m/s	_			
Is this Acceptable?	Yes		(Maximur	n velocity	y of flow =	0.15 m/s)
c) Cleanout Frequency						
Is this Acceptable?	Yes		L =	41.5	m	(Proposed Bottom Length)
			ASL =	1.7	m ³ /ha	(Annual Sediment Loading)
			A =	19.28	ha	(Drainage Area)
			FRC =	80	%	(Facility Removal Efficiency)
			FV =	1148.2	m ³	(Forebay Volume)
Cleanout Frequency =	43.7	Yea	rs			
Is this Acceptable?	Yes		(10 Ye	ar Minin	num Cleano	out Frequency)

Table 7 summarizes the peak flows discharging to and from the proposed wet pond facility in the 5 and 100 year design storm event. As shown in the below table, the maximum wet pond elevation reaches 180.51m, with utilized active storage volume of 8,023 m^3 for the 100 year design storm event.

Table 7. Stormwater Management Wet Pond Facility Characteristics							
Design	Peak Flo	ws (m ³ /s)	Maximum	Maximum			
Storm (Return Period)	Inflow	Outflow	Elevation (m)	Volume (m ³)			
5 Year	1.601	0.016	180.62	4,075			
100 Year	2.677	0.022	180.51	8,023			

Table 8	Table 8. Impacts of Wet Pond Facility on Future Peak Flows at Outlet A						
Design		Peak Flow (m ³ /s)					
Storm	Existing	Future with SWM	Change*				
5 Year	0.356	0.353	-0.8%				
100 Year	1.378	1.091	-21%				
Note: *indi wit	icates the percent chang h stormwater managem	ge between existing condition tent controls in place.	ns and future conditions				

As shown in Table 8 above, the proposed stormwater management facility can provide adequate stormwater quantity controls to reduce future peak stormwater flows below existing levels to Outlet A up to and including the 100 year design storm event.



DRAWING FILE: F:\2054\SWM\2054_SWM BASE.dwg PLOTTED: Nov 04, 2024 - 8:36am PLOTTED BY: zachb

6.0 SEDIMENT AND EROSION CONTROL

Sediment and erosion controls are required during construction. The proposed extended detention facilities can be used for this purpose. Therefore, the proposed constructed wet pond facilities should be constructed prior to development of the remainder of the site. Runoff from the site can then be directed to the facility for sediment control during construction. Following construction, the accumulated sediments will be removed from the facilities and disposed at an appropriate dumping location.

The following additional erosion and sediment controls will also be implemented during construction:

- Install silt control fencing along the limits of construction where overland flows will flow beyond the limits of the development or into a downstream watercourse.
- Re-vegetate disturbed areas as soon as possible after grading works have been completed.
- Lot grading and siltation controls plans will be provided with sediment and erosion control measures to the appropriate agencies for approval during the final design stage.

7.0 STORMWATER MANAGEMENT FACILITY MAINTENANCE

7.1 Wetland Facility

Maintenance is a necessary and important aspect of urban stormwater quality and quantity measures such as constructed wetlands. Many pollutants (i.e. nutrients, metals, bacteria, etc.) bind to sediment and therefore removal of sediment on a scheduled basis is required.

The wetland for this development is subject to frequent wetting and deposition of sediments as a result of frequent low intensity storm events. The purpose of the wetland is to improve post development sediment and contaminant loadings by detaining the 'first flush' flow for a 24-hour period. For the initial operation period of the stormwater management facility, the required frequency of maintenance is not definitively known and many of the maintenance tasks will be performed on an 'as required' basis. For example, during the home construction phase of the development there will be a greater potential for increased maintenance frequency, which depends on the effectiveness of sediment and erosion control techniques employed.

Inspections of the wetland will indicate whether or not maintenance is required. Inspections should be made after every significant storm during the first two years of operation or until all development is completed to ensure the wet pond is functioning properly. This may translate into an average of six inspections per year. Once all building activity is finalized, inspections shall be performed annually. The following points should be addressed during inspections of the facility.

- a) Standing water above the inlet storm sewer invert a day or more after a storm may indicate a blockage in the reverse slope pipe or orifice. The blockage may be caused by trash or sediment and a visual inspection would be required to determine the cause.
- b) The vegetation around the wet pond should be inspected to ensure its function and aesthetics. Visual inspections will indicate whether replacement of plantings are required. A decline in vegetation habitat may indicate that other aspects of the constructed wetland are operating improperly, such as the detention times may be inadequate or excessive.
- c) The accumulation of sediment and debris at the wetland inlet sediment forebay or around the high-water line of the wetland should be inspected. This will indicate the need for sediment removal or debris clean up.
- d) The wetland has been created by excavating a detention area. The integrity of the embankments should be periodically checked to ensure that it remains watertight and the side slopes have not sloughed.

Grass cutting is a maintenance activity that is done solely for aesthetic purposes. It is recommended that grass cutting be eliminated. It should be noted that municipal by-laws may require regular grass maintenance for weed control.

Trash removal is an integral part of maintenance and an annual clean-up, usually in the spring, is a minimum requirement. After this, trash removal is performed as required basis on observation of trash build-up during inspections.

To ensure long term effectiveness, the sediment that accumulates in the forebay area should be removed periodically to ensure that sediment is not deposited throughout the facility. For sediment removal operations, typical grading/excavating equipment should be used to remove sediment from the inlet forebay and detention areas. Care should be taken to ensure that limited damage occurs to existing vegetation and habitat.

Generally, the sediment which is removed from the detention pond will not be contaminated to the point that it would be classified as hazardous waste. However, the sediment should be tested to determine the disposal options.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this study, the following conclusions are offered:

- Infiltration techniques are not suitable for this site as the primary control facility due to the low soil infiltration rates and the large drainage area for this development.
- Roof water leaders shall discharge to grade to enhance future infiltration levels.
- The proposed stormwater management wetland facility will provide stormwater quality and quantity controls for the approximately 19.28 hectare catchment area.
- Various lot level vegetative stormwater management practices can be implemented to enhance stormwater quality.
- This report was prepared in accordance with the provincial guidelines contained in "Stormwater Management Planning and Design Manual, March 2003".

The above conclusions lead to the following recommendations:

- That the stormwater management criteria established in this report be accepted.
- That a stormwater management wetland facility be constructed to provide stormwater quality protection to MECP Enhanced Protection levels and quantity controls up to and including the 100 year design storm event, as outlined in this report.
- That additional lot level controls and vegetative stormwater management practices as described previously in this report be implemented.
- That sediment and erosion controls during construction as described in this report be implemented.

Prepared By:

Zach Barber, E.I.T. November 4, 2024



Reviewed By:

Brendan Kapteyn, P. Eng. November 4, 2024

APPENDICES

APPENDIX A Stormwater Management Facility Calculations

Upper Cana	ada Consult	ants											
3-30 Hanno [,]	ver Drive												
St. Catharin	aes, ON, L2	W 1A3											
PROJECT I	NAME:	McLeod	l Meadows										ļ
PROJECT I	NO.:	2054											
				PROPC	JSED CONS	STRUCTED) WETLA	AND CAI	CULATION	NS			
Quality Req	uirements			Quality	y Orifice	(Jutlet Wei r	r	Overflow	/ Spillway	Out	flow Pipe Or	rifice
Drainage	Area (ha) =	- 19.28		Diameter (m) =	- 0.100	Perimeter Le	ength(m) =	0.60	Length (m) =	= 8.00	Γ)iameter (m) =	= 0.450
Enhance	ed (m3/ha) =	- 101		Cd =	0.65	Inlet Elev:	ation $(m) =$	$= 180.80 \qquad \text{Slopes (X:1)} = 5.00 \qquad \text{Cd} = 0.65$			= 0.65		
Perm Poo	ol (m3/ha) =	- 61		Invert (m) =	179.50				Invert (m) =	= 180.85		Invert (m) =	= 179.50
Perm Pool	l Vol (m3) =	- 1,176			Pond	Drawdown Ti	ime Calcul	ation (MO	E, 2003)			Obvert (m) =	= 179.95
Acti	ve Vol (m3)) 771			25mm	1 Event Water	Surface Ele	vation (m) =	= 179.79		Тор	of Pipe (m) =	= 180.05
25mm MO	E Volume =	- 2,017			MOE Equat	ion 4.11 Draw	down Coeff	ficient 'C2' =	= 3,044				ļ
Water L	Level Elev. =	179.50	m		MOE Equat	ion 4.11 Draw	down Coeff	ficient 'C3' =	= 6,365				
					MOF	Equation 4.11	l Drawdowi	n Time (h) =	= 92.2				!
	. ,		C C	Average	T (D (D:/ 1	Max	2		. !
The other	Increment	Active	Surface	Surface	Increment	Permanent	Active	Quality	Ditch	Pipe	Overflow	Total	Average
Elevation	Deptn	Depth	Area	Area	volume	volume	Volume	(m3/c)	(m ³ /s)	(m_3/s)	Spillway	(m_3/s)	Discharge
178.20	(11)	<u> </u>	<u> </u>	(1112)	(1115)	(ms)	(1115)	(1113/8)	(1113/8)	(1113/8)	(1113/8)	(1115/8)	(1113/8)
Deen	0.50	-1.50	027	744	372	U							
178.70	0.20	-0.80	859	,	512	372							
Deep	0.50	0.00	007	980	490	512							
170.20		0 30	1 100			867	ļ	í	Deen	Dool Surface	$a \operatorname{Area}(m^2) =$	1 100	٦ '
1/7.40		-0.50	1,100			002		T	. LD	P 10 . C	$rac{1}{r}$ Area (m) –	1,100	
170.20		0.20	4 (17			9(2)		10	otal Permanent	Pool Surface	$e \operatorname{Area} (\mathbf{m}) =$	5,053	
1/9.20	0.20	-0.30	4,017	4.925	1 450	862	ļ	I	Deep Pool Area	1 Coverage (2	25% MAA) =	22%0	_ _ /
Perm 170 50	0.30	0.00	5 052	4,835	1,450	2 2 1 2							
1/9.50		0.00	3,035			2,313							
I													
179.50		0.00	6 373				0	0.000	0.000	0.000	0.000	0.000	
Active	0.30	0.00	0,575	6.825	2.048		U	0.000	0.000	0.000	0.000	0.000	0.005
179.80	0.20	0.30	7,277	0,020	2,010		2.048	0.011	0.000	0.051	0.000	0.011	0.000
Active	0.30	0.2 0	· ,= · ·	7,729	2,319		_,• • •			···	0.022	0.0	0.014
180.10		0.60	8,180	- /	2-		4,366	0.017	0.000	0.251	0.000	0.017	-
Active	0.30		·	8,639	2,592		*						0.019
180.40		0.90	9,098				6,958	0.021	0.000	0.355	0.000	0.021	
Active	0.30			9,563	2,869								0.022
180.70		1.20	10,029				9,827	0.024	0.000	0.434	0.000	0.024	
Active	0.30			10,502	3,150								0.494
181.00		1.50	10,974				12,977	0.027	0.092	0.502	0.845	0.964	
													
Notes	1. Quality (Orifice flo	w is the orif	fice controlling fo	or the 24 hour d	etention period	l and uses a	n orifice for	rmula.				
	2. Pipe Ori	fice flow i	is calcuated	using an orifice f	ormula on the r	pipe from the d	itch inlet to	the outlet a	and uses the tota	al head on the	orifice.		
1	3 Overflox	w Wair flc	wie onloule	ted using a trange	zondial wair to	convey outflor	v for lose fre	anient storr	ne through the e	ambankment i	with an amarga	now amillurow	

Overflow Weir flow is calculated using a trapezondial weir to convey outflow for less frequent storms through the embankment with an emergency spillway.
 Total Outflow is calculated by adding the Overflow Spillway with the lowest of Quality Orifice plus Ditch Inlet or Max Pipe Orifice.

APPENDIX B MIDUSS Output Files

B-1. Existing Conditions

11 50	Output File (4.7) EX.OUT opened 2024-10-08	
11:53	Units used are defined by $G = 9.810$	
	24 144 10.000 are MAXDT MAXHYD & DTMIN values	
35	Licensee: UPPER CANADA CONSULTANTS COMMENT	
	4 line(s) of comment	
	STORMWATER MANAGEMENT PLAN MCLEOD ROAD FRUITBELT	
	CITY OF NIAGARA FALLS	
14	START	
35	1 1=Zero; 2=Define	
55	3 line(s) of comment	
	*********** 5-YEAR STORM EVENT	

2	<pre>STORM 1 l=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic</pre>	
	719.500 Coefficient a	
	6.340 Constant b (min) .769 Exponent c	
	.450 Fraction to peak r	
	41.683 mm Total depth	
3	IMPERVIOUS 1 Option 1=SCS CN/C: 2=Horton: 3=Green-Ampt: 4=Beneat	
	.015 Manning "n"	
	98.000 SCS Curve No or C 100 Ta/S Coefficient	
	.518 Initial Abstraction	
35	COMMENT 3 line(s) of comment	

	Area EXI AND AI to Outlet A	
4	CATCHMENT	
	54.290 Area in hectares	
	605.000 Length (PERV) metres	
	3.000 Per cent Impervious	
	605.000 Length (IMPERV) .000 %Imp. with Zero Dpth	
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	74.000 SCS Curve No or C	
	.100 Ia/S Coefficient	
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv	
	.259 .000 .000 .000 c.m/s 211 875 231 C perv/imperv/total	
15	ADD RUNOFF	
4	.259 .259 .000 .000 c.m/s CATCHMENT	
	1.000 ID No.6 99999	
	325.500 Length (PERV) metres	
	1.000 Gradient (%) 1.530 Per cent Impervious	
	325.500 Length (IMPERV)	
	.000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250 Manning "n"	
	.100 Ia/S Coefficient	
	8.924 Initial Abstraction Option 1=Trianglr: 2=Rectanglr: 3=SWM HYD: 4=Lin Reserv	
	.102 .259 .000 .000 c.m/s	
15	.211 .869 .221 C perv/imperv/total ADD RUNOFF	
07	.102 .356 .000 .000 c.m/s	
21	5 is # of Hyeto/Hydrograph chosen	
1.4	Volume = .6690148E+04 c.m START	
	1 1=Zero; 2=Define	
35	COMMENT 3 line(s) of comment	

4	CATCHMENT 2.000 ID No.6 99999	
	5.720 Area in hectares	
	195.300 Length (FERV) metres 1.000 Gradient (%)	
	1.000 Per cent Impervious	
	.000 %Imp. with Zero Dpth	
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 250 Manning "n"	
	74.000 SCS Curve No or C	
	8.924 Initial Abstraction	
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv	
	.211 .871 .218 C perv/imperv/total	
15	ADD RUNOFF .047 .047 .000 .000 cm/s	
27	HYDROGRAPH DISPLAY	
	<pre>> 1s # of Hyeto/Hydrograph chosen Volume = .5186454E+03 c.m</pre>	
14	START 1 l=Zero: 2=Define	
35	COMMENT	
	J Line(s) of comment	

Area C1 to Outlet C ***** 4 CATCHMENT NT ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triandlr; 2=Rectanglr; 3=SWM HYD; 4=L; CATCHN 3.000 2.290 123.600 1.000 4.410 123.600 .000 .250 .100 8.924 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. .024 .000 .000 .000 c.m/s .211 .856 .239 C perv/imperv/total ADD RUNOFF .024 .000 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .2285447E+03 c.m START 1 1=Zero; 2=Define COMMENT Reserv 15 27 14 COMMENT 3 line(s) of comment ********** 35 100-YEAR STORM EVENT ***** 2 STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Constant b (min) Exponent c Fraction to peak r Duration 6 240 min 68.280 mm Total depth 1264.600 7.720 .781 .450 240.000 IMPERVIOUS 3 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" 1 .015 98.000 SCS Curve No or C Ia/S Coefficient .100 Initial Abstraction 35 COMMENT 3 line(s) of comment Area EX1 AND A1 to Outlet A 4 CATCHMENT CATCHM 10.000 54.290 605.000 1.000 3.000 605.000 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trional: 2=Destances 2=CSM HVD: 4-L .000 .250 74.000 .100 8.924 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .000 .000 .000 c.m/s .918 .364 C perv/imperv/total .998 .998 .347 ADD RUNOFF .998 CATCHMENT 15 .998 .000 .000 c.m/s 4 CATCHMENT 1.000 ID No.ó 99999 15.890 Area in hectares 25.500 Length (PERV) metres 1.000 Gradient (%) 1.530 Per cent Impervious 25.500 Length (IMPERV) 0.000 % Imp with Gare Park 15.890 325.500 1.000 1.530 325.500 Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. .250 74.000 .100 8.924 1 Reserv .000 c.m/s C perv/imperv/total 15 .000 c.m/s 27 START 1 1=Zero; 2=Define 14 1 COMMENT 3 line(s) of comment 35 Area B1 to Outlet B ******** 4 CATCHMENT CATCHN 2.000 5.720 195.300 1.000 1.000 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction 195.300 .000 .250 74.000 .100 8.924 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv

	.182	.000	.000	.000 c.m/s	
	.347	.901	.353	C perv/imperv/total	
15	ADD RUNOFF			* *	
	.182	.182	.000	.000 c.m/s	
27	HYDROGRAPH	DISPLAY			
	5 is#o	f Hyeto/Hydrogr	aph chosen		
	Volume =	.1377275E+04 c.1	m		
14	START				
	1 1=Zero	; 2=Define			
35	COMMENT				
	3 line(s) of comment			

	Area Cl to	Outlet C			

4	CATCHMENT				
	3.000 I	D No.ó 99999			
	2.290 A	rea in hectares			
	123.600 L	ength (PERV) me	tres		
	1.000 G	radient (%)			
	4.410 P	er cent Impervi	ous		
	123.600 L	ength (IMPERV)			
	.000 %	Imp. with Zero	Dpth		
	1 0	ption 1=SCS CN/	C; 2=Horto	n; 3=Green-Ampt; 4=Repeat	
	.250 M	anning "n"			
	74.000 S	CS Curve No or (С		
	.100 I	a/S Coefficient			
	8.924 I	nitial Abstract	ion		
	1 0	ption l=Triangl	r; 2=Recta	nglr; 3=SWM HYD; 4=Lin. Res	erv
	.091	.000	.000	.000 c.m/s	
	.347	.909	.372	C perv/imperv/total	
15	ADD RUNOFF				
	.091	.091	.000	.000 c.m/s	
27	HYDROGRAPH	DISPLAY			
	5 is#o	1 Hyeto/Hydrogr	aph chosen		
	Volume =	.5813171E+03 c.1	m		
20	MANUAL				

B-2. Future Conditions without SWM

	Output Fi	le (4.7)	FUT.OUT	opene	d 2024-11-04	9:13	
	24	144 10	0.000	are MA	XDT MAXHYD & D	TMIN values	3
35	Licensee: COMMENT 4 line	UPPER CA	ANADA CONSU	JLTANTS			
	STORMWATE MCLEOD RO CITY OF N	R MANAGEM AD FRUITE IAGARA FA	MENT PLAN BELT ALLS				
25	FUT CONDI	TIONS					
35	COMMENT 3 line	(s) of co	omment				
	******** 5_VFND 97	** ODM EVENT	-				
	*******	**					
2	STORM 1	1=Chicac	10.2=H11ff.3	R=IIser·4=	Cdnlbr.5=Histor	ric	
	719.500	Coeffici	lent a				
	6.340 .769	Exponent	:b (m: :c	.n)			
	.450	Fraction	to peak	r			
	240.000	41.683 mm	n 0 240 mi n Total	ln L depth			
3	IMPERVIOU 1	S Ontion 1	=SCS CN/C	2=Horto	n: 3=Green-Amo	t. 4=Reneat	
	.015	Manning	"n"	2 1101 000	iii, o oreen iimp	c, i nopeut	-
	98.000	SCS Curv Ia/S Coe	ve No or C efficient				
25	.518	Initial	Abstractic	on			
35	COMMENT 3 line	(s) of co	omment				
	********	**	010 +- (
	*******	**	- 010 10 0	Juliel C			
4	CATCHMENT	τρ Νο ό	99999				
	.840	Area in	hectares				
	123.600	Gradient	(PERV) meti : (%)	ces			
	18.000	Per cent	: Imperviou	1S			
	.000	%Imp. wi	(IMPERV) th Zero Dp	oth			
	250	Option 1 Manning	=SCS CN/C;	2=Horto	n; 3=Green-Ampt	t; 4=Repeat	
	74.000	SCS Curv	ve No or C				
	.100 8.924	Ia/S Coe Initial	Abstractic	on			
	1	Option 1	=Trianglr;	2=Recta	nglr; 3=SWM HYI	D; 4=Lin. P	leserv
	.0	11	.856	.327	C perv/imperv	v/total	
15	ADD RUNOF	F 24	024	000	000 c m/s		
27	HYDROGRAP	H DISPLAY					
	5 is #	of Hyeto	/Hydrograp	ph chosen			
	VOTUME -	.114526)/E+U3 C.M				
14	START	.114526	5/E+U3 C.M				
14 35	START 1 1=Ze COMMENT	.114526 ro; 2=Def	ine				
14 35	START 1 1=Ze COMMENT 3 line	.114526 ro; 2=Def (s) of co	fine				
14 35	START 1 1=Ze COMMENT 3 line ********* Uncontrol	.114526 ro; 2=Def (s) of cc ** led Areas	ine mment				
14 35 4	START 1 1=Ze COMMENT 3 line ********* Uncontrol ********* CATCHMENT	.114526 ro; 2=Def (s) of co ** led Areas **	Sine Sine S				
14 35 4	START 1 1=Ze COMMENT 3 line ********* Uncontrol ********* CATCHMENT 1.000 55.610	.114526 ro; 2=Def (s) of co ** led Areas ** ID No.ó	99999 bactares				
14 35 4	START 1 1=Ze COMMENT 3 line ******** Uncontrol ******** CATCHMENT 1.000 55.610 610.000	III4526 ro; 2=Def (s) of cc ** led Areas ** ID No.ó Area in Length (999999 hectares (PERV) metr	ces			
14 35 4	START START 1 1=Ze COMMENT 3 1ine ********* CATCHMENT 1.000 55.610 610.000 1.000 4.000	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.ó Area in Length (Gradient Per cent	<pre>>/E+U3 C.m ine omment 99999 hectares (PERV) metr : (%) Imperviou</pre>	15			
14 35 4	START 1 1=2e COMMENT 3 line ********* CATCHMENT 1.000 55.610 610.000 1.000 4.000 610.000	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.ó Area in Length (Gradient Per cent Length (99999 hectares (%) Imperviou (MPERV)	res 15			
14 35 4	COMMENT START 1 1=2e COMMENT 3 line ********* Uncontrol ********* CATCHMENT 1,000 55.610 610.000 1,000 610.000 1	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.ó Area in Length (Gradient Per cent Length (%Imp. wi	<pre>System 2 = Social System 2 = Social System</pre>	res 15 Dth : 2=Horto:	n; 3=Green-Amp	t; 4=Repeat	-
14 35 4	START 1 1=2e START 1 1=2e COMMENT 3 line ********* Uncontrol ********* CATCHMENT 1.000 55.610 610.000 1.000 610.000 .000 1.250 74.000	.114526 ro; 2=Def (s) of cc ** ID No.ó Area in Length (Gradient Per cent Length (%Imp. wi Option 1 Manning SCS Curv	<pre>System System Syst</pre>	res 18 xth : 2=Horto	n; 3=Green-Amp	t; 4=Repeat	-
14 35 4	START START 1 1=2e COMMENT 3 line Uncontrol 	.11452¢ ro; 2=Def (s) of cc ** led Areas ** ID No.ó Area in Length (Gradient Per cent Length (%Imp, wi %Imp, wi SCS Currur IA/S Coe	99999 hectares (PERV) metric (N) impervion (IMPERV) th Zero Dp =SCS CN/C; "n" re No or C efficient	res 15 Yth : 2=Horto:	n; 3=Green-Ampi	t; 4=Repeat	1
14 35 4	START START 1 1=2e COMMENT 3 line Uncontrol ******* CATCHMENT 1.000 55.610 610.000 1.000 610.000 .250 74.000 .100 8.924 1	.11452¢ ro; 2=Def (s) of cc ** led Areas ** ID No.ó Area in Length (Gradient Per cent Length (%IMP, wi Option 1 Manning SCS Curri Ia/S CCC Initial Option 1	99999 99999 hectares (PERV) metric (IMPERV) th Zero Dpieson (Contemporation (IMPERV) th Zero Dyieson (Contemporation) the Zero Dyieson (Contemporation) (IMPERV) the Zero Dyieson (Contemporation) (IMPERV) (IMPERV) the Zero Dyieson (Contemporation) (IMPERV	res 15 >th : 2=Horto 2 * 2=Recta	n; 3=Green-Ampi nglr; 3=SWM HYJ	t; 4=Repeat D; 4=Lin. F	: Reserv
14 35 4	START START 1 1=2e COMMENT 3 line WINCONTroll CATCHMENT 1.000 55.610 610.000 1.000 610.000 1.000 1.000 8.924 1 .250 .100 8.924 1 .250 .100 .250 .100 .250 .100 .250	.11452¢ ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Per cent Manning SCS Curv Ia/S CCe Initial Option 1 04	99999 hectares (PERV) metric (%) : Imperviou (IMPERV) th Zero Dr =SCS CN/C; "n" rh" re No or C officient Abstractic =Trianglr; .000	res 15 2=Horto: - 2=Recta: .000 238	n; 3=Green-Amp nglr; 3=SWM HY . ooo c.m/s	t; 4=Repeat D; 4=Lin. F	Reserv
14 35 4 15	START START 1 1=2e COMMENT 3 line WINCONTroll CATCHMENT 1.000 55.610 610.000 1.000 4.000 610.000 1.250 74.000 1.250 74.000 3.924 1 .22 ADD RUNOF	.11452¢ ro; 2=Def (s) of cc ** ID No.ó Area in Length (Gradient Per cent Length (Simp. w Option 1 Manning SCS Curv Ia/S Coe Initial Option 1 04 11 F	99999 hectares (%) : Imperviou (IMPERV) metri : Imperviou (IMPERV) ==SCS CW/C; "n" re No or C fficient Abstractic ==Trianglr; .000 .875	res 15 >> 2=Horto: >> 2=Recta: 2=Recta: 000 .238	n; 3=Green-Amp nglr; 3=SWM HY .000 c.m/s C perv/imper	t; 4=Repeat D; 4=Lin. F v/total	- Reserv
14 35 4 15 4	START START 1 1=2e COMMENT 3 line Uncontrol ******** CATCHMENT 1.000 55.610 610.000 1.000 4.000 610.000 1.250 74.000 1.250 74.000 1.250 74.000 3.924 1.250 74.000 3.022 ADD RUNOF .3 CATCHMENT	.11452¢ ro; 2=Def (s) of cc ** ID No.ó Area in Length (Gradient Per cent Length (\$Imp. wi Option 1 Manning SCS Curv Ia/S Coc Initial Option 1 04 11 04	Sperus c.m Sine Sp9999 hectares (%) : Imperviou (IMPERV) th Zero Dp =SCS CN/C; "n" re No or C fficient -Trianglr; .000 .875 .304	res 15 2=Horto: 2=Recta: 2=Recta: 000 .238 .000	n; 3=Green-Amp nglr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	t; 4=Repeat D; 4=Lin. F v/total	: Reserv
14 35 4 15 4	START START 1 1=2e COMMENT 3 line Uncontrol CATCHMENT 1.000 55.610 610.000 1.000 610.000 1.250 74.000 1.250 74.000 1.250 74.000 3.924 1 .250 74.000 3.924 1 .250 .100 8.924 1 .250 .100 8.924 1 .250 .100 8.924 1 .250 .100 .000	.11452¢ ro; 2=Def (s) of cc ** ID No.ó Area in Length (Gradient Per cent Length (Manning SCS Curv Ta/S Coc Initial 0¢ 10 F 04 ID No.ó	<pre>ine ine ine iment i ine iment i ine iment i ine imperviou imperviou imperviou imperviou imperviou imperviou imperviou imperviou impr e No or C impr e No or C impr imp imp imp imp imp imp imp imp imp imp</pre>	res 15 2=Horto: 2=Recta: .000 .238 .000	n; 3=Green-Amp nglr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	t; 4=Repeat D; 4=Lin. F v/total	: Neserv
14 35 4 15 4	START START COMMENT 3 line COMMENT 3 line CATCHMENT 1.000 55.610 610.000 55.610 610.000 55.610 610.000 1.000 610.000 1.000 8.924 1 3.2 ADD RUNOF .3 CATCHMENT 10.000 2.460 130.000	.11452¢ ro; 2=Def (s) of cc ** ID No.ó Area in Length (Gradient Per cent Gradient Per cent Length (%Imp, wi Øtion 1 Manning SCS Curr Ia/S Coe Initial 04 ID No.ó Area in Length (ID No.ó Area in Length (ID No.ó	<pre>>/r+u3 c.m ine > 99999 hectares (PERV) metri : (%) : Imperviot (IMPERV) th Zero Dp =SCS CN/C; "n" re No or C tr fficient Abstractic =Trianglr; .000 .875 .304 99999 hectares (PERV) metri </pre>	res 15 2=Horto: .000 .238 .000 .es	n; 3=Green-Ampi nglr; 3=SWM HYI .000 c.m/s C perv/imper .000 c.m/s	t; 4=Repeat D; 4=Lin. F V/total	: Reserv
14 35 4 15 4	START START 1 1=2e COMMENT 3 1in +	.11452¢ ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Per cent Length (%IMP, wi Option 1 Manning SCS Curry Initial Option 1 04 ID No.6 Area in Length (%IMP, wi Option 1 04 ID No.6 Area in Length (Gradient Per cent Length (Gradient Per cent Scatta (Gradient Scatta (Gradient Scatta (Grad) (Grad) (Grad) (Grad) (Grad) (99999 hectares PERV) metri (%) Impervion IMPERV) th Zero Dp =SCS CN/C, "n" =SCS CN/C, "a" eNo or C Abstractic =Trianglr; .000 .304 99999 hectares (PERV) metri (%) i Impervion Intervion (%) .001 .002 .002 .000 .000 .000 .000 .000	res 15 2=Horto: .000 .238 .000 :es 15	n; 3=Green-Ampr nglr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	t; 4=Repeat D; 4=Lin. F v/total	: Reserv
14 35 4 15 4	START START 1 1=2e COMMENT 3 1ine Uncontrol ******** CATCHMENT 1.000 610.000 1.000 1.000 1.000 1.000 1.000 1.000 2.400 3.2C ADD RUNOF 3.3C CATCHMENT 10.000 1.0000 1.0000 1.000 1.00000 1.0000 1.0000 1.0000 1.0000 1.0000 1.00	.11452¢ ro; 2=Def (s) of cc ** led Areas ** led Areas ** ID No.ó Area in Manning SCS Curr. Ia/S Coc Initial Option 1 04 ID No.ó Area in Length (Gradient F 04 ID No.ó	<pre>Sine Sine Sine Sine Sine Sine Sine Sine</pre>	res 15 2=Horto: 2=Recta .000 .238 .000 :es 15	n; 3=Green-Ampr nglr; 3=SWM HYI .000 c.m/s C perv/imper .000 c.m/s	t; 4=Repeat D; 4=Lin. F v/total	Neserv
14 35 4	START START 1 1=2e COMMENT 3 1ine Uncontrol ******** CATCHMENT 1.000 55.610 610.000 1.000 610.000 1.000 1.000 1.000 1.000 2.460 130.000 1.0000 1.00000 1.00000 1.00	.11452¢ ro; 2=Def (s) of cc ** led Areas ** ID No.ó Area in Manning SCS Curv Ia/S Coc Unitial Option 1 04 ID No.ó Area in Length (Gradient) Gadient Pr Curv Ia/S Coc Unitial Option 1 04 ID No.ó Area in Length (Gradient) Cotion 1 04 ID No.ó Area in Length (Gradient) Cotion 1 Cotion 1 Co	<pre>Sine Sine Sine Sine Sine Sine Sine Sine</pre>	res is th 2=Horto: .000 .238 .248 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .248 .000 .248 .000 .248 .000 .248 .000 .248 .000 .248 .000 .2488 .248 .248 .2488 .2488 .2488 .2488 .2488 .2488 .2488	n; 3=Green-Amp nglr; 3=SWM HYI .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Amp	t; 4=Repeat D; 4=Lin. F v/total t; 4=Repeat	Neserv
14 35 4	START START COMMENT 3 line COMMENT 3 line COMMENT 3 line CATCCHMENT 1.000 55.610 610.000 1.000 610.000 1.000 610.000 1.000 1.000 2.460 130.000 1.000 1.000 2.460 130.000 1.000 130.000 130.000 10.000 130.000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.00000 10.00000 10.00000000	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Per cent Length (MIMP, wi Option 1 Manning SCS Curv Il No.6 Area in Length (Gradient) Option 1 UN 0.6 Area in Length (Gradient) Callent Option 1 UN 0.6 Area in Length (Gradient) Callent (MIMP, wi Option 1 Manning SCS Curv IMAN Manning SCS Curv Manning SCS Curv Manning SCS Manning Manning SCS Manning	<pre>99999 ine 99999 hectares PERVy metr (%) IMPERVy metric end frictent end frict</pre>	res 18 2=Horto: 2=Recta: .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000	n; 3=Green-Ampi nglr; 3=SWM HYI .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Ampi	t; 4=Repeat D; 4=Lin. F v/total t; 4=Repeat	: Neserv
14 35 4	START = 2e START = 2e COMMENT 3 line TURCONTFOL 4.000 55.610 610.000 1.000 55.610 610.000 1.000 610.000 1.000 8.924 3.2 ADD RUNOF 3.2 ADD RUNOF 10.000 2.460 130.000 10.000 130.000 130.000 10.000 130.000 10.0000 10.000 10.0000 10.0000 10.0000 10.0000 10.	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Per cent Length (Gradient Per cent Length (Gradient Per cent Length (JID No.6 Area in Anning SCS Curv Il No.6 Area in Length (Gradient I A/S Coe Gradient Per cent Length (Gradient) I No.6 Area in Manning SCS Curv II No.6 Area in Length (Gradient) II No.6 Area in Length (Gradient) I A/S Coe SCS Curv II No.6 Area in Length (Gradient) II No.6 Area in Length (Jun) SCS Curv II Manning SCS Curv II A/S Coe	99999 hectares (%) (%) (%) (%) (%) (%) (%) (%) (%) (%)	res 15 52=Horto: 2=Recta: .000 .238 .2488 .248 .2488 .2488 .2488 .2488 .2488 .2488	n; 3=Green-Amp nglr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Amp	t; 4=Repeat D; 4=Lin. F v/total t; 4=Repeat	: Neserv
14 35 4	START = 2e START = 2e COMMENT 3 line Uncontrol 5.610 610.000 1.000 610.000 1.000 610.000 1.000 8.924 1.3 CATCHMENT 10.000 2.460 130.000 1.	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Per cent Length (%Imp. wi Option 1 Manning SCS Curv IA/S Coc Initial Option 1 Manning SCS Curv ID No.6 Area in Length (Gradient Per cent Length (Gradient) CSC Curv ID No.6 Area in Length (Gradient) CSC Curv ID No.6 Area in Length (Gradient) ID No.6 Area in Length (Gradient) ID No.6 Area in Length (Gradient) ID No.6 ID N	99999 hectares (%) (%) (%) (%) (%) (%) (%) (%) (%) (%)	res JS bth : 2=Horto: 2=Recta: .000 .238 .000 .248 .000 .248 .248 .000 .248 .000 .248 .000 .248 .000 .248 .000 .248 .000 .248 .248 .248 .248 .248 .000 .2488 .2488 .248 .248 .248 .248	n; 3=Green-Amp nglr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Amp n; 3=Green-Amp	t; 4=Repeat D; 4=Lin. F v/total t; 4=Repeat D; 4=Lin. F	:
14 35 4 15 4	START START 1 1=2e COMMENT 3 1ine Uncontrol 55.610 610.000 1.000 610.000 1.000 4.000 610.000 1.250 74.000 1.000 8.924 1.3. CATCHMENT 10.000 1.250 74.000 1.000 1.250 74.000 1.000 1.250 74.000 1.000 1.250 74.000 1.000 1.000 1.250 74.000 1.000 1.000 1.250 74.000 1.000 1.000 1.250 74.000 1.000 1.000 1.250 74.000 1.000 1.000 1.250 74.000 1.000 1.000 1.250 74.000 1.0000 1.0000 1.0000 1.0000 1.0000	.114526 ro; 2=Def (s) of cc ** ID No.ó Area in Length (Gradient Ver cent Length (Manning SCS Curv ID No.ó Area in Area in Area in Length (Gradient P Co Length (Gradient Ta/S Co Lital Option 1 Manning CS Curv ID No.ó Area in Length (Gradient P Od D No.ó Area in Length (Gradient ID No.ó Area in Length (Gradient ID No.ó Area in Length (Gradient ID No.ó CS Curv ID No.ó CS Curv IJ S COC ID No.ó CS Curv IJ S COC ID No.ó ID NO.ó	99999 hectares (%) (%) (%) (%) (%) (%) (%) (%)	res 15 2=Horto:	n; 3=Green-Amp nglr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Amp nglr; 3=SWM HY .000 c.m/s	t; 4=Repeat D; 4=Lin. F v/total t; 4=Repeat D; 4=Lin. F	: Reserv :
14 35 4 15 4	START START 1 1=2e COMMENT 3 1in +	.114526 ro; 2=Def (s) of cc ** ID No.6 Area in Length (Gradient Per cent Length (SIMP, with Anning SCS Curv IA/S Coe Initial Option 1 Manning CG ID No.6 Area in Length (Gradient ID No.6 Area in Length (Gradient ID No.6 Area in Length (Gradient ID No.6 Area in Length (Gradient ID No.6 Area in Length (ID No.6 Area in Length (ID No.6 Area in Length (Gradient ID No.6 Area in Ja/S Coe In II Area in Ja/S Coe In II Area in Ja/S Coe In II Area in Ja/S Coe In II Area in Ja/S Coe In II Ja/S Coe In II Ja/S Coe In II Ja/S Coe In II Ja/S Coe In II Ja/S Coe In II Ja/S Coe In II Area in Ja/S Coe In II Ja/S Coe In II Area in Ja/S Coe In II Ja/S Coe Ja/S Coe In II Ja/S Coe Ja/S Coe In II Ja/S Coe Ja/S Co	<pre>99999 incent of the second of the secon</pre>	res 15 2=Horto: 000 .238 .248 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .000 .238 .248 .000 .248 .248 .000 .2488 .2488 .248 .248 .248 .248 .248 .248 .248	n; 3=Green-Ampi .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Ampi nglr; 3=SWM HYI .000 c.m/s C perv/imper	t; 4=Repeat D; 4=Lin. F v/total L; 4=Repeat D; 4=Lin. F v/total	: Reserv : Reserv
14 35 4 15 4 15 9	START START 1 1=2e COMMENT 3 1ine ******* CATCHMENT 1.000 4.000 55.610 610.000 1.000 4.000 610.000 1.000 8.924 1 3. CATCHMENT 1.000 2.460 130.000 1.000 1.000 1.000 2.460 130.000 1.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 1.000 1.000 2.460 1.000 1.000 1.000 1.000 1.000 2.460 1.000 1.000 1.000 1.000 1.000 2.460 1.000 1.000 1.000 1.000 2.460 1.000 1.000 1.000 1.000 2.400 1.000 1.000 1.000 2.400 1.000 1.000 1.000 2.400 1.000 1.000 1.000 2.400 1.000 1.000 1.000 2.400 1.000 1.000 1.000 2.400 1.000 1.000 1.000 2.400 1.0000 1.000	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Fer cent Length (%Imp, wi Option 1 Manning SCS Curry ID No.6 Area in Length (Gradient Fer cent Length (Gradient) Fer cent Len	<pre>System System Syst</pre>	res 15 2=Horto: 2=Recta: .000 .238 .000 .000 .237 .0000 .000 .000 .000 .0000 .000 .000	n; 3=Green-Ampi .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Ampi .000 c.m/s C perv/imper .000 c.m/s	t; 4=Repeat D; 4=Lin. F v/total t; 4=Repeat D; 4=Lin. F v/total	: Leserv :
14 35 4 15 4	START START 1 1=2e COMMENT 3 1in +	.11452¢ ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Per cent Length (%IMP, wi Option 1 Manning SCS Curv. Ta/S Coe Initial ID No.6 Area in Length (%IMP, wi Option 1 11 F O4 ID No.6 Area in Length (%IMP, wi Option 1 Manning SCS Curv. Ta/S Coe Initial Length (%IMP, wi Option 1 Manning SCS Curv. Ta/S Coe Initial Manning SCS Curv. Ta/S Coe Initial Option 1 Manning SCS Curv. Ta/S Coe Initial No. Manning SCS Curv. Ta/S Coe Initial No. Manning SCS Curv. Manning SCS	<pre>Spect Comparison Comparison</pre>	res 15 2=Horto: 2=Recta: .000 .238 .000 .248 .000 .000 .248 .000 .000 .248 .0000 .000 .0000 .000 .000 .000 .000	n; 3=Green-Ampr .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Ampr .000 c.m/s C perv/imper .000 c.m/s	t; 4=Repeat D; 4=Lin. F v/total D; 4=Lin. F v/total	: Keserv : Keserv
14 35 4 15 4	START START COMMENT 3 line COMMENT 3 line COMMENT 3 line CATCHMENT 1.000 610.000 55.610 610.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 2.460 130.000 1.000 130.000 1.000 130.000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.00000 10.00000 10.00000000	.11452f ro; 2=Def (s) of cc ** led Areas ** led Areas ** ID No.6 Area in Length (Gradient Per cent Length (SCS Curry Il No.6 Area in Length (Gradient Per cent Length (SCS Curry Il Manning SCS Curry Il Manning SCS Curry Il Per cent Length (Gradient Per cent Length (SCS Curry Length (SCS Curry L	<pre>%1F+U3 C.m fine mmment % % % % % % % % % % % % % % % % % % %</pre>	res is th 2=Horto: 2=Recta: .000 .238 .000 .238 .000 .238 .000 .238 .000 .24	n; 3=Green-Ampr .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Ampr .000 c.m/s C perv/imper .000 c.m/s C perv/imper .000 c.m/s	t; 4=Repeat D; 4=Lin. F v/total t; 4=Repeat D; 4=Lin. F v/total	: Reserv
14 35 4 15 4 15 9	START START 1 1=2e COMMENT 3 1ine COMMENT 3 1ine COMMENT 3 1ine COMMENT 1.000 5.610 610.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 2.460 130.000 1.000 1.000 2.460 130.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 1.000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.000000 0.00000 0.000000 0.00000 0.00	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Per cent Length (Gradient Per cent Length (Gradient Per cent Length (Joption 1 Manning SCS Curvi Ia/S Coc Initial 04 ID No.6 Area in Length (Gradient) To No.6 Area in Length (Gradient) Cotion 1 04 ID No.6 Area in Length (Gradient) Cotion 1 Manning SCS Curvi II No.6 Area in Length (Gradient) Cotion 1 Manning SCS Curvi II No.6 Area in Length (Gradient) Cotion 1 Manning SCS Curvi II Pr 04 Conduit No.6 Area in Length (Gradient) Area in Area in Area in Length (Gradient) Area in Area in	<pre>Sine Sine Sine Sine Sine Sine Sine Sine</pre>	res 15 2=Horto: 2=Recta: .000 .238 .000 .238 .000 .238 .000 .238 .000 .275 .000 .275 .000 .275	n; 3=Green-Ampr .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Ampr .000 c.m/s C perv/imper .000 c.m/s	t; 4=Repeat D; 4=Lin. F v/total L; 4=Repeat D; 4=Lin. F v/total	: : : &eserv
14 35 4 15 4	START START 1 1=2e COMMENT 3 1ine Uncontrol 55.610 610.000 55.610 610.000 1.000 610.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 1.000 2.460 1.000 1.000 2.460 1.000 1.000 2.460 1.000 2.460 1.000 1.000 2.460 1.000 1.000 2.460 1.000 1.000 2.460 1.000 2.460 1.000 1.000 2.460 1.000 1.000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.000000	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Per cent Length (Gradient Per cent Length (Gradient Per cent Length (Joption 1 Manning SCS Curv Ia/S Coc Initial Option 1 04 ID No.6 Area in Length (Gradient) F 04 ID No.6 Area in Length (Gradient) Contine 1 Manning SCS Curv Initial Option 1 Manning SCS Curv In Sco Contine 1 Manning SCS Curv In Sco Contine 1 Manning SCS Curv In Sco Area in Length (Sco Curvital Od In No.6 Area in Length (Sco Initial Option 1 Manning SCS Curv In Sco Area in Length (Sco Curvital Option 1 Manning SCS Curv In Sco Area in Length (Sco Curvital Sco Curvital Sco Curvital Sco Curvital Sco Curvital Sco Conduit No.6 Area wei Routing No.6 Sco Sco Sco Sco Sco Sco Sco Sco	<pre>99999 ine 99999 hectares (%) Impervion Im</pre>	res 13 50th 2=Horto: 000 .238 .000 .275 .000 .275 .000 .275 .000 .275 .000 .275 .000 .275 .000 .275 .000 .275 .000 .275 .000 .275 .000 .275 .000 .275 .000 .275 .000 .275 .000 .000 .275 .000 .000 .275 .0000 .000 .000 .000 .000 .000 .000	n; 3=Green-Ampi .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Ampi nglr; 3=SWM HYI .000 c.m/s C perv/imper .000 c.m/s	t; 4=Repeat D; 4=Lin. F v/total t; 4=Repeat D; 4=Lin. F v/total	:
14 35 4 15 4 15 9	START START 1 1=2e COMMENT 3 1ine Uncontrol ******** CATCHMENT 1.000 55.610 610.000 1.000 55.610 610.000 1.000 1.000 1.000 1.000 2.460 130.000 1.000 130.000 130.000 130.000 130.000 10.000 130.000 10.000 130.000 10.000 10.000 10.000 10.000 10.000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.000000	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Per cent Length (Gradient Per cent Length (Option 1 Manning SCS Curv Initial Option 1 04 ID No.6 Area in Length (Gradient) F 04 ID No.6 Area in Length (Gradient) Caline Per cent Length (Gradient) II No.6 Area in Length (Gradient) Caline II No.6 Area in Length (Gradient) Caline Caline II Manning SCS Curv II Manning SCS Curv Initial Option 1 Manning SCS Curv Initial Notion 1 42 Conduit No. of s 42	<pre>99999 ine 99999 hectares (%) Impervion I</pre>	res 13 50 14 52=Hortor 50 15 15 12=Hortor 50 1000 11 11 1000 11 11 1000 11 11	n; 3=Green-Ampi .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Ampi .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s	t; 4=Repeat D; 4=Lin. F V/total t; 4=Repeat D; 4=Lin. F V/total	: : : Reserv
14 35 4 15 4 15 9	START START START COMMENT 3 line COMMENT 3 line COMMENT 3 line CATCEMENT 1.000 55.610 610.000 55.610 610.000 55.610 610.000 1.000 610.000 1.000 1.000 2.460 1.000 2.460 1.000 2.460 1.000 1.000 1.000 1.000 1.000 1.000 1.000 2.460 1.000 1.000 2.460 1.000 2.460 1.000 1.000 2.460 1.000 2.460 1.000 2.460 1.000 2.460 1.000 2.460 1.000 2.460 1.000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.000000	.114526 ro; 2=Def (s) of cc ** led Areas ** ID No.6 Area in Length (Gradient Per cent Length (Gradient Per cent Length (Gradient Pa/S Coc Initial Option 1 Manning SCS Curv In/S Coc Initial Option 1 04 ID No.6 Area in Length (Gradient) Ta/S Coc Initial Option 1 04 ID No.6 Area in Length (Gradient) CS Curv Initial Option 1 04 ID No.6 Area in Length (Gradient) CS Curv Il F 04 CC Conduit 1 Manning SCS Curv In/S Coc Initial Option 1 Manning SCS Curv In/S Coc Initial Notion 1 42 Conduit Note 42	<pre>99999 ine 99999 hectares (%) Impervion Impervion Impervion How Fricter S 99999 hectares PERVV metri S S 99999 hectares PERVV metri S 304 99999 hectares PERVV metri Impervion Impervion Impervion Impervion S 304 99999 hectares PERVV metri S 304 S 304 S 304 Length S 346 Length S 346 Length S 346 S No. 346</pre>	res 13 50 52=Horto: 500 .228 .000 .238 .000 .238 .000 .238 .000 .238 .000 .275 .000 .000 .275 .000 .000 .275 .000 .000 .275 .000 .000 .275 .0000 .0000 .000 .000 .000 .000 .000	n; 3=Green-Ampi .000 c.m/s C perv/imper .000 c.m/s n; 3=Green-Ampi .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .346 c.m/s	t; 4=Repeat D; 4=Lin. F V/total D; 4=Lin. F V/total	:

	1 1=Ze	ero; 2=	Define			
35	COMMENT	(a) of	commont			
	*******	*** ***	Commente			
	Area All					
	*******	***				
4	11 000	TD No	6 99999			
	16.320	Area	in hectares	3		
	330.000	Lengt	h (PERV) me	etres		
	60 000	Per c	ent (%) ent Impervi	0115		
	330.000	Lengt	h (IMPERV)	1040		
	.000	%Imp.	with Zero	Dpth		
	.250	Manni	ng "n"	.c, 2-Hoitt	лі, з-втеен-мырс, ч-кеј	Jeau
	74.000	SCS C	urve No or	С		
	.100	Ia/S Initi	Coefficient	ion		
	1	Op	tion 1=Tria	anglr; 2=F	ectanglr; 3=SWM HYD;	4=Lin.
Reserv						
	1.5	211	.000	.346	.346 c.m/s C perv/imperv/total	
15	ADD RUNOR	F				
4	1.5	551	1.551	.346	.346 c.m/s	
4	12.000	ID No	.ó 99999			
	2.960	Area	in hectares	3		
	140.000	Lengt	h (PERV) me	etres		
	10.000	Per c	ent Impervi	Lous		
	140.000	Lengt	h (IMPERV)			
	.000	%1mp. Optio	with Zero	Dpth (C: 2=Horto	on: 3=Green-Ampt: 4=Rep	peat
	.250	Manni	ng "n"	0, 2 10100	in, o orecu imper, i nel	Jeac
	74.000	SCS C	urve No or	С		
	8.924	Ia/S Initi	al Abstract	ion		
	1	Op	tion l=Tri	anglr; 2=F	ectanglr; 3=SWM HYD;	4=Lin.
Reserv		0.50	1 551	246	246 /-	
		211	.856	.346	.346 C.m/s C perv/imperv/total	
15	ADD RUNOR	F				
0	.(050	1.601	.346	.346 c.m/s	
9	.000	Condu	it Length			
	.000	No Co	nduit defir	ned		
	.000	Zero	lag			
	.000	Routi	ng timester	D		
	0	No. o	f sub-reach	nes		
17	COMPINE .(050	1.601	1.601	.346 c.m/s	
17	1 June	ction N	ode No.			
	.(050	1.601	1.601	1.947 c.m/s	
35	COMMENT	(a) of	commont			
	*******	***	Commente			
	Flow at 0	Dutlet	A			
1.8	CONET UEN	*** ~r				
10	1 June	ction N	ode No.			
		050	1.947	1.601	.000 c.m/s	
27	5 is i	PH DISP # of Hv	'LAY eto/Hydrogi	caph choser	1	
	Volume =	.102	4620E+05 c.	.m		
14	START		Dofino			
35	COMMENT	2=	Derine			
	3 line	e(s) of	comment			
	********	****	DUDNO			
	*********	\$10RM	EVENT			
2	STORM					
	1264 600	l=Chi Coeff	cago;2=Hufi	E;3=User;4=	=Cdnlhr;5=Historic	
	7.720	Const	ant b	(min)		
	.781	Expon	ent c			
	.450	Durat	ion to peak ion ó 240	c r min		
		68.280	mm Tot	al depth		
3	IMPERVIOU	JS	- 1-000 01	(a.)_II		
	.015	Manni	ng "n"	C; Z=HOILG	on; s=green-Ampt; 4=kep	pear
	98.000	SCS C	urve No or	С		
	.100	Ia/S Initi	Coefficient	ion		
35	COMMENT	111101	ai Abstiact	1011		
	3 line	e(s) of	comment			
	Uncontrol	led Ar	ea - C10 to	Outlet C		
	*******	***	010 00	outree o		
4	CATCHMENT	C TD N-	6 00000			
	.840	Area	in hectares	5		
	123.600	Lengt	h (PERV) me	etres		
	1.000	Gradi	ent (%)			
	123.600	Lengt	h (IMPERV)	1045		
	.000	%Imp.	with Zero	Dpth		
	250	Optio Marri	n l=SCS CN/	C; 2=Horto	on; 3=Green-Ampt; 4=Rep	peat
	74.000	SCS C	urve No or	С		
	.100	Ia/S	Coefficient	-		
	8.924 1	initi On	ai Abstract tion 1=Tria	.⊥on anglr; 2=F	ectanglr; 3=SWM HYD:	4=Lin,
Reserv	-	op		, <u></u> -		
	.(046	.000	1.601	.000 c.m/s	
15	ADD RUNO	FF	.909	.448	<pre>c perv/imperv/total</pre>	
		146	046	1 CO1	000 a m/a	
			.040	1.001	.000 C.m/s	

14	Volume = START	.2570	677E+03 c.	m		
25	1 1=Ze	ero; 2=De	efine			
35	3 line	e(s) of (comment			
	*********	** led lre:				
	*******	**	10			
4	1.000	ID No.	5 99999			
	55.610	Area in	(DEDV) ma	trog		
	1.000	Gradie	(PERV) me nt (%)	licites		
	4.000 610.000	Per cen Length	nt Impervi (IMPERV)	ous		
	.000	%Imp. 1	with Zero	Dpth		
	.250	Manning	J=SCS CN/ g "n"	C; Z=Horto	on; 3=Green-Ampt; 4	=kepeat
	74.000	SCS Cu	rve No or Defficient	С		
	8.924	Initia	l Abstract	ion		
	1	Option 20	1=Triangl	r; 2=Recta 1.601	.000 c.m/s	=Lin. Reserv
	.3	47	.918	.370	C perv/imperv/to	tal
15	ADD RUNOF	120	1.020	1.601	.000 c.m/s	
4	CATCHMENT	TD No.	5 99999			
	2.460	Area in	n hectares			
	130.000	Length Gradie	(PERV) me nt (%)	tres		
	10.000	Per cen	nt Impervi	ous		
	.000	%Imp. 1	with Zero	Dpth		
	.250	Option Manning	1=SCS CN/ z "n"	C; 2=Horto	on; 3=Green-Ampt; 4	=Repeat
	74.000	SCS Cu	rve No or	С		
	8.924	Initia	l Abstract	ion		
	1	Option	1=Triangl	r; 2=Recta	anglr; 3=SWM HYD; 4	=Lin. Reserv
	.3	47	.909	.403	C perv/imperv/to	tal
15	ADD RUNOF	.F.	1.071	1.601	.000 c.m/s	
9	ROUTE	Conduit	tlength			
	.000	No Con	duit defin	ed		
	.000	Zero la Beta W	ag eighting f	actor		
	.000	Routin	g timestep	I.		
	.0	NO. 01 199	1.071	1.071	.000 c.m/s	
17	COMBINE 1 Junc	tion No.	te No.			
	.0	99	1 071	1 071	1 071 c m/s	
1.4	0.000		1.0/1	1.0/1	1.0/1 0.10/5	
14	START 1 1=Ze	ero; 2=De	efine	1.0/1	1.0/1 0.11/3	
14 35	START 1 1=Ze COMMENT 3 line	ero; 2=De	efine	1.071	1.0/1 C.m/3	
14 35	START 1 1=Ze COMMENT 3 line ********	ero; 2=De e(s) of e	efine	1.071	1.071 (
14 35	START 1 1=Ze COMMENT 3 line ********* Area All *********	ero; 2=De e(s) of e **	efine	1.071	1.0/1 C.m/5	
14 35 4	START 1 1=Ze COMMENT 3 line ********* Area All ********* CATCHMENT 11.000	ero; 2=De e(s) of e *** ID No.e	comment	1.071	1.071 C.m/3	
14 35 4	START 1 1=Ze COMMENT 3 line ********* Area All ********** CATCHMENT 11.000 16.320 2000	(s) of ((s) of () (t) No Area in	5 99999 h hectares	1.071	1.0/1 Cim/3	
14 35 4	START 1 1=Ze COMMENT 3 line ********* Area All ********* CATCHMENT 11.000 16.320 330.000 1.000	(s) of ((s) of () ID No Area in Length Gradien	5 99999 n hectares (PERV) me nt (%)	tres	1.0/1 Cim/3	
14 35 4	START 1 1=2¢ COMMENT 3 line ********* Area All ********* CATCHMENT 11.000 16.320 330.000 1.000 60.000 330.000	ID No.(Area in Length Gradien Per cent	5 99999 h hectares (PERV) me nt (%) nt Impervi (IMPERV)	tres ous	1.0/1 C.M/3	
14 35 4	START 1 1=Ze COMMENT 3 line ********* Area All ********* CATCHMENT 11.000 16.320 330.000 1.000 60.000 330.000 .000	ro; 2=De (s) of (** ID No Area in Length Gradieu Per cei Length %Imp.	5 99999 h hectares (PERV) me nt [%] ht Impervi (IMPERV) with Zero	tres ous Dpth	1.0/1 C.M/3	
14 35 4	STRAT 1 1=2c COMMENT 3 line ******** Area All ******** CATCHNENT 11.000 16.320 330.000 1.000 60.000 330.000 1.250	ID No.(Area in Length Gradien Per cen Length %Imp. 1 Option Mannine	5 99999 h hectares (PERV) me ht (%) ht Impervi (IMPERV) with Zero 1=SCS CN/ g "n"	tres ous Dpth C; 2=Horto	<pre>>n; 3=Green-Ampt; 4</pre>	=Repeat
14 35 4	START 1 1=2c COMMENT 3 1ine ******** Area All ******** CATCHMENT 11.000 16.320 330.000 1.000 60.000 330.000 1.250 74.000 100	<pre>ico; 2=De (s) of e *** ID No.4 Area in Length Gradien Per cei Length %Imp.1 Option Manning SCS Cui La/S CC</pre>	5 99999 h hectares (PERV) me ht (%) ht Impervi (IMPERV) with Zero 1=SCS CN/ g "n" rve No or pefficient	tres ous Dpth C; 2=Horto	on; 3=Green-Ampt; 4	=Repeat
14 35 4	START 1 1=2c COMMENT 3 1ine Area All ******* CATCHMENT 11.000 16.320 330.000 1.000 60.000 330.000 1.250 74.000 8.924	<pre>ist and a second s</pre>	efine comment 5 99999 n hectares (%) (DERV) me nt (%) nt Impervi (IMPERV) with Zero 1=SCS CN/ g "n" cve No or pefficient 1 Abstract	tres ous Dpth C; 2=Horto C ion	on; 3=Green-Ampt; 4	=Repeat
14 35 4	START 1 1=2c COMMENT 3 1ine Area All ******** CATCHNEN 11.000 16.320 330.000 1.000 60.000 330.000 .250 74.000 .100 .100 .200 74.000 .100 .201 .2100 .210 .210 .210 .2100 .21	<pre>is a series of a series o</pre>	efine comment 5 99999 n hectaress (PERV) ment (IMPERV) nt Impervi (IMPERV) nt Impervi (IMPERV) sefficient 1 =Briangl .000	tres ous Dpth C; 2=Hortc C c ion r; 2=Rectz 1.071	<pre>n; 3=Green-Ampt; 4 anglr; 3=SWM HYD; 4 1.071 c.m/s</pre>	=Repeat =Lin. Reserv
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14 35 4 15 4 15 9	START 1 1=2c COMMENT 3 11ne ******** Area All ******* CATCHMENT 11.000 16.320 330.000 .000 .000 .100 8.924 12.55 CATCHMENT 12.000 2.960 140.000 1.0000 1.0000 1.0000 1.000 1.0000 1.0000 1	<pre>**</pre>	afine afine comment b 99999 a hectaress (PERV) ment t (%) at Impervi (IMPERV) at Impervi (IMPERV) afficient 1=SSC SW/ g "n" cool 2.569 b hectaress (PERV) ment t=rriangl .000 2.569 b hectaress (PERV) ment t=rriangl .020 2.569 b a hectaress (PERV) ment t=rriangl .569 .907 2.677 t Length duit defin ag sub-reach 2.677	1.0/1 tres ous Dpth C; 2=Hortc C ion r; 2=Recta 1.071 .691 .071 .691 .071 .691 .071 .691 .071 .691 .071	<pre>n; 3=Green-Ampt; 4 nglr; 3=SWM HYD; 4 l.071 c.m/s C perv/imperv/tc l.071 c.m/s on; 3=Green-Ampt; 4 nglr; 3=SWM HYD; 4 l.071 c.m/s C perv/imperv/tc l.071 c.m/s l.071 c.m/s </pre>	=Repeat =Lin. Reserv tal =Repeat =Lin. Reserv tal
14 35 4 15 4 15 9 17	START 1 1=2c COMMENT 3 1ine ******** Area All ******* CATCCHMENT 11.000 16.320 330.000 .000 .000 .250 74.000 .100 8.924 1 2.5 CATCHMENT 12.000 2.96 140.000 140.000 140.000 140.000 140.000 140.000 140.000 1.250 74.000 1.250 74.000 1.000 1.000 1.250 74.000 1.000 1.250 74.000 1.000 1.250 74.000 1.000 1.250 74.000 1.000 1.250 74.000 1.000 1.250 74.000 1.000 1.250 74.000 1.000 1.250 74.000 1.000 1.250 74.000 1.000 1.000 1.000 1.250 74.000 1.000 1.000 1.000 1.000 1.250 74.000 1.	<pre>**</pre>	sfine sfine comment (PERV) main (PERV) main (PERV) main (PERV) main (PERV) main (PERV) main (PERV) main (PERV) main 2.569 5.99999 a hectares (PERV) main (PERV) main (PERV) (PERV) main (PERV) main	1.0/1 tres ous Dpth C; 2=Hortc C ion r; 2=Recta 1.071 .691 1.071 .691 1.071 .691 1.071 .003 Dpth C; 2=Hortc C ion r; 2=Recta 1.071 .691 1.071 .693 .071 .693 .071 .693 .071 .693 .071 .075 .077 .075 .077 .075 .077 .075 .077 .075	<pre>n; 3=Green-Ampt; 4 nglr; 3=SWM HYD; 4 l.071 c.m/s C perv/imperv/tc l.071 c.m/s on; 3=Green-Ampt; 4 no71 c.m/s C perv/imperv/tc l.071 c.m/s l.071 c.m/s l.071 c.m/s</pre>	=Repeat =Lin. Reserv tal =Repeat =Lin. Reserv tal
14 35 4 15 4 15 9 17 35	START 1 1=2c COMMENT 3 11ne ******** Area All ******* CATCIMENT 11.000 16.320 330.000 1.000 60.000 330.000 .250 74.000 .100 8.924 1 2.960 140.000 140.000 140.000 140.000 140.000 140.000 140.000 1.250 74.000 1.000 1.250 74.000 1.000 1.000 1.250 74.000 1.0000 1.00000 1.00000 1.00	<pre>** ** ID No.4 Area in Length Gradie Per cere Length %Imp. 1 Option Mannink SCS Cu: Ia/S Ci Initia: Option Mannink SCS Cu: Length Gradie Per cere Length Gradie Per cere Length Gradie Per cere Length SCS Cu: Initia: Option I6 Condui No.of I6 tion No </pre>	sfine sfine comment (PERV) main (PERV) main (PERV) main (IMPERV) (IMPERV) (IMPERV) (IMPERV) (IMPERV) (IMPERV) (IMPERV) (INPERV) (PERV) main (PERV) main (IMPERV)	1.0/1 tres ous Dpth C; 2=Hortc C c ion r; 2=Recta 1.071 .691 1.071 1.071 tres ous Dpth C; 2=Hortc C c ion r; 2=Recta 1.071 .071 .071 .071 .071 .071 .071 .07	<pre>introf clubs in; 3=Green-Ampt; 4 i.071 c.m/s C perv/imperv/tc i.071 c.m/s i.071 c.m/s c perv/imperv/tc i.071 c.m/s c perv/imperv/tc i.071 c.m/s i.071 c.m/s i.071 c.m/s</pre>	=Repeat =Lin. Reserv tal =Repeat =Lin. Reserv tal
14 35 4 15 4 15 9 17 35	START 1 1=2c COMMENT 3 11ne Area All ******* CATCHMENT 11.000 16.320 330.000 1.000 60.000 330.000 1.250 74.000 1.000 2.55 74.000 2.920 74.000 2.920 74.000 2.920 74.000 2.920 74.000 1.000 2.960 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.00000 1.0000 1.00000 1.00000 1.00000 1.000000 1.00000000 1.0000000000	<pre>** ** ID No.(Area in Length Gradien Per cell Length %Imp. 1 Option Mannink SCS Cu: Ia/S Ci ID No.(Area in Ia/S Ci Initia Option Gof ID No.(Area in Ia/S Ci Initia Option Iof I</pre>	efine efine comment b 99999 a hectares (UPERV) model (UPERV) with Zero 1=SCS (W) g "n" verve No or 000 2.569 b 99999 a hectares (UPERV) a hectares (UPERV) a hectares (UPERV) a hectares (UPERV) a hectares (UPERV) a hectares (UPERV) a hectares (UPERV) a hectares (UPERV) a hectares (SCS (W) g "n" tength abstract 1=ST (and 1=St (1.0/1 tres ous Dpth C; 2=Horto C ion r; 2=Recta 1.071 .691 1.071 .691 1.071 .691 1.071 .693 1.071 .403 1.071 ed actor 2.677 2.677	<pre>introf clubs inglr; 3=Green-Ampt; 4 i.071 c.m/s C perv/imperv/to i.071 c.m/s i.071 c.m/s i.071 c.m/s c perv/imperv/to i.071 c.m/s i.071 c.m/s i.071 c.m/s i.071 c.m/s</pre>	=Repeat =Lin. Reserv tal =Repeat =Lin. Reserv tal

****** 18

CONFLUENCE CONFLUENCE 1 Junction Node No. 116 3.499 2.677 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hysto/Hydrograph chosen Volume = .2323560E+05 c.m MANUAL 27

20

B-3. Future Conditions with SWM

	Output File (4.7) SWM.OUT opened 2024-11-04 9:14
	Units used are defined by G = 9.810 24 144 10.000 are MAXDT MAXHYD & DTMIN values
35	Licensee: UPPER CANADA CONSULTANTS COMMENT
	4 IIIE(S) OI COMMENT STORWATER MANAGEMENT FLAN MCLEOD ROAD FRUITBELT CITY OF NIAGARA FALLS
35	SWM CONDITIONS COMMENT
	3 line(s) of comment
	25mm STORM EVENT
2	************* STORM
	<pre>1 l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic 512.000 Coefficient a</pre>
	6.000 Constant b (min)
	.450 Fraction to peak r
	240.000 Duration o 240 min 25.035 mm Total depth
3	IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.015 Manning "n" 98.000 SCS Curve No or C
	.100 Ia/S Coefficient
35	COMMENT
	3 LINE(S) OF COMMENT
	Area All *******
4	CATCHMENT 11.000 ID No.ó 99999
	16.320 Area in hectares
	1.000 Gradient (%)
	330.000 Length (IMPERV)
	.000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 Manning "n" 74.000 SCS Curve No or C
	.100 Ia/S Coefficient
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.098 .805 .522 C perv/imperv/total
15	ADD RUNOFF .879 .879 .000 .000 c.m/s
4	CATCHMENT 12.000 ID No.ó 99999
	2.960 Area in hectares 140.000 Length (PERV) metres
	1.000 Gradient (%)
	140.000 Length (IMPERV)
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 Manning "n" 74.000 SCS Curve No or C
	.100 Ia/S Coefficient 8.924 Initial Abstraction
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .028 .879 .000 .000 c.m/s
16	.098 .803 .169 C perv/imperv/total
10	.028 .907 .000 .000 c.m/s
10	6 Depth - Discharge - Volume sets
	179.500 .000 .0 179.800 .0110 2048.0
	180.100 .0170 4366.0 180.400 .0210 6958.0
	180.700 .0240 9827.0 181.000 964 12977.0
	Peak Outflow = .011 c.m/s
	Maximum Storage = 2017. c.m
14	.028 .907 .011 .000 c.m/s START
35	l l=Zero; 2=Define COMMENT
	3 line(s) of comment *********
	5-YEAR STORM EVENT
2	STORM
	719.500 Coefficient a
	0.340 CONSTANT D (MIN) .769 Exponent c
	.450 Fraction to peak r 240.000 Duration ó 240 min
3	41.683 mm Total depth IMPERVIOUS
-	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	98.000 SCS Curve No or C
	.518 Initial Abstraction
35	COMMENT 3 line(s) of comment
	************ Uncontrolled Area - C10 to Outlet C
4	CATCHMENT
1	10.000 ID No.ó 99999

	940	Aron in	hootaxoo		
	123.600	Length	(PERV) metre	s	
	1.000	Gradient	: (%)		
	18.000	Per cent	: Impervious	3	
	123.600	Length	(IMPERV)	h	
	.000	Option 1	L=SCS CN/C;	2=Horton;	; 3=Green-Ampt; 4=Repeat
	.250	Manning	"n"		
	74.000	SCS Curv	/e No or C		
	8.924	Initial	Abstraction	1	
	1	Option :	L=Trianglr;	2=Rectano	glr; 3=SWM HYD; 4=Lin.
Reserv		-	-		
	.0:	24	.000	.011	.000 c.m/s
1.5	ADD BUNOF	F	.000	. 32 /	c perv/imperv/cotai
	.0	24	.024	.011	.000 c.m/s
14	START				
35	I I=Ze:	ro; 2=Dei	tine		
55	3 line	(s) of co	omment		
	*******	* *			
	Uncontrol:	led Areas **	3		
4	CATCHMENT				
	1.000	ID No.ó	99999		
	55.610	Area in	hectares	-	
	1.000	Gradient	(PERV) metre - (%)	:5	
	4.000	Per cent	. Impervious	3	
	610.000	Length	(IMPERV)		
	.000	%Imp. w: Option	Lth Zero Dpt	2=Worton	· 3=Green-Ampt. /=Pepeat
	.250	Manning	"n"	2-1101 0011,	, 5-Green Ampr, 4-Repear
	74.000	SCS Curv	/e No or C		
	.100	Ia/S Coe	efficient		
	0.924	Option 3	ADStraction	2=Rectano	alr; 3=SWM HYD; 4=Lin.
Reserv					
	.3	04	.000	.011	.000 c.m/s
15	ADD BUNOF	11 F	.875	.238	C perv/imperv/total
10	.3	04	.304	.011	.000 c.m/s
4	CATCHMENT				
	10.000	ID No.ó	99999 bootaroo		
	130.000	Length	(PERV) metre	s	
	1.000	Gradient	. (%)		
	10.000	Per cent	: Impervious	3	
	130.000	Lengtn %Tmn w	(IMPERV) ith Zero Dot	h	
	1	Option :	L=SCS CN/C;	2=Horton;	; 3=Green-Ampt; 4=Repeat
	.250	Manning	"n"		
	74.000	SCS Curv	/e No or C		
	8.924	Initial	Abstraction	1	
	1	Option 3	L=Trianglr;	2=Rectang	glr; 3=SWM HYD; 4=Lin.
Reserv	0				
			204	011	
	.0	42 11	.304	.011	.000 c.m/s C perv/imperv/total
15	.2 ADD RUNOFI	42 11 F	.304 .854	.011 .275	.000 c.m/s C perv/imperv/total
15	ADD RUNOF	42 11 F 42	.304 .854 .346	.011 .275 .011	.000 c.m/s C perv/imperv/total .000 c.m/s
15 9	ADD RUNOFI .0 ROUTE	42 11 F 42	.304 .854 .346	.011 .275 .011	.000 c.m/s C perv/imperv/total .000 c.m/s
15 9	.0. .2 ADD RUNOF .00 ROUTE .000 .000	42 11 F 42 Conduit No Condu	.304 .854 .346 Length uit defined	.011 .275 .011	.000 c.m/s C perv/imperv/total .000 c.m/s
15 9	.0. 2: ADD RUNOFI .00 ROUTE .000 .000 .000	42 11 F 42 Conduit No Condu Zero lag	.304 .854 .346 Length uit defined	.011 .275 .011	.000 c.m/s C perv/imperv/total .000 c.m/s
15 9	.0 ADD RUNOF ROUTE .000 .000 .000 .000	42 11 F 42 No Condu Zero lao Beta we Pouting	.304 .854 .346 Length hit defined gighting fact	.011 .275 .011	.000 c.m/s C perv/imperv/total .000 c.m/s
15 9	.00 ADD RUNOFI .00 ROUTE .000 .000 .000 .000 .000 .000 0	42 F 42 No Conduit Zero lag Beta we Routing No. of s	.304 .854 .346 Length uit defined g ighting fact timestep sub-reaches	.011 .275 .011	.000 c.m/s C perv/imperv/total .000 c.m/s
15 9	.00 ADD RUNOFI .00 ROUTE .000 .000 .000 .000 .000 0	42 11 F 42 Vo Condu Zero lag Beta we: Routing No. of s 42	.304 .854 .346 Length nit defined glatting fact timestep sub-reaches .346	.011 .275 .011 .or	.000 c.m/s C perv/imperv/total .000 c.m/s
15 9 17	.2: ADD RUNOFI .00 ROUTE .000 .000 .000 .000 .000 .000 .000 .0	42 11 F 42 Conduit No Condui Zero lac Beta we Routing No. of s 42 tion Nod	.304 .854 .346 Length iit defined gdhting fact timestep sub-reaches .346	.011 .275 .011 .or .346	.000 c.m/s C perv/imperv/total .000 c.m/s
15 9 17		42 11 F 42 Conduit No Condu Zero lac Beta we: Routing No. of s 42 tion Node	.304 .854 .346 Length hit defined gighting fact timestep sub-reaches .346 e No. .346	.011 .275 .011 	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s
15 9 17 14		42 11 F 42 Conduit No Condu Zero lac Beta we: Routing No. of s 42 tion Node	.304 .854 .346 Length ighting fact timestep sub-reaches .346 a No. .346	.011 .275 .011 	.000 c.m/s C perv/imperv/total .000 c.m/s .346 c.m/s
15 9 17 14 25		42 11 F 42 Conduit No Condu Zero lad Beta we Routing No. of s 42 tion Node 42 ro; 2=Des	.304 .854 .a46 Length iit defined g gighting fact timestep sub-reaches .346 e No. .346 fine	.011 .275 .011 	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s
15 9 17 14 35		42 F 42 Conduit No Condu Zero lag Beta wei Routing No. of s 42 tion Node 42 ro; 2=Des (s) of cc	.304 .854 Length lit defined gubting fact timestep sub-reaches .346 a No. .346 fine	.011 .275 .011 .011 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s
15 9 17 14 35		42 F 42 Conduit No Condu Zero lad Beta wei Routing No. of s 42 tion Node 42 ro; 2=Dei (s) of co	.304 .854 .346 Length lit defined g dighting fact timestep sub-reaches .346 e No. .346 fine comment	.011 .275 .011 	.000 c.m/s C perv/imperv/total .000 c.m/s .346 c.m/s
15 9 17 14 35		42 F 42 Conduit No Condu Zero lad Beta we: Routing No. of s 42 tion Node 42 ro; 2=De! (s) of co	.304 .854 Jangth Jit defined g gub-reaches .346 e No. .346 fine comment	.011 .275 .011 .or .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s
15 9 17 14 35		42 F F 42 Conduit No Condi Zero lac Beta we: Routing No. of s 42 tion Node 42 ro; 2=De: (s) of co	.304 .854 Length jit defined g ubreaches .346 e No. .346 fine comment	.011 .275 .011 .or .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s
15 9 17 14 35 4		42 II F 42 Conduit No. Condu Zero lat Beta we's Routing No. of s 42 tion Node 42 tion Node 42 tion Sofe 42 tion Node 42 tion Sofe tion Node 42 tion Node 43 tion Node 44 tion Node 42 tion Node 43 tion Node 44 tion Node 44 tion Node 45 tion Node 45 tion Node 46 tion Node 47 tion Node 48 tion Node tion Node	.304 .854 .346 Length jit defined	.011 .275 .011	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s
15 9 17 14 35 4		42 F F 42 Conduit No Condu Zero lag Beta we: Routing No. of : 42 tion Node 42 tion Node 42 tion So conduct 42 tion Node 42 tion Node 43 tion Node 44 tion Node 44 tion Node 44 tion Node 45 tion Node 47 tion Node 48 tion Node tion Node ti	.304 .854 .346 Length jit defined gubracht fact timestep sub-reaches .346 e No. .346 fine pmment 99999 hectares	.011 .275 .011 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s
15 9 17 14 35 4		42 F F 42 Conduit No Conduit Zero lag Beta we's Routing No. of s 42 tion Node 42 tion Node 42 tion Node 42 To; 2=Des (s) of co ** TD No.ó Area in Length Cradient	.304 .854 .346 Length iit defined g gubreaches .346 e No. .346 fine omment 99999 hectares (PERV) metrec (a)	.011 .275 .011 .007 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s
15 9 17 14 35 4		42 F F 42 Conduit No Condu Zero lac Beta wei Routing No. of : 42 tion Node 42 tion Node 42 (s) of cc ** * ID No.6 Area in Length Gradieni Fer cent	.304 .854 .346 Length Jit defined ghting fact timestep sub-reaches .346 a No. .346 fine omment 99999 hectares (FERV) metre c (%)	.011 .275 .011 .011 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s
15 9 17 14 35 4		42 F 42 Conduit No Condu Zero lao Beta we's Routing No. of s 42 tion Node 42 tion Node 42 ro; 2=Des (s) of co ** ** ID No.ó Area in Length Per cent	.304 .854 .346 Length mit defined J gghting fact timestep sub-reaches .346 e No. .346 fine pomment 99999 hectares (PERV) metre : (%)	.011 .275 .011 .or .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .346 c.m/s
15 9 17 14 35 4		42 F F 42 Conduit No Conduit Zero lac Beta we's Routing No. of : 42 tion Node 42 tion Node 43 tion Node tion Node	.304 .854 .346 Length iit defined g sub-reaches .346 e No. .346 fine y9999 hectares (PERV) metre c (%) c (MPERV) ith Zero Dpt	.011 .275 .011 .346 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s
15 9 17 14 35 4		42 F 42 Conduit No Condu Zero lag Routing No. of : 42 tion Node 42 ro; 2=De: (s) of co ** ID No.6 Area in Length Gradient Per cent Length Simp. w: Option :	.304 .854 .346 Length jit defined g gubreaters .346 e No. .346 fine omment 99999 hectares (PERV) metre c (%) Impervious (IMPERV) ith Zero Dpt =SCS CN/C; "n"	.011 .275 .011 .346 .346 .346	.000 c.m/s .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat
15 9 17 14 35 4		42 F F 42 Conduit No condi Zero lag Routing No. of : 42 tion Node 42 tion Node 42 ro; 2=Des (s) of co ** ** ID No.ó Area in Length Gradient Per cent Length Suppin w: Manning SCS Curr	.304 .854 .346 Length mit defined g gghting fact timestep sub-reaches .346 a No. .346 fine omment 99999 hectares (PERV) metre c (%) c Impervious (IMPERV) th Zero Dpt th Zero Dpt = SCS CN/C; "n" ve No or C	.011 .275 .011 .346 .346 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat
15 9 17 14 35 4		42 F F 42 Conduit No Condi Zero lac Beta we's Routing No. of : 42 tion Node 42 tion Node tion Node	.304 .854 .346 Length jit defined gubreaches .346 e No. .346 fine omment 99999 hectares (%) c (%) c (%	.011 .275 .011 .346 .346 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat
15 9 17 14 35 4		42 F F 42 Conduit No Conduit Zero lac Beta we's Routing No. of : 42 tion Node 42 tro; 2=De: (s) of co ** * ID No.ó Area in Length %Imp. w: Option : Manning SCS Curr Ia/S Cov Initial Option :	.304 .854 .346 Length iit defined gubrreaches .346 e No. .346 fine .346 fine y99999 hectares (PERV) metre c (%) c Impervious th Zero Dpt =SCS CN/C; "n" re No or C efficient Abstraction	.011 .275 .011 .346 .346 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat
15 9 17 14 35 4 8		42 F F Conduit No condi Zero lag Routing No. of : 42 tion Node 42 tion Node 42 (s) of co ** ** ID No.6 Area in Length Simp. w. Øtimp. w. Øtimp. Scs Curri Maning Scs Curri Initial Option : Sci Cor	.304 .854 .346 Length jit defined gighting fact timestep ub-reaches .346 e No. .346 fine omment 99999 hectares (PERV) metre c (%) c Impervious (IMPERV) the Zero Dpt LeSCS CN/C; "n" e No or C efficient Abstractior	.011 .275 .011 .346 .346 .346 .346 .346 .346	<pre>.000 c.m/s C perv/imperv/total .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin.</pre>
15 9 17 14 35 4		42 F F 42 Conduit No.condu Zero lay Routing No. of s 42 tion Node 42 tion Node 42 tion Node 42 tion Node 42 TD No.ó Area in Length Gradient Per cent Length SUPDIEN Manning SCS Curr Initial Option : 51	.304 .304 .854 .346 Length mit defined J gghting fact timestep sub-reaches .346 e No. .346 fine comment 99999 hectares (%) compervious ((MPERV) metre c (%) compervious ((MPERV)) th Zero Dpt leSCS CN/C; "n" ce No or C efficient Abstraction l=Trianglr; .000	.011 .275 .011 .or .346 .346 .346 2=Horton, 2=Horton, 2=Rectang .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s
15 9 17 14 35 4 		42 F F 42 Conduit No condi Zero lac Beta we's Routing No. of : 42 tion Node 42 tion Node 42 (s) of cc ** * ID No.6 Area in Length Gradient Per cent Length SCS Curv Ia/S Coc Initial Option : 51 11 F	.304 .304 .854 .346 Length jit defined y sub-reaches .346 e No. .346 fine mment 99999 hectares (%) c Impervious c (%) c Impervious th Zero Dpt leSCS CN/C; "n" ce No or C efficient Abstractior =Trianglr; .000 .868	.011 .275 .011 .346 .346 .346 .346 .346 	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total
15 9 17 14 35 4 Reserv		42 F F Conduit No condu Zero lag Routing No. of 2 42 tion Node 42 tion Node 42 (s) of co ** ID No.6 Area in Length Gradient Per cent Length Simp. w. Option : 51 F 51 51	.304 .354 .346 Length jit defined gdpting fact timestep ub-reaches .346 fine omment 99999 hectares (PERV) metre c (%) c Impervious (IMPERV) th Zero Dpt l=SCS CN/C; "n" ve No or C efficient Abstractior =Trianglr; .000 .868	.011 .275 .011 .011 .346 .346 .346 2=Horton; .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s
15 9 17 14 35 4 Reserv 15 4		42 F 42 Conduit No Condu Zero lag Routing No. of 2 42 tion Node 42 tion Node 42 (s) of co ** ** ID No.ó Area in Length %Impo w: Option : 51 SCS Currial Particial Sci Control Sci Control S	.304 .304 .854 .346 Length mit defined g gghting fact timestep sub-reaches .346 a No. .346 fine omment 99999 hectares (PERV) metre (%) th Zero Dpt elscs CN/C; "n" c %) or C afficient Abstractior .868 L.551	.011 .275 .011 .346 .346 .346 .346 2=Rorton, .346 .605 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s
15 9 17 14 35 4 Reserv 15 4		42 F F 42 Conduit No.condi Zero lac Beta we's Routing No. of s 42 tion Node 42 tion Node 42 ro; 2=Des (s) of cc ** * ID No.ó SCS Curr Ianing SCS Curr Ianing SCS Curr Ianing SCS Curr SI II ID No.ó	.304 .354 .346 Length jit defined gubreates .346 a No. .346 fine comment 99999 hectares (%) comment 99999 hectares (%) comment 99999 hectares (%) comment 99999 hectares (%) comment 99999 hectares (%) comment 99999 hectares (%) comment 99999 hectares (%) comment 99999 hectares (%) comment 99999 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment 9868 hectares (%) comment (%	.011 .275 .011 .or .346 .346 .346 .346 .2=Rectang .346 .605 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s
15 9 17 14 35 4 Reserv 15 4		42 F F 42 Conduit No Condu Zero lag Routing No. of : 42 tion Node 42 ro; 2=Dei (s) of co ** * ID No.6 Area in Length %Imp. w: Option : 51 I ID No.6 Area in Length %Imp. w: 51 I ID No.6 Area in Length %Imp. w: 51 I ID No.6 Area in Length %Imp. w: 51 I I D No.6 Area in Length %Imp. w: 51 I I D No.6 Area in Length %Imp. w: 51 I D No.6 Area in Length %Imp. w: 51 N Length %Imp. w: 51 I D No.6 Area in Length %Imp. w: 51 I D No.6 Area in Length %Imp. w: 51 I D No.6 Area in Length %Imp. w: 51 I D No.6 Area in Length %Imp. w: 51 I I D No.6 Area in Length %Imp. w: 51 I I D No.6 Area in Length %Imp. w: 51 I I I M M M M M M M M M M M M M	.304 .854 .346 Length iii defined y sub-reaches .346 e No. .346 fine mment 99999 hectares (FERV) metre c (%) c Impervious (IMPERV) th Zero Dpt L=SCS CN/C; "n" re No or C efficient Abstractior L=Trianglr; .000 .868 L.551 99999 hectares	.011 .275 .011 .346 .346 .346 .346 .346 .2=Rectang .346 .605 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s
15 9 17 14 35 4 Reserv 15 4		42 Conduit F 42 Conduit No.condu Zero lad. Routing No. of s 42 tion Node 42 ro; 2=De! (s) of co ** ** ID No.ó Area in Length Gradient Per cent SCS Curr Ta/S Cot Initial Option : 51 II D No.ó Area in Length SCS Curr F 51 II D No.ó Area in Length SCS Curr F 51 II D No.ó Area in Length Gradient F 51 II D No.ó Area in Length Gradient F 51 II D No.ó Area in Length Gradient F 51 II D No.ó Area in Co Initial Co Initial Co Initial Co Initial Co Initial Co Initial Co Initial Co Initial Co Initial Co Initial Co Initial Co Initial Co Initial Co Initial Co Co Area in Length Co Co Co Co Co Co Co Co Co Co	.304 .304 .854 .346 Length jit defined .346 a No. .346 fine .346 fine .346 fine .346 fine .346 fine .346 fine .346 .346 .346 .346 .346 .346 .346 .346	.011 .275 .011 .346 .346 .346 .346 2=Horton, 2=Horton, .346 .605 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s
15 9 17 14 35 4 Reserv 15 4		42 TI F 42 Conduit No.condi Zero lay Beta we's Routing No. of s 42 tion Nodd 42 tion Nodd 42 tion Nodd 42 tion Nodd 42 ** ** ID No.ó Area in Length Gradient Option : 51 ID No.ó Area in Length SCS Curr 51 ID No.ó Area in Length Gradient Fr 51 ID No.ó	.304 .304 .854 .346 Length mit defined J didfing fact timestep sub-reaches .346 e No. .346 fine comment 99999 hectares (%) Chargervious (MPERV) th Zero Dpt leSCS CN/C; "n" e No or C efficient Abstraction l=Trianglr; .000 .868 L.551 99999 hectares (PERV) metre c (%) .000 .868	.011 .275 .011 .or .346 .346 .346 .346 2=Rectang .346 .605 .346 .605 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s
15 9 17 14 35 4 Reserv 15 4		42 F 42 Conduit No Condi Zero lac Beta we's Routing No. of : 42 tion Node 42 tion Node 42 tion Node 42 ** * ID No.6 Area in Length Support Manning SCS Curv Ia/S Corv Initial Option : 51 II D No.6 Area in Length STD 51 II D No.6 Area in Length STD 51 II D No.6 Area in Length STD 51 II D No.6 Area in Length STD 51 II D No.6 Area in Length STD 51 II STD	.304 .304 .854 .346 Length jit defined y sub-reaches .346 e No. .346 fine mment 99999 hectares (%) c Impervious (IMPERV) ith Zero Dpt leSCS CN/C; "n" ze No or C efficient Abstraction =Trianglr; .000 .868 l.551 99999 hectares (FERV) metre c (%) c Impervious (IMPERV)	.011 .275 .011 .346 .346 .346 .346 .346 .2=Rectang .346 .605 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s
15 9 17 14 35 4 Reserv 15 4		42 F 42 Conduit No condi Zero lad Routing No. of : 42 tion Node 42 tion Node 42 (s) of co ** ** ID No.6 Area in Length %Imp. w. Option : 51 ID No.6 Area in Length ScS Curr F 51 ID No.6 Area in Length Gradient F 51 ID No.6 Area in Length Gradient F 51 ID No.6 Area in Length Gradient F 51 ID No.6 Area in Length Gradient F 51 Co Area in Length Gradient F 51 Co Area in Length Gradient F 51 Co Area in Length Gradient F 51 Co Area in Length Simp. w. Option : Co Area in Length Gradient F Sim (co Area in Length Gradient F Co (co Area in Length Gradient F Co (co Area in Length Sim (co Co Co (co Co Co (co Co Co (co Co (co Co (co Co (co Co (co Co (co (co (co (co (co (co (co (c	.304 .304 .854 .346 Length lit defined 	.011 .275 .011 .011 .346 .346 .346 .346 .2=Horton, .346 .605 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s ; 3=Green-Ampt; 4=Repeat
15 9 17 14 35 4 Reserv 15 4		42 Conduit F 42 Conduit No.condu Zero lag. Routing No. of 2 42 tion Node 42 tion Node 42 tion Node 42 ** ** ID No.ó Area in Length %Imp. w: Option : 51 ID No.ó Area in Length %Imp. w: Option : 51 ID No.ó Area in Length %Imp. w: Option : 51 ID No.ó Area in Length %Imp. w: Option : 51 ID No.ó	.304 .304 .854 .346 Length mit defined j gdhing fact timestep sub-reaches .346 a No. .346 fine omment 99999 hectares fine comment 99999 hectares (MPERV) metre c (%) c No or C afficient Abstraction L=Trianglr; .000 .868 L.551 99999 hectares (PERV) metre c (%) c (%)	.011 .275 .011 .or .346 .346 .346 .346 .346 .346 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s glr; 3=Green-Ampt; 4=Repeat .346 c.m/s C perv/imperv/total .346 c.m/s ; 3=Green-Ampt; 4=Repeat
15 9 17 14 35 4 Reserv 15 4		42 F F 42 Conduit No condi Zero lac Beta we's 42 tion Node 42 tion Node 42 ro; 2=De: (s) of co ** * ID No.6 Area in Length SIMD, w: Option : 51 II D No.6 Area in Length SIMD, w: Option : 51 II ID No.6 Area in Length SIMD, w: Option : 51 II D No.6 Area in Length SCS Curr F F SIMD, w: Option : 51 ID No.6 Area in Length Gradient Per cent Length Gradient F SIMD, w: Option : 51 ID No.6 Contine in Contine in Contin Contine in Contine in Contine in Contine in Contin Con	.304 .304 .854 .346 Length iit defined .346 .346 .346 .346 .346 .346 .346 .346	.011 .275 .011 .or .346 .346 .346 .346 .2=Horton, .346 .605 .346 .346 .605 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s ; 3=Green-Ampt; 4=Repeat
15 9 17 14 35 4 Reserv 15 4		42 F F Conduit No Condu Zero lag. Routing No. of s 42 tion Node 42 tion Node 42 (s) of co ** ** ID No.6 Area in Length Gradient Per cent Length Simp. w. Option : 51 ID No.6 Area in Length Simp. w. Option : 51 ID No.6 Area in Length Simp. w. Option : 51 ID No.6 Area in Length Simp. w. Option : Manning SCS Curr IA/S Cot Initial Manning SCS Curr IA/S Cot Initial SCS Curr IA/S Cot Initial IN SCS Curr IA/S Cot Initial IN SCS Curr IA/S Cot Initial IN IN IN SCS Curr IA/S Cot Initial SCS Curr IA/S Cot Initial IN IN SCS Curr IA/S Cot Initial IN IN IN IN IN IN IN IN IN IN	.304 .304 .354 .346 Length lit defined gdpting fact timestep ub-reaches .346 fine omment 99999 hectares (FERV) metre c (%) c Impervious (IMPERV) th Zero Dpt l=SCS CN/C; "n" .000 .868 l.551 99999 hectares (FERV) metre c (%) c Impervious (IMPERV) th Zero Dpt l=SCS CN/C; "n" .000 .868 l.551 99999 hectares (%) c Impervious (IMPERV) th Zero Dpt l=SCS CN/C; "n" .000 .386 c Impervious c (%) c Impervious c Impervious	.011 .275 .011 .346 .346 .346 .346 2=Horton; .346 .346 .346 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s ; 3=Green-Ampt; 4=Repeat
15 9 17 14 35 4 8 Reserv 15 4		42 Conduit F 42 Conduit No condi Zero lad. Routing No. of 3 42 tion Node 42 ro; 2=De! (s) of co ** ** ID No.6 Area in Length Gradient Per cent Length SCS Curry Ta/S Cot Initial Option : 51 II No.6 Area in Length ST 51 II Por cent Length SCS curry II No.6 Area cent SCS curry II No.6 Area in Length SCS curry II No.6 Area in Length SCS curry II No.6 Area in Length SCS curry II No.6 Area in Length SCS curry II No.6 Area in Length SCS curry II SCS curry II No.6 Area in Length SCS curry II No.6 Area in Con II No.6 Area in Length SCS curry II No.6 Area in Length SCS curry II No.6 Area in Length SCS curry II No.6 Area in Cordinitial Option : SCS curry II Arson SCS curry II Arson Ars	.304 .304 .3854 .346 Length pit defined .346 .346 .346 .346 .346 .346 .346 .346	.011 .275 .011 .346 .346 .346 .346 .346 .346 .346 .346	.000 c.m/s C perv/imperv/total .000 c.m/s .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin. .346 c.m/s C perv/imperv/total .346 c.m/s ; 3=Green-Ampt; 4=Repeat glr; 3=SWM HYD; 4=Lin.

Stormwater Management Plan McLeod Meadows , City of Niagara Falls

Reserv							
		050 211	1.551	.346	с ,	.346 c.m/s	
15	ADD RUNO	FF			- 1		
10	POND	050	1.601	.346		.346 c.m/s	
	6 Depth -	Discharg	re - Volume	sets			
	179.800	.01	.10 20	48.0			
	180.100	.01	.70 43	66.0			
	180.700	.02	40 98	27.0			
	181.000 Peak Out	.9 flow =	064 129	77.0			
	Maximum	Depth =	180.062	metres			
	Maximum	Storage = 050	4075.	c.m .016		.346 c.m/s	
17	COMBINE						
	ı Jun	Ction Noo 050	1.601	.016		.353 c.m/s	
35	COMMENT 3 lin	e(e) of a	omment				
	*******	***	onneric				
	Flow at *******	Outlet A ***					
18	CONFLUEN	CE					
	I Jun	ction Nod 050	ie No. .353	.016		.000 c.m/s	
14	START	oro. 2=Do	fine				
35	COMMENT	ero; z=be	ittlie				
	3 lin	e(s) of c *****	comment				
	100-YEAR	STORM EV	ENT				
2	******* STORM	****					
	1	1=Chica	go;2=Huff;	3=User;4=	Cdnll	hr;5=Historic	
	7.720	Constan	it b (m	in)			
	.781	Exponen	it c	~			
	240.000	Duratic	on ó 240 m	in			
3	IMPERVIO	68.280 m US	um Tota	l depth			
	1	Option	1=SCS CN/C	; 2=Horto	n; 3:	=Green-Ampt; 4=Repeat	
	98.000	SCS Cur	rn" ve No or C				
	.100	Ia/S Co	efficient				
35	COMMENT	Iniciai	. ADSCINCT	011			
	3 lin *******	e(s) of c ***	comment				
	Uncontro	lled Area	- C10 to	Outlet C			
4	CATCHMEN	T					
	10.000	ID No.ć	999999 bectares				
	123.600	Length	(PERV) met	res			
	1.000 18.000	Gradien Per cen	ıt (%) ıt Impervio	us			
	123.600	Length	(IMPERV)	- + 1			
	.000	Option	1=SCS CN/C	; 2=Horto	n; 3:	=Green-Ampt; 4=Repeat	
	.250	Manning SCS_Cur	r"n" ve No or C				
	.100	Ia/S Co	efficient				
	0.924	Option	1=Trianglr	; 2=Recta	nglr.	; 3=SWM HYD; 4=Lin. Reser	v
		046 347	.000	.016	с ,	.000 c.m/s	
15	ADD RUNO	FF			0 1	per () imper () cocur	
14	START	046	.046	.016		.000 c.m/s	
25	1 1=Z	ero; 2=De	fine				
55	3 lin	e(s) of c	comment				
	******* Uncontro	*** lled Area	IS				
	*******	***					
4	1.000	T ID No.ć	99999				
	55.610	Area in Length	(PEPV) met	ree			
	1.000	Gradien	(111(0)) mee	200			
	4.000 610.000	Per cen Length	t Impervio (IMPERV)	us			
	.000	%Imp. w	ith Zero D	pth		-Curren Daueta d-Dauent	
	.250	Manning	1-303 CN/C ["n"	, 2-HOICO	11, 5.	-Green-Ampt, 4-Repeat	
	74.000	SCS Cur Ta/S Co	ve No or C				
	8.924	Initial	Abstracti	on			
	1.	Option 020	.000	; 2=Recta .016	ngir,	; 3=SWM HYD; 4=Lin. Reser .000 c.m/s	v
15	ADD RINO	347 FF	.918	.370	Сl	perv/imperv/total	
15	ADD KONO 1.	020	1.020	.016		.000 c.m/s	
4	CATCHMEN 10.000	T ID No.ć	99999				
	2.460	Area in	hectares				
	1.000	Length Gradien	(FERV) Met. it (%)	162			
	10.000	Per cen	t Impervio	us			
	.000	%Imp. w	ith Zero D	pth			
	.250	Option Manning	1=SCS CN/C	; 2=Horto	n; 3:	=Green-Ampt; 4=Repeat	
	74.000	SCS Cur	ve No or C				
	8.924	Initial	Abstracti	on			
	1	Option 099	1=Trianglr 1.020	; 2=Recta .016	nglr,	; 3=SWM HYD; 4=Lin. Reser .000 c.m/s	v
		347	.909	.403	С	perv/imperv/total	

15	ADD RUNO	FF	1 071	01.0	000/-
9	ROUTE	099	1.0/1	.010	.000 C.m/s
	.000	Condu	it Length		
	.000	No Co:	nduit def	ined	
	.000	Beta	ray weighting	factor	
	.000	Routi	ng timest	ep	
	0	No. o	f sub-rea	ches	
17	COMBINE	099	1.0/1	1.0/1	.000 c.m/s
	1 Jun	ction N	ode No.		
		099	1.071	1.071	1.071 c.m/s
14	START	ara. 2=	Dofino		
35	COMMENT	210, 2-	Dertife		
	3 lin	e(s) of	comment		
	*******	***			
	********	***			
4	CATCHMEN	г			
	11.000	ID No	.6 99999		
	16.320	Lengt	in hectar h (PERV)	es metres	
	1.000	Gradi	ent (%)		
	60.000	Per c	ent Imper	vious	
	330.000	Lengt:	h (IMPERV) o Doth	
	.000	Optio:	n 1=SCS C	N/C; 2=Hortor	; 3=Green-Ampt; 4=Repeat
	.250	Manni	ng "n"		
	74.000	SCS C	urve No o	rC	
	.100	Ia/S I Initi	Coefficie al Abstra	nt ction	
	1	Optio	n 1=Trian	glr; 2=Rectar	nglr; 3=SWM HYD; 4=Lin.
Reserv					
	2.	569 347	.000	1.071	1.0/1 c.m/s C pery/impery/total
15	ADD RUNO	FF	. 520	.001	o perty imperty coedr
	2.	569	2.569	1.071	1.071 c.m/s
4	CATCHMEN	T TD No.	6 00000		
	2.960	Area	in hectar	es	
	140.000	Lengt	h (PERV)	metres	
	1.000	Gradi	ent (%)		
	140 000	Lengt	ent imper h (IMPERV	Vlous	
	.000	%Imp.	with Zer	o Dpth	
	1	Optio	n 1=SCS C	N/C; 2=Hortor	n; 3=Green-Ampt; 4=Repeat
	.250	Manni SCS C	ng "n" urve No o	rC	
	.100	Ia/S	Coefficie	nt	
	8.924	Initi	al Abstra	ction	
Decort	1	Optio	n l=Trian	glr; 2=Rectar	nglr; 3=SWM HYD; 4=Lin.
NGSEL V		116	2.569	1.071	1.071 c.m/s
		347	.907	.403	C perv/imperv/total
15	ADD RUNO	FF 116	2 677	1 071	1 071 c m/s
10	POND .	110	2.077	1.0/1	1.0/1 0.11/3
	6 Depth -	Discha	rge - Vol	ume sets	
	179.500		.000	.0	
	180.100		0170	4366.0	
	180.400		0210	6958.0	
	180.700		0240	9827.0	
	Peak Out	flow	.964	12977.0 022 c.m/s	
	Maximum	Depth	= 180.	511 metres	
	Maximum	Storage	= 80	23. c.m	
17	COMBINE	110	2.677	.022	1.0/1 c.m/s
1 /	1 Jun	ction N	ode No.		
		116	2.677	.022	1.091 c.m/s
35	COMMENT				
	5 Lln *******	e(S) Oİ ***	comment		
	Flow at	Outlet .	A		
1.0	*******	***			
10	1 Jun	ction N	ode No.		
		116	1.091	.022	.000 c.m/s
20	MANUAL				