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UCC File: 5331

FUNCTIONAL SERVICING REPORT

Rosedale Subdivision City of Port Colborne November 2023

INTRODUCTION

Upper Canada Consultants has been retained to undertake and provide a Functional Servicing Report to address the servicing needs and requirements for the proposed residential development known as Rosedale Subdivision as part of the Draft Plan of Subdivision application process for the City of Port Colborne.

The project site is located in the City of Port Colborne as part of Lot 30 and Concession 3 and is situated south of Stonebridge Drive, west of Elm Street, with West Side Road (Highway 58) at the west site limits and at the north limit of Oxford Boulevard. The site is approximately 12.77 hectares and shall consist of 131 single family dwellings and 118 townhouse units for a total unit count of 249 units. A park block (Block 153) will be located at the south-east corner of the site and Block 154 at the north limits will consist of the proposed Stormwater Management (SWM) Facility.

Currently, separate engineering submission are being made for the easterly adjacent Meadow Heights (Phase 3) subdivision. It is expected that the Meadow Heights development will be completed prior to the Rosedale Subdivision and the servicing infrastructures from both developments will ultimately be connected. The site shall include associated asphalt road, concrete curb, catch basins, storm sewers, sanitary sewers, and watermain.

The objectives of this study are as follows:

- 1. Identify domestic and fire protection water service needs for the site;
- 2. Identify sanitary servicing needs for the site; and,
- 3. Identify stormwater management needs for the site.

WATER SERVICING

The following existing watermains are located in close proximity to the proposed development:

- 400mm diameter watermain on Stonebridge Drive
- 300mm diameter watermain on Meadowlark Drive
- 150mm diameter watermain on Oxford Boulevard



It is expected as part of the adjacent Meadow Heights Subdivision development, the 300mm diameter Meadowlark Drive watermain will be extended westerly on Meadowlark Drive to the new Parkside Drive and then continue northerly to the proposed Westfield Place at the north end of the site. This 300mm diameter watermain will then continue north, immediately adjacent to the Rosedale SWM facility, and ultimately connect to the Stonebridge Drive 400mm diameter watermain providing a loop.

The servicing plan for the proposed Rosedale Subdivision will result in watermain connections at the following locations to provide both domestic and fire water supply:

- 300mm diameter Meadowlark Drive watermain extended westerly from Meadow Heights
- 300mm diameter Westfield Place watermain
- 150mm diameter Oxford Boulevard watermain

Fire protection will be provided to the proposed development with municipal fire hydrants within the subdivision. The sizes and locations of the proposed internal watermain and hydrants will be finalized as part of the future detailed design. It is expected approximately 8 proposed municipal hydrants will be required on this site to adequately provide the necessary fire protection.

Upper Canada Consultants has undertaken a watermain analysis using the EPANET software to model flows and pressures within the existing and proposed system as a result of the proposed development under various conditions. The software was used to model the conditions utilizing average day, maximum day, and peak unit consumption rates per MECP standards. The model has been calibrated utilizing hydrant test flow data provided by the municipality from tests conducted in May/June of this year and have ensured supportable conclusions for this development.

As the adjacent Meadow Heights (Phase 3) subdivision has not yet been completed, this development has included both subdivisions within the modelling. The modelling utilizes the proposed watermains to be constructed as part of the proposed development plan for Mead Heights Phase 3, and a preliminary watermain design for the proposed Rosedale Subdivision. It is proposed to extend the 300mm diameter Meadowlark Drive watermain to Street B in Rosedale Subdivision, and continue with a 150mm diameter for the remainder of the subdivision. Images detailing the proposed watermain design can be found in Appendix A. Elevations were used per the Rosedale Preliminary Grading Design page also included in Appendix A

The EPANET model has utilized flow test data from seven hydrants located at the following locations:

- 1. Apollo Drive at Oriole Crecent (Hyd #6300009)
- 2. Meadowlark Drive, 120m west of Elm Street (Hyd #63000020)
- 3. Fronting #59 Hillcrest Road (Hyd # 63000304)
- 4. Fronting #10 Oxford Boulevard (Hyd #63000157)
- 5. Fronting #20 Oxford Boulevard (Hyd #63000158)
- 6. Stonebridge Drive, 2nd hydrant east of Highway 58 (Hyd #63000160)
- 7. Stonebridge Drive, 2nd hydrant west of Petersburg Circle (Hyd #63000283)



The model was able to replicate the static and residual pressures in the above noted hydrants to within 5% of the values documented from in the City of Port Colbornes' hydrant testing results as shown on the calculation page in Appendix A. Different pressure zones were observed north and south of the proposed subdivision. Through the modelling, an increase of approximately 5% was noted to the static pressure at existing Oxford Boulevard hydrants while a decrease of approximately 2% was noted to the static pressures on Stonebridge Drive as the pressure equalizes with the new connections. However, this new looping is modelled to significantly increase the future calculated theoretical fire flows at 20PSI in all existing fire hydrants

Due to the extreme elevation differences on the site, the proposed hydrant located at the highest point at the intersection of Oxford Boulevard and Street 'C' will experience the lowest pressures (and therefore flows rates) through this modelling. The hydrant will provide a reduced flow rate of 150L/s at 20 PSI under peak day conditions. Per Table 8 of the 'Water Supply of Public Protection' guideline (Fire Underwriters Survey, 2020) regarding minimum required flow rates for row housing exposures, a minimum flow rate of 133.3L/s is required for townhouses experiencing exposure distances of 3 to 10m. As all townhouse structures on site are separated by approximately 3.1m, and the minimum provided fire flow is greater than 133.3L/s, the proposed watermain system is expected to provide sufficient fire flow for the development. Additionally, as shown in the Rosedale Subdivision Static Pressure imagery in Appendix A, all proposed hydrants within the system will provide static pressures within the preferred system range of 50-80 PSI (35.2-56.2 m of H2O). Only the existing hydrant fronting #59 Hillcrest Road will remain slightly below at 45.4 PSI (higher than the 40PSI minimum standard), though this is an increase from existing conditions.

This model is limited in scope with regards to the impact of the City's system. Therefore, tolerances between this analysis and the City's overall model should prioritize results obtained from the large City model. It should be noted that the pressures and flow rates observed by this model are purely theoretical, attempting to replicate information provided by the City's hydrant flow test data for hydrants within the immediate vicinity of the proposed development site. Without a complete model of the city's entire water system, a highly accurate model providing reliable flow rate data for the future development is unobtainable.

SANITARY SERVICING

There is an existing 300mm diameter municipal sanitary sewer located on Stonebridge Drive conveying flows westerly before directing flows north-east along the south limit of the Biederman Municipal Drain. The sewer conveys flows easterly along the south limit of the Elm Street Lease Free Dog Park before discharging flows to the Industrial Park Sanitary Pumping Station.

As part of the adjacent Meadow Heights (Phase 3) subdivision, a 300mm diameter sanitary sewer will be constructed immediately east of the proposed Rosedale Subdivision Stormwater Management Facility, through a servicing easement on the Van Jon Paving property (#64 Stonebridge Drive), and discharge to a maintenance hole on Stonebridge Drive at the extreme upstream limit of the sanitary sewer. It is proposed to discharge sanitary flows from the proposed



Rosedale Subdivision to the 300mm diameter Meadow Heights easement sanitary sewer. This easement sanitary sewer has been designed to convey sanitary flows from the proposed Rosedale Subdivision development.

An overall sanitary analysis has been conducted and included in Appendix B for the municipal sanitary sewer system downstream of the proposed development site from the site connection to the Regional Sanitary Sewer at the Industrial Park Sanitary Pumping Station (SPS). The analysis utilizes a flow rate of 0.2 L/s/gross hectare as well as a Peak Factor of 2.0 for industrial lands north of the site as recommended in the 'Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under an Environmental Compliance Approval' per the Ministry of the Environment, Conservation and Parks (MECP, 2023). Additionally, an Infiltration Rate of 0.28 L/s/ha is used with a Residential Flow rate of 255 L/cap/day per Regional '2021 Water and Wastewater Master Servicing Plan Update' (2023). All existing sanitary sewer information utilized in the analysis is per information provided by the City of Port Colborne.

The analysis has concluded that the proposed Rosedale Subdivision development will discharge a peak dry weather flow of approximately 8.55L/s and a peak wet weather flow of 11.87L/s to the downstream municipal sanitary sewer system. With the combination of the proposed development and surrounding properties, the existing downstream municipal sanitary sewer system reaches maximum capacities of approximately 75% upon reaching the Elm Street Dog Park south property limit. This includes numerous areas of currently undeveloped industrial lands within Drainage Areas E5, E6, E8 and E9. Therefore, it is expected that the downstream municipal sanitary infrastructure will have sufficient capacity for the proposed development.

Previous conversations occurred with the Niagara Region discussing the possibility of discharging sanitary flows from the existing Oxford Boulevard SPS into the proposed development to ultimately be included within the Industrial Park SPS Overall Drainage Area. As such, two additional calculation sheets have been included in Appendix B. The first calculation sheet includes and additional flow of 7.6L/s per the Oxford SPS ECA Firm Capacity which ultimately increases the downstream maximum sanitary sewer capacity to 93.2%. The second sanitary calculation sheet includes the sanitary flow rate calculated by UCC for the Oxford Boulevard SPS, concluding in a flow rate of 4.49L/s. This would result in a maximum downstream sanitary capacity of 85.7%. However, no further details have been provided by the Region on this matter, and as such, these additional flows are not expected to be included in the future Rosedale Subdivision sanitary sewer design.

STORMWATER MANAGEMENT PLAN

As part of the site development, the following is a summary of the stormwater management plan for the proposed residential development.

The criteria provided by the City of Port Colborne and Region of Niagara for this development includes the requirement to control peak stormwater flows from the proposed development area to



existing levels up to and including the 100 year design storm event and improve stormwater quality levels to MECP Normal (70% TSS removal) Protection levels prior to discharge from the development.

To limit future stormwater flows to allowable levels, and improve stormwater quality to the required TSS removal levels, a Stormwater Management (SWM) Wetpond Facility will provide the necessary controls for this development. The SWM facility will be located at the north limit of the proposed development and discharge stormwater flows to a storm sewer located at the northwest corner of the site. Stormwater flows will then be directed to the Biederman Drain north of the site. Stormwater quality levels will be treated to a Normal Standard (70% TSS removal) before discharging from the development site.

Stormwater flows up to and including the 5 year design storm event will be directed to the SWM facility via storm sewers. During major storm events greater than the 5 year event, stormwater flows unable to enter the storm sewer system will be directed overland towards to the SWM facility. Additionally, overland stormwater flows from the adjacent Meadow Heights Subdivision will be directed to the Rosedale Subdivision SWM Facility. A Stormwater Management Plan for this development has been created and can be found in Appendix C.



CONCLUSIONS AND RECOMMENDATIONS

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

- 1. The existing municipal watermain system will have sufficient capacity to provide both domestic and fire protection water supply.
- 2. The existing municipal sanitary sewer system downstream of the site will have adequate capacity for the proposed residential development.
- 3. Stormwater quality controls are being provided to Normal Protection (70% TSS removal) levels by a stormwater wetpond facility before outletting to the Biederman Drain.
- 4. Stormwater quantity controls are being provided by a stormwater management wetpond facility up to the 100 year design storm event prior to discharging from the site.
- 5. The site stormwater overland route from the road system is to the proposed stormwater management facility before outletting to the Biederman Drain.

Based on the above and the accompanying Stormwater Management Brief, 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.

Yours very truly, Jason Schooley, P.Eng.

Jason Schooley, P.Eng. November 22, 2023

Encl.





APPENDICES



APPENDIX A

EPANET – Existing Conditions Imagery (Sewer Diameters) EPANET – Existing Conditions Imagery (Static Pressures in m of H₂O) EPANET – Future Conditions Imagery (Sewer Diameters) EPANET – Future Conditions Imagery (Static Pressures in m of H₂O) EPANET Analysis Calculations Rosedale Subdivision Preliminary Grading Design



EPANET Imagery – Existing Conditions with Pipe Diameters (mm)





EPANET Imagery – Existing Conditions with Static Pressures (m of H2O)





EPANET Imagery – Future Conditions with Pipe Diameters (mm)





EPANET Imagery – Future Conditions with Static Pressures (m of H2O)



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Dat	e: November 22, 2023		Α	В	С	D	E	F	G	н	I	J	К	L	М	Ν	0	Р	Q	R	S	т
ROSEDALE SUBDIVISION EPANET WATER MODEL CALCULATIONS			Hydr	ant Data	Existing	Modelled	Future	Modelled (with	Rosedale)	Hydra	nt Data	Existing	Modelled	н	ydrant Data	1	Hydra	nt Data	Existing Modelled		Future Moo Rose	lelled with dale
Hyd Numbe	Key Street	Hydrant Address	Static (PSI)	Static (m of H20)	Static (m of H2O)	% Difference	Modelled Static Pressures (m of H2O)	Modelled Static Pressures (PSI)	% Difference	Residual PSI	Residual (m of H20)	Modelled Residual	% Difference	Residual Hydrant No.	Actual Flow (GPM)	Actual Flow (LPS)	Theoretical Flow (GPM @ 20psi)	Theoretical Flow (LPS @ 20psi)	Modelled Theoretical Flow (LPS @ 14.06m)	% Difference	Fire Flow (LPS @ 14.06m)	Fire Flow GPM
4 630000	9 APOLLO DRIVE	APOLLO DRIVE @ ORIOLE CRESCENT	62	43.6	42.5	-2.5%	42.4	60.3	-0.2%	52	36.6	35.2	3.7%	20	1350	85.2	2930	184.9	185	0.1%	293	4644
5 6300002	0 MEADOWLARK DRIVE	120M WEST OF ELM STREET	58	40.8	42.1	3.2%	41.9	59.6	-0.5%	50	35.2	35.3	-0.4%	9	1306	82.4	3030	191.2	186	-2.7%	311	4929
75 6300030	4 HILLCREST ROAD	IN FRONT OF # 59 HILLCREST ROAD	45	31.6	31.9	0.8%	31.9	45.4	0.0%	36	25.3	25.7	-1.5%	305	1216	76.7	2111	133.2	133	-0.1%	138	2187
25 6300015	7 OXFORD BOULEVARD	IN FRONT OF # 10 OXFORD BOULEVARD	50	35.2	35.9	2.1%	37.5	53.3	4.5%	41	28.8	29.3	-1.6%	156	631	39.8	1213	76.5	76	-0.7%	146	2314
26 6300015	8 OXFORD BOULEVARD	IN FRONT OF # 20 OXFORD BOULEVARD	50	35.2	34.5	-1.9%	36.9	52.5	7.0%	39	27.4	27.3	0.5%	157	533	33.6	916	57.8	59	2.1%	148	2346
28 6300016	0 STONEBRIDGE DRIVE	2ND HYD EAST OF HWY # 58 ON STONEBRIDGE DRIVE	70	49.2	48.7	-1.0%	47.5	67.6	-2.5%	57	40.1	38.2	4.7%	159	1686	106.4	3490	220.2	204	-7.4%	378	5991
55 6300028	3 STONEBRIDGE DRIVE	2ND W. OF PETERSBURG CIRCLE ON STONEBRIDGE DRIVE	67	47.1	47.5	0.8%	46.6	66.3	-1.9%	54	38.0	38.9	-2.4%	160	1508	95.1	3019	190.5	200	5.0%	365	5785

<u>Conversions</u>

PSI	m of H2O									
1	0.703					Average Flow	Max Dav	Peak Dav	Modelled Peak Day	1
20	14.062	Node	Street	# of Houses	Population	(LPS)	Flow (LPS)	Flow (LPS)	Hydrant Flow @ 20	
40	28.124	1	Meadowlark	16	48	0.18	0.11	0.48	311	
50	35.154	2	Apollo	12	36	0.13	0.24	0.36	293	
80	56.247	3	Hillcrest	12	36	0.13	0.24	0.36	138	ľ
Column	Explanation	4	Meadowlark	11	33	0.12	0.22	0.33	l	
А	Static pressures in PSI provided by City	5	Parkside	7	21	0.08	0.14	0.21	183	
В	Static Pressures converted to m of H2O	6	Meadowlark	9	27	0.10	0.18	0.27	347	
С	Static Pressures (in m of H2O) from EPANET model attempting to replicate Column B values	7	Springside	21	63	0.23	0.42	0.63	l	
D	% difference of Hydrant Data and Existing Model static pressures (Columns D & B)	8	Springside	19	57	0.21	0.38	0.57	193	
E	New Modelled Pressures with inclusion of Rosedale and Meadow Heights Subdivisions	9	Springside	22	66	0.24	0.44	0.66	184	
F	Pressures in Column E converted back to PSI	10	Sherwood	21	63	0.23	0.42	0.63	155	ľ
G	% difference of existing and future modelled static pressures (Columns C & E)	11	Sherwood	19	57	0.21	0.38	0.57	179	
Н	Residual Pressures in PSI provided by City	12	Sherwood	17	51	0.19	0.34	0.51	l	
I	Residual Pressures converted to m of H2O	13	Meadowlark	18	54	0.20	0.36	0.54	l	
J	Residual Pressures (in m of H2O) from EPANET model attempting to replicate Column I values	14	Parkside	14	42	0.16	0.28	0.42	179	
К	% difference of Hydrant Data and Existing Model Residual Pressures (Columns Q & R)	15	Parkside	13	39	0.14	0.26	0.39	l	
L	Hydrant Number utilized to complete residual hydrant flow test	16	Parkside	21	63	0.23	0.42	0.63	l	
М	Actual Residual Flow data provided by City in GPM	17	Aintree	14	42	0.16	0.28	0.42	l	
Ν	Actual Residual Flow data provided by City converted to LPS	18	Westfield	24	72	0.27	0.48	0.72	l	
0	Theoretical Fire Flows in GPM at 20 PSI provided by City	19	Westfield	25	75	0.28	0.49	0.75	l	
Р	Theoretical Fire Flows provided by City converted to LPS	20	Westfield	38	114	0.42	0.75	1.13	186	
Q	Theoretical Fire Flows in LPS (@ 14.06 m of H2O) from EPANET model attempting to replicate Column P values	21	Westfield	35	105	0.39	0.69	1.05	155	
R	% difference of city calculated existing theoretical flow and modelled theoretical flow at 20 PSI (Columns P & Q)	22	Street B	40	120	0.44	0.79	1.19	l	
S	Calculated Fire Flows (@ 20PSI) calculated for future conditions with Rosedale Subdivision in LPS	23	Meadowlark	28	84	0.31	0.55	0.84	l	
Т	Column S values converted to GPM	24	Meadowlark	28	84	0.31	0.55	0.84	201	
Average	320	25	Oxford	34	102	0.38	0.67	1.02	169	
Max Day	570	26	Street B	39	117	0.43	0.77	1.16	150	ľ
Peak	860	27	Oxford	23	69	0.26	0.46	0.69	148	
				То	tal Average	0.24	0.42	0.64		_

Total Average 0.24 Rosedale Average 0.36

0.64

0.97

Rosedale

Average Day (0.36) use 0.40 everywhere Max Day (0.64) use 0.70 everywhere Peak Day (0.96) use 1.0 everywhere

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	APPROVED BY AK			CONSULTANTS ENGINEERS / PLANNERS	Phone: (905)688–9400 Fax: (905)688–5274	
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APPENDIX B

Overall Sanitary Drainage Area Plan – Proposed Conditions Overall Sanitary Calculations – with Regional MSP Oxford SPS Flows Overall Sanitary Calculations – with UCC Oxford SPS Flows

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LOCATIC	DN		A	REA	Number of	POPULAT: Population	ION	Total	AC	CUMULA	TEI T
Location and Description	From M.H	То М.Н.	Increment (hectares)	Accumulated (hectares)	Units	Density (persons/unit)	Population Increment	Population Served	Peaking Factor	Flow (L/s)	-
A28 - PARKSIDE DRIVE			0.61	0.61	8	3.0	24	24	4.37	0.31	
A30 - PARKSIDE DRIVE			0.18	1.06	2	3.0	6	39 42	4.33	0.42	
A32 - PARKSIDE DRIVE	1		0.52	1.69	5	3.0	15	57	4.30	0.72	
A35 - MEADOWLARK DRIVE			0.87	1.04	11	3.0	33	39 69	4.34	0.50	
A36 - MEADOWLARK DRIVE	5		0.38	2.11	5	3.0	15	84	4.26	1.06	
A37 - PARKSIDE DRIVE A38 - SHERWOOD DRIVE			0.49	4.29 0.94	0 14	3.0	42	42	4.18 4.33	0.54	
A 39 - SHERWOOD DRIVE A 40 - SPRINGSIDE DRIVE			0.67	1.61 0.63	10 14	3.0 3.0	30 42	72 42	4.28 4.33	0.91 0.54	
A41 - CONDO A42 - SPRINGSIDE DRIVE			0.97	0.97	40 9	3.0 3.0	120 27	120 189	4.22 4.16	1.49 2.32	
A43 - SPRINGSIDE DRIVE A44 - SPRINGSIDE DRIVE			0.23	2.27 2.38	5 2	3.0 3.0	15 6	204 210	4.14	2.50 2.57	
A45 - SPRINGSIDE DRIVE A46 - SHERWOOD DRIVE			0.46 0.48	2.84 4.93	8 6	3.0 3.0	24 18	234 324	4.12 4.06	2.85 3.89	
A47 - SHERWOOD DRIVE A48 - SHERWOOD DRIVE			0.58 0.49	5.51 6.00	9 8	3.0 3.0	27 24	351 375	4.05 4.04	4.19 4.47	
A49 - SHERWOOD DRIVE A50 - PARK SIDE DRIVE			0.30 0.73	6.30 11.32	4 12	3.0 3.0	12 36	387 582	4.03 3.94	4.60 6.77	
A51 - AINTREE PLACE			0.65	0.65	12	3.0	36	36	4.34	0.46	
A52 - PARKSIDE DRIVE A53 - WESTFIELD PLACE			0.76	12.73 0.60	15 12	3.0 3.0	45 36	663 36	3.91 4.34	7.65 0.46	
A54 - WESTFIELD PLACE A55 - WESTFIELD PLACE			0.22	0.82	5	3.0 3.0	15 15	51 729	4.31 3.88	0.65 8.36	
WESTFIELD PLACE			11.05	13.78	210	2.0	747	729	3.88	8.36	
EASEMENT - ROSEDALE			11.85	25.63	249	3.0	/4/	1476	3.68	8.55 16.05	
EASEMENT - VAN JON E1 - VAN JON PAVING		EXMH 12	1.72	25.63				1476	3.68 2.00	16.05 0.69	
E2 - STONEB RIDGE DR E3 - INDUSTRIAL LANDS	EXMH 12	EXMH 11	0.14	27.49				1476	3.68 2.00	16.05 0.12	
E4 - INDUSTRIAL LANDS STONEBRIDGE DR	EXMH 11	EXMH 7	1.82	27.49				1476	2.00	0.73	
E5 - INDUSTRIAL LANDS E6 - INDUSTRIAL LANDS			0.90 4.56						2.00	0.36	
E7 - STONEB RIDGE DR E8 - INDUSTRIAL LANDS	EXMH 8	EXMH 7	0.29	5.75			· ·		2.00	1.24	
INDUSTRIAL LANDS	EXMH 7	EXMH 6	5.10	36.34				1476	3.68	16.05	
INDUSTRIAL LANDS INDUSTRIAL LANDS	EXMH 6 EXMH 5	EXMH 5 EXMH 4		36.34 36.34				14/6 1476	3.68	10.05 16.05	
E9 - INDUSIKIAL LANDS E10 - INDUSTRIAL LANDS	EXMH 4	EXMH 4 EXMH 3	0.04	37.52				1476	3.68	0.46	
ELM ST DOG PARK ELM ST DOG PARK	EXMH 3 EXMH 2	EXMH 2 EXMH 1	0.10	37.62 37.74				1476 1476	3.68 3.68	16.05 16.05	
ELM ST DOG PARK ELM ST DOG PARK	EXMH 1 EX 1042	EX 1042 EX 1043	0.01	37.75 37.82				1476 1476	3.68 3.68	16.05 16.05	
ELM ST DOG PARK	EX 1043	EX 1062	0.08	37.90	<u>NOTE</u> S:			1476	3.68	16.05	
					1. THE UTILI	POSITION OF POLE LII TIES AND STRUCTURES ACCURACY OF THE PO	NES, CONDUITS IS NOT NECE DISTION OF ST	S, WATERMAIN SSARILY SHO	S, SEWER, WN ON TH AND STRU	AND OTHER	
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									BIEDERMAN MUNICIPAL DF	2A)
									4.30 1.82L/s	
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								SIDE	0.36L/s 0 EX MH #7 EX MH #11	
								ROAD	EX MH #12	-
SN ESS:	0.013 1.016	FOR MAN	INING'S EC	QUA TION LENT FA	CTOR			(HIGH	E1 1.71 0.69L/s	
L:	M - 1 -	TOTAL PE	EAK FLOW	V/CAPA	CITY			NAY 5	A55 A54	
PEAK FI	M = 1 + LOW Total	4 + P ^{0.5} Pipe	DE DE Pipe	SIGN FI Pipe	LOW Full Flow	Full Flow	Percent			A
Flow L/s 0.17	Peak Flow (L/s) 0.48	Diameter (mm) 200	Length (m) 60.0	Slope (%) 0.40	Velocity (m/s) 0.67	Capacity (L/s) 21.64	Full 2.2%		⇒ STREET 'A' ⇒ TA' ⇒ TA'	
0.25	0.67	200 200	52.9 23.7	0.40	0.67	21.64 21.64	3.1% 3.7%		$\begin{pmatrix} 11.85\\747\\ 747\\ 747\\ 747\\ 747\\ 747\\ 747\\ 747$	
0.33	0.80 1.20 0.13	200 200 200	74.1 29.7	0.40	0.07	41.91 30.60	4.0% 2.9% 0.4%			
0.29 0.48	0.79 1.36	200 200	95.6 81.7	0.40 0.40	0.67 0.67	21.64 21.64	3.7% 6.3%		STREET 'C' ⇒ T	
0.59 1.20	1.65 3.16	200 200	49.3 87.8	0.40 0.87	0.67 0.98	21.64 31.92	7.6% 9.9%			
0.26 0.45	0.80	200 200	95.0 96.0	0.80	0.94	30.60 21.64	2.6% 6.3%			
0.18 0.27	0.71 1.77	200 200	70.6 13.6	0.40 0.40	0.67 0.67	21.64 21.64	3.3% 8.2%			
0.57 0.64	2.89 3.13	200 200	54.9 23.8	0.40	0.67 0.75	21.64 24.19	13.4% 12.9%			
0.67 0.80	3.23 3.64	200 200	18.5 59.1	0.40 0.40	0.67 0.67	21.64 21.64	14.9% 16.8%			A4
1.38 1.54	5.27 5.74	200 200	67.7 56.9	0.92	1.01 0.99	32.82 32.10	16.0% 17.9%			$\frac{0.3}{12}$
1.68	6.15 6.37	200	53.7 59.1	1.35	1.23	39.76 39.76	15.5% 16.0%			
3.17 0.18	9.94 0.64	200 200	86.3 65.0	0.40	0.67 1.06	21.64 34.22	45.9% 1.9%			
3.56	11.21	200	102.5	0.40	0.67	21.64	51.8%			A3 0.3
0.23	0.88	200	43.7	0.40	0.67	21.64	4.1%			
3.86	12.22	200	37.6	0.40	0.67	21.64	56.4%			
3.32 7.18	23.23	300	52.4	0.37	0.84	61.36	37.9%			A3
7.18	23.23	300	48.8	0.43	0.91	66. <u>1</u> 5	35.1%			<u>0.1</u> 6
7.70	24.44	300	28.0	0.29	0.74	54.33	45.0%		G ⇒ STREET 'E' ⇒ H	
7.70	<mark>24.4</mark> 4	300	45.0	0.20	0.62	45.12	54.2%		$\hat{\mathbf{t}}$	
1.61	3 70	300	16.0	1.00	1 44	105 32	3 6%		$\begin{array}{c c} \hline \\ \hline $	
10.18	30.34	300	88.8	0.20	0.62	45.12	67.2%			
10.18	30.34 30.34	300 300	94.8 92.6	0.20	0.62	45.12	67.2%		⇒ STREET 'B' ⇒	
10.51	31.12	300	64.7	0.27	0.72	52.42	59.4%			
10.53 10.57	31.15	300 300	99.8 120.4	0.17	0.57	41.59	74.9%			
10.57	31.19	300	14.0	0.22	0.65	47.32	65.9%			
10.61	31.23	300	77.0	0.22	0.65	47.32	66.0%			
ERGROUND WINGS AND	AND OVERG	ROUND OWN,	drafting K1	- [
UARANTEEL L SUCH U). BEFORE S TILITIES AND	ARTING	DESIGN KT	-						
N THE FIEL	LD. TO VERII D CONSTRUC	THE TION.	CHECKED	BY					PORT COLBORNE	
TRACT DOC	UMENT.		JS APPROVE	S D BY					UPPER CANADA CONSULTANTS	
			JS						ENGINEERS / PLANNERS	



UPPER CANADA CONSULTANTS																		
3-30 HANNOVER DRIVE ST CATHARINES ONTARIO INCLUIDING OXFORD BOULEVARD SANITARY SEWER FLOWS PER REGIONAL MSP UPDATE																		
L2W1A3																		
DESIGN FLOWS										SEWER D	ESIGN							
RESIDENTIAL:	255	LITRES/P	PERSON/DA	Y (AVERAGE	E DAILY FL	OW)				PIPE ROUG	GHNESS:	0.013	FOR MAN	NING'S I	EQUATIO	N		
INDUSTRIAL:	0.2	LITRES/S	SECOND/GI	ROSS HECTAR	RE (MECP A	LLOWANCE IS 0.	2 - 0.64)			PIPE SIZES	S:	1.016	IMPERIAL	EQUIVA	ALENT FA	ACTOR		
INFILTRATION RATE:	0.28	L / s / ha (M.O.E FLO	W ALLOWAN	CE IS BETV	WEEN 0.10 & 0.28	L / s / ha)			PERCENT	FULL:		TOTAL PI	EAK FLO	W / CAPA	CITY		
POPULATION DENSITY:	3.0	PERSONS	S / UNIT															
MUNICIPALITY:	CITY OF	PORT COI	LBORNE										14					
PROJECT :	MEADOV	V HEIGHT	S			OVERALL SANII	ARY SEWE	ER DESIGI	N SHEET	Pea	king Factor=	M = 1 +	$4 + P^{0.5}$	Where P	= design p	opulation ir	thousands	
PROJECT NO:	227 N			DEA		POPULAT	ION				TD PFAK I	TOW		DF	SICN FI	OW		
LOCAIR	1				Number of	Population		Total		UNIOLAI	Infiltration	Total	Pipe	Pipe	Pipe	Full Flow	Full Flow	Percent
Location and Description	From	То	Increment	Accumulated	Units	Density	Population	Population	Peaking	Flow	Flow	Peak Flow	Diameter	Length	Slope	Velocity	Capacity	Full
	M.H	M.H.	(hectares)	(hectares)		(persons/unit)	Increment	Served	Factor	(L/s)	L/s	(L/s)	(mm)	(m)	(%)	(m/s)	(L/s)	
A28 - PARKSIDE DRIVE			0.61	0.61	8	3.0	24	24	4.37	0.31	0.17	0.48	200	60.0	0.40	0.67	21.64	2.2%
A29 - PARKSIDE DRIVE			0.27	0.88	3	3.0	9	33	4.35	0.42	0.25	0.67	200	52.9	0.40	0.67	21.64	3.1%
A30 - PARKSIDE DRIVE			0.18	1.06	2	3.0	6	39	4.34	0.50	0.30	0.80	200	23.7	0.40	0.67	21.64	3.7%
A31 - PARKSIDE DRIVE			0.11	1.17	1	3.0	3	42	4.33	0.54	0.33	0.86	200	17.2	0.40	0.67	21.64	4.0%
A32 - PARKSIDE DRIVE	2		0.52	1.69	2	3.0	15	5/	4.30	0.72	0.47	1.20	200	74.1	1.50	1.29	41.91	2.9%
A34 - MEADOWLARK DRIVI	२ २		0.17	1.04	11	3.0	33	39	4 34	0.08	0.05	0.15	200	95.6	0.30	0.54	21.64	3.7%
A35 - MEADOWLARK DRIV	3		0.69	1.73	10	3.0	30	69	4.28	0.87	0.48	1.36	200	81.7	0.40	0.67	21.64	6.3%
A36 - MEADOWLARK DRIV	Ξ		0.38	2.11	5	3.0	15	84	4.26	1.06	0.59	1.65	200	49.3	0.40	0.67	21.64	7.6%
A37 - PARKSIDE DRIVE			0.49	4.29	6	3.0	18	159	4.18	1.96	1.20	3.16	200	87.8	0.87	0.98	31.92	9.9%
A38 - SHERWOOD DRIVE			0.94	0.94	14	3.0	42	42	4.33	0.54	0.26	0.80	200	95.0	0.80	0.94	30.60	2.6%
A39 - SHERWOOD DRIVE			0.67	1.61	10	3.0	30	72	4.28	0.91	0.45	1.36	200	96.0	0.40	0.67	21.64	6.3%
A40 - SPRINGSIDE DRIVE			0.63	0.63	14	3.0	42	42	4.33	0.54	0.18	0.71	200	70.6	0.40	0.67	21.64	3.3%
A41 - CONDO			0.97	2.04	40	3.0	27	120	4.22	2 32	0.27	2.80	200	54.9	0.40	0.67	21.64	13 /1%
A42 - SPRINGSIDE DRIVE			0.23	2.04	5	3.0	15	204	4.14	2.50	0.64	3.13	200	23.8	0.50	0.75	24.19	12.9%
A44 - SPRINGSIDE DRIVE			0.11	2.38	2	3.0	6	210	4.14	2.57	0.67	3.23	200	18.5	0.40	0.67	21.64	14.9%
A45 - SPRINGSIDE DRIVE			0.46	2.84	8	3.0	24	234	4.12	2.85	0.80	3.64	200	59.1	0.40	0.67	21.64	16.8%
A46 - SHERWOOD DRIVE			0.48	4.93	6	3.0	18	324	4.06	3.89	1.38	5.27	200	67.7	0.92	1.01	32.82	16.0%
A47 - SHERWOOD DRIVE			0.58	5.51	9	3.0	27	351	4.05	4.19	1.54	5.74	200	56.9	0.88	0.99	32.10	17.9%
A48 - SHERWOOD DRIVE			0.49	6.00	8	3.0	24	375	4.04	4.47	1.68	6.15	200	53.7	1.35	1.23	39.76	15.5%
A49 - SHERWOOD DRIVE			0.30	6.30	4	3.0	12	387	4.03	4.60	1.76	6.37	200	59.1 86.2	1.35	1.23	39.76	16.0%
A50 - FARKSIDE DRIVE			0.73	0.65	12	3.0	36	36	4 34	0.46	0.18	9.94	200	65.0	1.00	1.06	34.22	43.9%
			0.05	0.05		210	50	50		0.10	0.10	0.01	200	00.0	1.00	1.00	51.22	11,7,70
A52 - PARKSIDE DRIVE			0.76	12.73	15	3.0	45	663	3.91	7.65	3.56	11.21	200	102.5	0.40	0.67	21.64	51.8%
A53 - WESTFIELD PLACE			0.60	0.60	12	3.0	36	36	4.34	0.46	0.17	0.63	200	23.1	1.00	1.06	34.22	1.8%
A54 - WESTFIELD PLACE			0.22	0.82	5	3.0	15	51	4.31	0.65	0.23	0.88	200	43.7	0.40	0.67	21.64	4.1%
A55 - WESTFIELD PLACE			0.23	13.78	5	3.0	15	729	3.88	8.36	3.86	12.22	200	49.2	0.40	0.67	21.64	56.4%
WESTFIELD PLACE				13./8				729	3.88	8.36	5.80	12.22	200	57.6	0.40	0.67	21.64	56.4%
RDS - ROSEDALE			11.85		249	3.0	747	747	3.88	8.55	3.32	11.87						
OXFORD SPS (Per Regional M	ISP Update	e)	12.50		2051 Proj	ected Population &	Employment	453				7.60	ECA Firm	Capacity	per 2021 F	Regional MS	SP Update	
EASEMENT - ROSEDALE				25.63				1476	3.68	16.05	7.18	30.83	300	52.4	0.37	0.84	61.36	50.2%
EASEMENT - VAN JON		EXMH 12	2	25.63				1476	3.68	16.05	7.18	30.83	300	48.8	0.43	0.91	66.15	46.6%
E1 - VAN JON PAVING	EX) (1110	EVA (II 11	1.72	27.40				1476	2.00	0.69	7.70	22.04	200	20.0	0.20	0.74	54.22	50.00/
E2 - STONEBRIDGE DR	EXMH 12	EAMH II	0.14	27.49				14/6	3.68	0.12	7.70	32.04	300	28.0	0.29	0.74	54.55	59.0%
E4 - INDUSTRIAL LANDS			1.82						2.00	0.73								
STONEBRIDGE DR	EXMH 11	EXMH 7		27.49				1476	3.68	16.05	7.70	32.04	300	45.0	0.20	0.62	45.12	71.0%
E5 - INDUSTRIAL LANDS			0.90						2.00	0.36								
E6 - INDUSTRIAL LANDS			4.56						2.00	1.82								
E7 - STONEBRIDGE DR	EXMH 8	EXMH 7	0.29	5.75							1.61	3.79	300	16.0	1.09	1.44	105.32	3.6%
E8 - INDUSTRIAL LANDS		EXMH 7	3.10	3.10				1456	2.00	1.24	10.10	25.04	200	00.0	0.00	0.62	45.10	
INDUSTRIAL LANDS	EAMH 7	EXMH 6		36.34			-	1476	3.68	16.05	10.18	37.94	300	88.8	0.20	0.62	45.12	84.1%
INDUSTRIAL LANDS	EXMH 5	EXMH 4		36 34			-	1476	3.68	16.05	10.18	37.94	300	92.6	0.20	0.62	49.12	76 8%
E9 - INDUSTRIAL LANDS		EXMH 4	1.14	50.54			-	14/0	2.00	0.46	10.10	51.94	500	72.0	0.24	0.00	77.72	/0.0/0
E10 - INDUSTRIAL LANDS	EXMH 4	EXMH 3	0.04	37.52				1476	3.68	16.05	10.51	38.72	300	64.7	0.27	0.72	52.42	73.9%
ELM ST DOG PARK	EXMH 3	EXMH 2	0.10	37.62				1476	3.68	16.05	10.53	38.75	300	99.8	0.17	0.57	41.59	93.2%
ELM ST DOG PARK	EXMH 2	EXMH 1	0.12	37.74				1476	3.68	16.05	10.57	38.79	300	120.4	0.21	0.63	46.23	83.9%
ELM ST DOG PARK	EXMH 1	EX 1042	0.01	37.75				1476	3.68	16.05	10.57	38.79	300	14.0	0.22	0.65	47.32	82.0%
ELM ST DOG PARK	EX 1042	EX 1043	0.07	37.82			-	1476	3.68	16.05	10.59	38.81	300	69.0	0.22	0.65	47.32	82.0%
ELM ST DOG PARK	EX 1043	EX 1062	0.08	37.90				1476	3.68	16.05	10.61	38.83	300	77.0	0.22	0.65	47.32	82.1%

UPPER CANADA CONSULTANTS																		
3-30 HANNOVER DRIVE																		
ST.CATHARINES, ONTARIO INCLUDING OXFORD BOULEVARD SANITARY SEWER FLOWS PER UCC CALCULATIONS																		
L2W 1A3																		
DESIGN FLOWS	DESIGN FLOWS SEWER DESIGN																	
RESIDENTIAL:	255	LITRES/P	ERSON/DA	Y (AVERAGE	E DAILY FL	OW)				PIPE ROUG	GHNESS :	0.013	FOR MAN	INING'S E	QUATIO	N		
INDUSTRIAL:	0.2	LITRES/S	ECOND/GI	ROSS HECTAF	RE (MECP A	LLOWANCE IS 0.2	2 - 0.64)			PIPE SIZES	S:	1.016	IMPERIAL	L EQUIVA	LENT FA	ACTOR		
INFILTRATION RATE:	0.28	L / s / ha (M.O.E FLO	W ALLOWAN	CE IS BETV	VEEN 0.10 & 0.28 I	_ / s / ha)			PERCENT	FULL:		TOTAL PI	EAK FLO	W / CAPA	CITY		
POPULATION DENSITY:	3.0	PERSONS	S / UNIT															
MUNICIPALITY:	CITY OF	PORT COI	BORNE										14					
PROJECT :	MEADOW	V HEIGHT	S			OVERALL SANIT	ARY SEWE	R DESIGN	SHEET	Peal	king Factor=	M = 1 +	14	Where P	= design p	opulation in	thousands	
PROJECT NO:	227												$4 + P^{-10}$					
LOCATIC	N		A	REA		POPULAT	ION		ACC	CUMULAT	ED PEAK I	FLOW		DE	SIGN FL	OW		
					Number of	Population		Total			Infiltration	Total	Pipe	Pipe	Pipe	Full Flow	Full Flow	Percent
Location and Description	From	То	Increment	Accumulated	Units	Density	Population	Population	Peaking	Flow	Flow	Peak Flow	Diameter	Length	Slope	Velocity	Capacity	Full
	M.H	M.H.	(hectares)	(hectares)		(persons/unit)	Increment	Served	Factor	(L/s)	L/s	(L/s)	(mm)	(m)	(%)	(m/s)	(L/s)	
A28 - PARKSIDE DRIVE			0.61	0.61	8	3.0	24	24	4.37	0.31	0.17	0.48	200	60.0	0.40	0.67	21.64	2.2%
A29 - PARKSIDE DRIVE			0.27	0.88	3	3.0	9	33	4.35	0.42	0.25	0.67	200	52.9	0.40	0.67	21.64	3.1%
A30 - PARKSIDE DRIVE			0.18	1.06	2	3.0	6	39	4.34	0.50	0.30	0.80	200	23.7	0.40	0.67	21.64	3.7%
A31 - PARKSIDE DRIVE			0.11	1.17	1	3.0	3	42	4.33	0.54	0.33	0.86	200	17.2	0.40	0.67	21.64	4.0%
A32 - PARKSIDE DRIVE			0.52	1.69	5	3.0	15	57	4.30	0.72	0.47	1.20	200	74.1	1.50	1.29	41.91	2.9%
A33 - MEADOWLARK DRIV	E		0.17	0.17	2	3.0	6	6	4.43	0.08	0.05	0.13	200	29.7	0.80	0.94	30.60	0.4%
A34 - MEADOWLARK DRIVI	E		0.87	1.04	11	3.0	33	39	4.34	0.50	0.29	0.79	200	95.6	0.40	0.67	21.64	3.7%
A35 - MEADOWLARK DRIV	E		0.69	1.73	10	3.0	30	69	4.28	0.87	0.48	1.36	200	81.7	0.40	0.67	21.64	6.3%
A36 - MEADOWLARK DRIV	E		0.38	2.11	5	3.0	15	84	4.26	1.06	0.59	1.65	200	49.3	0.40	0.67	21.64	7.6%
A37 - PARKSIDE DRIVE			0.49	4.29	6	3.0	18	159	4.18	1.96	1.20	3.16	200	87.8	0.87	0.98	31.92	9.9%
A38 - SHERWOOD DRIVE			0.94	0.94	14	3.0	42	42	4.33	0.54	0.26	0.80	200	95.0	0.80	0.94	30.60	2.6%
A39 - SHERWOOD DRIVE			0.67	1.61	10	3.0	30	72	4.28	0.91	0.45	1.36	200	96.0	0.40	0.67	21.64	6.3%
A40 - SPRINGSIDE DRIVE			0.63	0.63	14	3.0	42	42	4.33	0.54	0.18	0.71	200	70.6	0.40	0.67	21.64	3.3%
A41 - CONDO			0.97	0.97	40	3.0	120	120	4.22	1.49	0.27	1.77	200	13.6	0.40	0.67	21.64	8.2%
A42 - SPRINGSIDE DRIVE			0.44	2.04	9	3.0	27	189	4.16	2.32	0.57	2.89	200	54.9	0.40	0.67	21.64	13.4%
A43 - SPRINGSIDE DRIVE			0.23	2.27	5	3.0	15	204	4.14	2.50	0.64	3.13	200	23.8	0.50	0.75	24.19	12.9%
A44 - SPRINGSIDE DRIVE			0.11	2.38	2	3.0	6	210	4.14	2.57	0.67	3.23	200	18.5	0.40	0.67	21.64	14.9%
A45 - SPRINGSIDE DRIVE			0.46	2.84	8	3.0	24	234	4.12	2.85	0.80	3.64	200	59.1	0.40	0.67	21.64	16.8%
A46 - SHERWOOD DRIVE			0.48	4.93	6	3.0	18	324	4.06	3.89	1.38	5.27	200	67.7	0.92	1.01	32.82	16.0%
A4/ - SHERWOOD DRIVE			0.58	5.51	9	3.0	27	351	4.05	4.19	1.54	5.74	200	56.9	0.88	0.99	32.10	17.9%
A48 - SHERWOOD DRIVE			0.49	6.00	0	3.0	24	207	4.04	4.47	1.08	6.13	200	50.1	1.55	1.23	39.70	15.5%
A49 - SHERWOOD DRIVE			0.30	0.30	4	3.0	26	587	4.05	4.00	2.17	0.07	200	39.1 96.2	0.40	0.67	39.70	16.0%
A51 AINTREE DI ACE			0.73	0.65	12	3.0	26	362	1 24	0.77	0.19	9.94	200	65.0	1.00	1.06	24.22	43.9%
AST - AINTREE FLACE			0.05	0.05	12	5.0	50	30	4.34	0.40	0.18	0.04	200	05.0	1.00	1.00	34.22	1.970
A52 - PARKSIDE DRIVE			0.76	12.73	15	3.0	45	663	3.91	7.65	3.56	11.21	200	102.5	0.40	0.67	21.64	51.8%
A53 - WESTFIELD PLACE			0.60	0.60	12	3.0	36	36	4.34	0.46	0.17	0.63	200	23.1	1.00	1.06	34.22	1.8%
A54 - WESTFIELD PLACE			0.22	0.82	5	3.0	15	51	4.31	0.65	0.23	0.88	200	43.7	0.40	0.67	21.64	4.1%
A55 - WESTFIELD PLACE			0.23	13.78	5	3.0	15	729	3.88	8.36	3.86	12.22	200	49.2	0.40	0.67	21.64	56.4%
WESTFIELD PLACE				13.78				729	3.88	8.36	3.86	12.22	200	37.6	0.40	0.67	21.64	56.4%
RDS - ROSEDALE			11.85		249	3.0	747	747	3.88	8.55	3.32	11.87						
OVEORD SPS (UCC Calanda	(0.62		=	2.0	160	160	4.17	2.07	2.02	4.40	Comment O		Elan Dad	UCC C	landad E	
OAFORD SFS (UCC Culculu	ionsj		8.03		50	5.0	100	100	4.17	2.07	2.42	4.49	Curreni O.	xjoru SFS	Flow Kal		icululeu F	JOWS
EASEMENT - ROSEDALE				25.63				1476	3.68	16.05	7.18	27.71	300	52.4	0.37	0.84	61.36	45.2%
EASEMENT - VAN JON		EXMH 12		25.63				1476	3.68	16.05	7.18	27.71	300	48.8	0.43	0.91	66.15	41.9%
EI - VAN JON PAVING	F10 (11 10		1.72	27.10				1.454	2.00	0.69	5.50	20.02	200	20.0	0.00	0.74	54.00	52.00/
E2 - STONEBRIDGE DR	EXMH 12	EXMH II	0.14	27.49				1476	3.68	16.05	7.70	28.92	300	28.0	0.29	0.74	54.33	53.2%
E3 - INDUSTRIAL LANDS			0.50						2.00	0.12								
STONERBIDGE DR	EVMII 11	EVMU 7	1.62	27.40				1476	2.00	16.05	7 70	28.02	200	45.0	0.20	0.62	45.12	64.10/
F5 INDUSTRIAL LANDS	EAMITT	EAMIN /	0.90	27.49				1470	2.00	0.36	7.70	20.92	300	45.0	0.20	0.02	45.12	04.170
E6 INDUSTRIAL LANDS			0.90						2.00	1.82								
E0 - INDUSTRIAL EANDS	EXMH 8	EXMH 7	0.29	5.75					2.00	1.62	1.61	3 79	300	16.0	1.09	1 44	105.32	3 6%
F8 - INDUSTRIAL LANDS	Extentio	EXMIT 7	3.10	3.10					2.00	1.24	1.01	5.17	500	10.0	1.07	1.44	105.52	5.070
INDUSTRIAL LANDS	EXMH 7	EXMH 6	5.10	36.34				1476	3.68	16.05	10.18	34.82	300	88.8	0.20	0.62	45.12	77.2%
INDUSTRIAL LANDS	EXMH 6	EXMH 5		36.34				1476	3,68	16.05	10.18	34.82	300	94.8	0,20	0,62	45,12	77,2%
INDUSTRIAL LANDS	EXMH 5	EXMH 4		36.34				1476	3,68	16.05	10.18	34.82	300	92.6	0,24	0.68	49,42	70.5%
E9 - INDUSTRIAL LANDS		EXMH 4	1.14						2.00	0.46		2.102	2.50					
E10 - INDUSTRIAL LANDS	EXMH 4	EXMH 3	0.04	37.52				1476	3.68	16.05	10.51	35.61	300	64.7	0.27	0.72	52.42	67.9%
ELM ST DOG PARK	EXMH 3	EXMH 2	0.10	37.62				1476	3.68	16.05	10.53	35.64	300	99.8	0.17	0.57	41.59	85.7%
ELM ST DOG PARK	EXMH 2	EXMH 1	0.12	37.74				1476	3.68	16.05	10.57	35.67	300	120.4	0.21	0.63	46.23	77.2%
ELM ST DOG PARK	EXMH 1	EX 1042	0.01	37.75				1476	3.68	16.05	10.57	35.68	300	14.0	0.22	0.65	47.32	75.4%
ELM ST DOG PARK	EX 1042	EX 1043	0.07	37.82				1476	3.68	16.05	10.59	35.70	300	69.0	0.22	0.65	47.32	75.4%
ELM ST DOG PARK	EX 1043	EX 1062	0.08	37.90				1476	3.68	16.05	10.61	35.72	300	77.0	0.22	0.65	47.32	75.5%
			•										-					



APPENDIX C

Northland Estates – Stormwater Management Plan

STORMWATER MANAGEMENT PLAN

ROSEDALE SUBDIVISION

CITY OF PORT COLBORNE

Prepared for:

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November 23, 2023

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APPENDICES

Appendix A Stormwater Management Facility Calculations

Appendix B MIDUSS Output Files

REFERENCES

1. Stormwater Management Planning and Design Manual Ontario Ministry of Environment (March 2003)

STORMWATER MANAGEMENT PLAN

ROSEDALE SUBDIVISION

PORT COLBORNE

1.0 INTRODUCTION

1.1 Study Area

The proposed residential subdivision development is located in the City of Port Colborne as part of Lot 30 and Concession 3. As shown on the enclosed Site Location Plan (Figure 1), the subject property is situated east of West Side Road (Highway 58), south of Stonebridge Drive, west of Elm Street, and north of Barrick Road at the north limit of Oxford Boulevard. This Stormwater Management Plan has been completed in support of the application for Draft Plan of Subdivision approval on the subject lands.

The 12.77-hectare property is bound by existing residential properties on the south side and future residential lands (Meadow Heights Subdivision) to the east, as well as West Side Road (Highway 58) to the west and industrial lands (Van Jon Paving) to the north. The development will have entrances on Oxford Boulevard as well as Meadowlark Drive and Westfield Place as part of the adjacent Meadow Heights subdivision development to the east.

The drainage areas contributing to this Stormwater Management (SWM) Plan will be assessed from the following areas: the subject Rosedale Subdivision lands, the adjacent Meadow Heights Subdivision development, existing residential lands to the south, and a small area of undeveloped agricultural lands on the west side of West Side Road (Highway 58). Future stormwater flows from the development area will discharge to a Stormwater Management (SWM) Facility and subsequent sewer located immediately east of the proposed SWM facility, conveying flows northerly through an easement on the Van John Paving lands to Stonebridge Drive and ultimately the Biederman Drain. This storm sewer will be constructed as part of the adjacent Meadow Heights Subdivision development prior to the Rosedale Subdivision beginning construction.

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 development on the stormwater peak flow & volume of from this site.
- 3. Investigate alternatives for controlling the quantity and quality of stormwater from this site.
- 4. Recommend a comprehensive plan for the management of stormwater during and after construction.



Figure 1. Site Location Plan

1.3 Existing & Proposed Conditions

a) Existing Conditions

The development site has been historically been the location of a single detached residential dwelling and associated garage, as well as for agricultural purposes. The gradient of the land is generally north to north-east for the majority of the site directing flows to the north site limit. Flows are then generally directed westerly at the site limit to the West Side Road (Highway 58) MTO road allowance due to the Van Jon Paving development All stormwater flows from the site ultimately discharge to the Biederman Drain north of the site and to the Welland Recreational Canal further downstream.

The majority of native soil with the study area has been characterized as a Farmington soil with rapid drainage properties though contains shallow bedrock areas close to the surface. The northern portion of the site has been classified with more imperfect to poor draining soils as part of the Franktown soil group.

b) Proposed Conditions

The proposed development will consist of 131 single-detached dwellings and 21 townhouse block (118 units) for a total of 249 residential units. A park will be built at the south-east corner of the site and a stormwater management (SWM) facility will be located at the north limit of the site. The site shall be provided with full municipal services including sanitary sewers, storm sewers, and watermain with asphalt pavement and concrete curbs and gutters.

At this time, due to the current state of approvals and intentions of known developers, it is expected that the adjacent Meadow Heights subdivision development will be constructed prior to the proposed Rosedale Subdivision discussed in this report. It is expected that a storm sewer will be constructed through an easement within the Rosedale Subdivision and northerly-adjacent Van Jon Paving lands to ultimately discharging to the Biederman Drain to provide a stormwater outlet for the Meadow Heights development. As such, calculations and conclusions discussed in this stormwater management plan have been conducted with the assumption that under future conditions, both development sites are fully developed.

2.0 STORMWATER MANAGEMENT CRITERIA

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

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

Based on the comments and outstanding policies from various agencies (City of Port Colborne, Regional Municipality of Niagara, Ministry of Transportation, Niagara Peninsula Conservation Authority (NPCA), and the Ministry of the Environment, Conservation and Parks (MECP), and others) the following site specific considerations were identified:

- The receiving watercourse, Biederman Drain has been identified by the Ministry of Natural Resources watercourse evaluation as a **Type 2** (*Important*) fish habitat. Based on this fish habitat, the corresponding MECP level of protection for stormwater management <u>quality</u> practices on all new developments shall be *Normal*.
- The site outlets to the Biederman Drain which contain lands that would be negatively impacted by increased flooding levels, and, therefore, stormwater quantity control is considered necessary to maintain the downstream peak water elevations.

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

- Stormwater **quality** controls are to be provided for the internal storm system of the Rosedale Subdivision development according to MECP guidelines. It is proposed to provide Normal Protection (70% TSS removal) quality enhancements to the stormwater before discharging to the Biederman Drain.
- Stormwater **quantity** controls are to be provided for the outlet to limit the proposed development peak flows from the 2, 5, 10, 25, 50 and 100 year storm events to existing peak flow levels

3.0 STORMWATER ANALYSIS

A stormwater analysis has been conducted by Upper Canada Consultants as part of the design of the Rosedale Subdivision development using the MIDUSS computer modelling program. A new stormwater analysis was conducted to represent the existing and future conditions to the Biederman Drain.

This program was selected because it is applicable to an urban drainage area like the study area, it is relatively easy to use and modify for the proposed drainage conditions and control facilities, and it readily allows for the use of design storm hyetographs for the various return periods being investigated.

Copies of the current model output files are enclosed in Appendix B.

3.1 Design Storms

Design storm hyetographs were developed using a Chicago distribution based on the Ministry of Transportation's (MTO) Intensity-Duration-Frequency curves for the subject area in Port Colborne. The MTO's IDF Curves have been utilized for this development due to the proximity of Highway 58 (West Side Road) immediately adjacent to the site, as the results of this report directly impact their infrastructure. Hyetographs for the 25mm, 2, 5, 10, 25, 50 and 100 year events were developed using a 4-hour Chicago distribution. Table 1 summarizes the rainfall data.

Table 1. Rainfall Data											
Design Storm	Chicago Distribution Parameters										
(Return Period)	a	b	c								
25mm	512.000	6.00	0.800								
2 Year	397.149	0.0	0.699								
5 Year	524.867	0.0	0.699								
10 Year	608.845	0.0	0.699								
25 Year	715.568	0.0	0.699								
50 Year	794.298	0.0	0.699								
100 Year	871.279	0.0	0.699								
Intensity $(mm/hr) = \frac{a}{(t_d+b)^c}$											

3.2 Existing Conditions

The existing conditions were modelled to establish the stormwater peak flows and volumes prior to development within this site. The existing drainage area for this subwatershed is shown on Figure 2. This area was determined from field investigations and recent topographic surveys. Additionally, a schematic outlining the modelling process for both existing and future calculations has been included on Figure 4.

As shown in Figure 2, stormwater flows from an existing agricultural field (Drainage Area 'FX') on the west side of West Side Road (Highway 58) are conveyed east under the highway through a 1.2m x 0.9m concrete box culvert and towards the Oxford Boulevard road allowance. Stormwater flows are then captured by a series of catch basins and directed east through a park access and ultimately discharged via culvert to a ditch at the north limit of the park, east of Oxford Boulevard. The ditch passes through the south-east corner of the Rosedale Subdivision lands and through the adjacent Meadow Heights Subdivision lands. The ditch conveys stormwater flows from both Drainage Areas 'FX' and 'WT' and was included in the original approved engineering design to be accommodated in the Meadow Heights internal storm sewer system.

Through a combination of field surveys and topographical information it has been determined that existing stormwater flows from the Meadow Heights and Rosedale Subdivision lands (Drainage Areas MH and EX respectively) are directed overland westerly at the north limits of the Rosedale Subdivision lands to the Highway 58 road allowance and ultimately to the Biederman Drain at Outlet 'A'.

The adjacent Meadow Heights Subdivision was Draft Approved, Registered and obtained Certificate of Approval for all sewers without the requirement for stormwater management quality or quantity controls prior to discharging to the Biederman Drain. At the time of completing this report, Meadow Heights Phases 1 & 2 have been completed, with a complete engineering submission for the remaining subdivision lands expected to be submitted to the municipality imminently. For the purpose of this report, all calculations have been completed with the assumption that the Meadow Heights subdivision has been completely developed (see figure 2).

Due to unforeseen circumstances however, the location of the storm sewer outlet for the Meadow Heights Subdivision will be adjusted from its' originally planned path north of Parkside Drive. The Meadow Heights Subdivision storm sewer will be constructed within an easement on the Rosedale Subdivision lands, conveying flows westerly on Westfield Place/Street 'A' before being directed north on the east side of the Rosedale SWM facility and continue westerly along the north property line, actively bypassing the future Rosedale Subdivision SWM Facility. The storm sewer will be constructed within an easement through the Van Jon Paving property (#64 Stonebridge Drive and discharge flows via headwall to the Biederman Drain.

An imperviousness of 0.5% has been utilized for both Drainage Areas 'FX' and 'EX' as they are both largely undeveloped vacant properties under existing conditions. An imperviousness of 25.0% has been attributed to Drainage Area 'WT' to align with the single-family residential dwelling and significant park area uses comprising this area. Lastly, an imperviousness of 35.6% has been utilized for the Meadow Heights subdivision which is equivalent to the overall average Runoff Coefficient calculated for the Meadow Heights Subdivision development area per the storm sewer calculations.

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.

3.3 Proposed Conditions

The proposed Rosedale Subdivision development will result in the construction of 249 residential units with an associated park and stormwater management facility. For the purpose of this report, the future imperviousness of the development area has been conservatively increased from 0.5% under existing conditions (Drainage Area EX), to 70.0% under proposed conditions (Drainage Area FUT).

An internal storm sewer system will be constructed to convey stormwater flows up to and including the 5-year design storm event to the stormwater management facility at the north

limit of the site. As well, stormwater flows unable to enter the storm sewer system during storm events greater than the 5-year event will be directed overland to the stormwater management facility within the future road allowances.

As previously stated, a storm sewer will be constructed immediately east and north of the SWM Facility as part of Meadow Heights stormwater outlet (prior to the Rosedale Subdivision development). The storm sewer will be utilized to convey flows from the stormwater management facility outlet to the Biederman Drain north of the site (Outlet A). This downstream section of storm sewer has been designed to accommodate flows from the Rosedale Subdivision SWM Facility as well as the unrestricted flows from the Meadows Heights Subdivision.

As it will not be ideal to direct major overland flows from the Meadow Heights subdivision through the servicing easement on the Van Jon Paving lands, the roadway design of Street 'A' and Westfield Place at the north limit of the Rosedale/Meadow Heights Subdivision will be designed to direct overland flows from both developments to the proposed SWM facility. During extreme storm events, an emergency overflow spillway will discharge stormwater flows from the SWM facility westerly to the Highway 58 (MTO) road allowance and ultimately to the Biederman Drain (Outlet A). Modelling for the proposed Rosedale Stormwater Management Facility includes overland flows during the 10-100 year storm events.

Ultimately, stormwater flows will continue to discharge flows to Outlet 'A' under future conditions as occurs today under existing conditions.

As the Rosedale Subdivision SWM Facility will accommodate stormwater flows from both the Rosedale (FUT) and Meadow Heights (MH) Subdivisions, modelling has been conducted to determine the peak stormwater flow rates at both the Rosedale Subdivision SWM Facility Outlet as well as the Biederman Drain Outlet (Outlet A) during the larger storm events.

The future drainage areas for the proposed development, shown in Figure 3, were modelled to establish the stormwater peak flows and volumes once development has been completed at the proposed site. Input parameters for the computer model with the proposed development conditions are shown in Table 2.

Table 2. Hydrologic Parameters													
Area No.	Area (ha)	Length (m)	Slope (%)	SCS CN	Percent Impervious								
		Exist	ting Conditions										
EX	12.77	400	2.0	77	0.5								
FX	3.44	150	1.0	77	0.5								
WT	10.84	300	1.0	77	25.0								
MH	29.25	500	2.0	77	35.7								
	56.30	Total Area											
		Futi	ure Conditions										
FUT	12.77	400	2.0	77	70.0								
FX	3.44	150	1.0	77	0.5								
WT	10.84	300	1.0	77	25.0								
MH	29.25	500	77	35.7									
	56.30 Total Area												

Table 3 below outlines existing peak flows to the Biederman Drain under existing conditions (Outlet A) and combined peak flows to the Biederman Drain under future conditions without stormwater management quantity controls (Outlets A & C). Peak flows and runoff volumes were calculated for the 2-, 5-, 10-, 25-, 50-, and 100-year design storm events.

Tabl	Table 3. Peak Flows and Volumes for Future Development Conditions											
Design	Р	eak Flow (m	1 ³ /s)	Volume (m ³)								
Storm	Existing	Future*	Change	Existing	Future*	Change						
2 Year	1.512	2.697	+ 78%	6,864	8,843	+ 1,979						
5 Year	2.224	3.822	+ 72%	10,757	13,207	+ 2,450						
10 Year	2.707	4.498	+ 66%	13,539	16,232	+ 2,693						
25 Year	3.340	5.425	+ 62%	17,283	20,226	+ 2,943						
50 Year	3.824	6.117	+ 60%	20,164	23,257	+ 3,093						
100 Year	4.585	7.069	+ 54%	23,078	26,294	+ 3,216						
*Note: outlin	nes peak sto	ormwater flow	ws without qu	antity contro	ls							

As seen above in Table 3, stormwater quantity controls are considered necessary for the proposed development since the peak flows and volumes discharging into the Biederman Drain significantly increase as a result of the proposed development. The existing and future stormwater drainage areas shown on Figures 2 and 3 were used to assess the stormwater management plan for this study. A modelling schematic has also been included per Figure 4 to detail how the model was created.







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 to 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 (
Rosedale Subdivision	Topography	Soils	Bedrock	Groundwater	Area	Technical	Recommend				
	Variable	Silty Sand	At Considerable	At Considerable	±	Effectiveness	Implementation				
Site Conditions	1 to 3%	±13.3mm/hr	Depth	Depth	12.77ha	(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. Drains	nlc	nlc	nlc	nlc	nlc	2	No	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	Yes	Very effective quality control			
Wetlands	nlc	nlc	nlc	nlc	> 5 ha	10	No	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 wet pond facility to be constructed to provide stormwater quality enhancement for frequent storms.

5.0 STORMWATER MANAGEMENT PLAN

A MIDUSS model was created to assess existing, future and ultimate development peak flows and stormwater volumes generated by the proposed subdivision. The stormwater management facility was sized according to MECP Guidelines (MECP, March 2003) as follows:

5.1 Proposed Stormwater Management Facility

5.1.1 Stormwater Quality

The stormwater drainage outlet for the proposed development is the Biederman Drain, which has been identified by the Ministry of Natural Resources watercourse evaluation as a Type 2 fish habitat. Based on this fish habitat, the corresponding MECP level of protection for stormwater management quality practices on all new developments shall be Normal.

Based on Table 3.2 of SWMP & Design Manual, the water quality storage requirement is approximately 130m³/ha for *Normal* protection for developments with 70% impervious areas. The drainage area requiring stormwater quality improvement draining to the proposed facility is 12.77 hectares. The storage volumes required for this proposed facility are shown in Table 5.



Table 5. Stormwater Quality Volume Calculations								
Total Water Quality Volume = 12.77 ha x 130 m ³ /ha = $1,660$ m ³	Reference: Table 3.2, SWMP & Design Manual (MECP 2003)							
Minimum Permanent Pool Volume = 12.77 ha x 90 m ³ /ha = 1,149 m ³	Minimum Extended Detention Volume = 12.77 ha x 40 m ³ /ha = 511 m ³							

As per the Stormwater Management Facility Calculations in Appendix A, the proposed stormwater management facility will have a Permanent Pool volume of 1,693m³ as well as an extended detention volume of 2,746m³. These are both greater than the minimum required.

5.1.2 Stormwater Quantity Control

As shown in the previous Table 3, stormwater management quantity controls are required to reduce the peak flows from the development area to existing conditions for up to and including the 100-year design storm event. The stormwater peak flows from the proposed development and surrounding lands 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 discharging from the proposed facility.

As described previously, overland flows during storm events greater than the 5-year event from the Rosedale Subdivision development area as well as the adjacent Meadow Heights Subdivision and upstream lands shall be directed proposed stormwater management facility. Modelling for the proposed Rosedale Stormwater Management Facility includes overland flow volumes during the 10-100 year storm events.

5.1.3 Stormwater Management Facility Configuration

As seen on the proposed Stormwater Management Facility detail (Figure 5), the layout of the SWM facility is providing a single storm sewer outlet to the future easement storm sewer from Meadow Heights.

It is proposed to construct a three-stage outlet for the stormwater management facility as shown in Figure 5. The first stage of control consists of a reverse slope pipe acting as a 150mm diameter orifice to provide the required quality controls. The second stage of control consists of a ditch inlet catch basin and outlet pipe which provides an outlet for flows exceeding the extended detention volume. An emergency spillway will complete the third stage providing an outlet for flows exceeding the capacity of the ditch inlet catch basin and outlet pipe during extreme storm events.

The proposed effective bottom elevation of the facility is 173.85m, and the permanent pool water level is 174.85m for a water depth of 1.0 metre. The configuration of the facility provides 1,693m³ of permanent pool volume, which is more than the required 1,149m³. The ditch inlet will be constructed at an elevation of 175.60m providing an extended detention of 2,746m³, greater than the 511m³ required. The proposed top of pond is at an elevation of 176.85m which will provide a total active volume of 9,663m³.

Based on the configuration of the proposed facility, it was determined that a 150mm diameter quality orifice shall provide approximately 28 hours of detention for the 25mm design storm event (24 hours is the minimum).

The outflow pipe from the stormwater management facility is to be 450mm in diameter and will convey stormwater flows from the ditch inlet and quality pipe to 1500mm diameter storm sewer which will be constructed immediately north of the SWM Facility as part of the Meadow Heights Subdivision stormwater outlet. A stage-storage-discharge relationship was determined for the facility and is included in Appendix A for reference purposes.

As the facility will be discharging flows from multiple areas, a comparison of flows from existing to future conditions for specifically the Rosedale Subdivision development will not be attainable. Therefore, Table 6 below outlines the characteristics of the SWM facility during all storm events, though Table 7 on the following page outlines the overall peak stormwater flows discharging to the Biederman Drain.

Table 6. Stormwater Management Wet Pond Facility Characteristics										
Design Storm	Peak Flo	ows (m^3/s)	Maximum	Maximum Volume (m ³)						
(Return Period)	Inflow	Outflow	Elevation							
25mm	0.821	0.028	175.31	1,562						
2 Year	1.342	0.040	175.59	2,711						
5 Year	1.643	0.072	175.73	3,327						
10 Year	1.991	0.083	175.87	4,001						
25 Year	2.918	0.083	176.11	5,254						
50 Year	3.610	0.083	176.29	6,247						
100 Year	4.562	0.083	176.52	7,568						

Based on the MIDUSS model, Table 6 shows the maximum wet pond elevation of 176.52m, and an active storage volume of 7,568 m^3 for the 100-year design storm event. Therefore, as the SWM facility has a top elevation of 176.85m, a freeboard of 0.33m will be provided by this Stormwater Management Plan.

During all storm events, stormwater flows from the development area are ultimately conveyed towards Outlet 'A' (West Side Road, MTO road allowance) under existing conditions. An emergency overflow spillway has been included as part of the SWM Facility design, discharging flows towards the West Side Road MTO road allowance. However, due to the size of the SWM Facility, no stormwater flows will be conveyed to the MTO road allowance as part of Outlet 'A' (West Side Road) during any of the modelled storm events.

The storm sewer system immediately downstream of the SWM facility outlet to the Biederman Drain was designed to convey peak stormwater flows up to and including the 5-year design storm event. During the 5-year event, the Rosedale SWM Facility will discharge approximately 72L/s to the downstream storm sewer system according to the MIDUSS modelling. As part of the design of this storm sewer, a conservatively increased flow allocation from the Rosedale SWM Facility of 100L/s was included in the calculations

to ensure sufficient capacity was provided. With this allocation, the sewers experience flows reaching approximately 87% of their capacity during the 5-year event.

During events greater than the 5-year storm event, it has been conservatively assumed that storm sewers can accommodate flow at an additional 15% on top of their full flow capacity due to surcharged conditions. Therefore, for the purpose of modelling the stormwater management facility, a maximum discharge rate of 83 L/s (72L/s + 15%) has been utilized for flows being discharged at the outlet pipe. Additional outflow capacity is included once stormwater flows within the SWM facility reach the spillway elevation of 176.65m.

Table 7 details the difference in peak stormwater flows ultimately discharging to the Biederman Drain at Outlet A under existing conditions as well as to the Biederman Drain at Stonebridge Drive (Outlet C) under future conditions with the stormwater management facility in place.

Table 7. Impacts of Wet Pond Facility on Peak Flows to Biederman Drain									
	Peak Flow (m ³ /s)								
Design Storm	Existing	Future with SWM	Change*						
2 Year	1.512	1.512	0.0%						
5 Year	2.224	2.206	- 0.8%						
10 Year	2.707	2.540	- 6.2%						
25 Year	3.340	2.545	- 23.8%						
50 Year	3.824	2.590	-32.3%						
100 Year	4.585	2.589	- 43.5%						
Note: *indicates with storn	the percent change be mwater management	etween existing conditions controls in place.	and future conditions						

Therefore, as outlined in Table 7 above, stormwater flows discharging to the Biederman Drain will remain relatively unchanged during storm events up to and including the 5-year event, and experience significant peak flow reductions as a result of the proposed stormwater management plan during storms greater than the 5-year event. As discussed previously, it should be noted again that overland flows from the adjacent Meadow Heights Subdivision during storms greater than the 5-year event will be directed to the Rosedale SWM Facility and ultimately be provided quantity controls as a result.

The proposed facility has a single storm sewer inlet, therefore, the sediment forebay was designed to minimize the transport of heavy sediment from the storm sewer outlet throughout the facility and to localize maintenance activities. Calculations for the forebay sizing follow MECP Guidelines and are shown in Tables 8 for the storm sewer outlet.

Table 8. Stormwater Management Facility Forebay Sizing										
a) Forebay Settling Length (MOECC SWMP&D, Equation 4.5)										
		r =	2.3	:1	(Length:Width Ratio)					
Settling Length =	$\frac{r * Q_p}{V_s}$	$Q_p =$	0.03	m ³ /s	(25mm Storm Pond Discharge)					
Ň		$V_s =$	0.0003	m/s	(Settling Velocity)					
Settling Length = 15.22 m										
b) Dispersion Length (N	10ECC S	SWMP&D	, Equatic	on 4.6)						
	8 * Q	Q =	1.643	m ³ /s	(5 Yr Stm Sew Design Inflow)					
Dispersion Length =	$\overline{D * V_f}$	D =	1.50	m	(Depth of Forebay)					
	,	$V_{\mathrm{f}} =$	0.5	m/s	(Desired Velocity)					
Dispersion Length =	17.53	Μ								
c) Minimum Forebay D	eep Zone	Bottom W	/idth (M	OECC S	WMP&D, Equation 4.7)					
	× .1	Minimun	n Foreba	y Lengtł	n from Equations 3.3 and 3.4					
$Width = rac{Dispersion}{8}$	Length		17.53	m	(minimum required length)					
Width =	2.19	m (minir	num requ	uired wi	dth)					
d) Average Velocity of	Flow	× ×	1		,					
		Q =	0.839	m ³ /s	(Quality Design Inflow)					
	-	A =	21.00	m ²	(Cross Sectional Area)					
Average Velocity	$=\frac{Q}{4}$	D =	1.50	m	(Depth of Forebay)					
	A	$\mathbf{W} =$	9.50	m	(Proposed Bottom Width)					
		S =	3	:1	(Side slopes - minimum)					
Average Velocity =	0.04	m/s								
Is this Acceptable?	Yes	(Maxi	mum vel	ocity of	flow = 0.15 m/s)					
e) Cleanout Frequency										
Is this Acceptable?	Yes	L =	22.0	m	(Proposed Bottom Length)					
		ASL =	2.8	m ³ /ha	(Annual Sediment Loading)					
		A =	12.77	ha	(Drainage Area)					
		FRC =	70	%	(Facility Removal Efficiency)					
		FV =	586.9	m^3	(Forebay Volume)					
Cleanout Frequency =	11.5	years								
Is this Acceptable?	Yes				(10 year minimum cleanout frequency)					

6.0 SEDIMENT AND EROSION CONTROL

Sediment and erosion controls are required during all construction phases of this development to limit the transport of sediment into the Biederman Drain.

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

- Install silt control fencing along the limits of construction of the development to collect sediment in overland flows before discharging to downstream systems. The silt control fence installed along east end of site will be installed along the wetland buffer to act as the limit of construction.
- 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 Wetpond Facility

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

The wet pond 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 wet pond 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 wet pond 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 wet pond are operating improperly, such as the detention times may be inadequate or excessive.
- c) The accumulation of sediment and debris at the wet pond inlet sediment forebay or around the high water line of the wet pond should be inspected. This will indicate the need for sediment removal or debris clean up.
- d) The wet pond 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 cleanup, 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 in 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.
- The proposed stormwater management facility will provide stormwater quality controls for the proposed Rosedale Subdivision and quantity controls for the Rosedale Subdivision as well as the adjacent Meadow Heights Subdivision during larger storm events.
- 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 wet pond facility be constructed to provide stormwater quality protection to MECP *Normal* Protection levels and quantity controls as outlined in this report.
- That additional lot level controls and vegetative stormwater management practices as described previously in this report be implemented.

Prepared By:

Kurt Tiessen, E.I.T.



Reviewed By:

Jason Schooley, P.Eng. November 23, 2023

APPENDICES

APPENDIX A

Stormwater Management Facility Calculations

Upper Canada Consultants 30 HANNOVER DRIVE, UNIT 3 St. Catharines, Ontario L2W 1A3 PROJECT NAME: ROSEDALE SUBDIVISION PROJECT NO.: 5331

DATE: SEPTEMBER 2023

					STORM	WATER M	IANAGE	MENT FA	CILITY	WETPON	D				
Quality Rec	Juirements	12 77	Di	Quality Ori	ifice]	Ditch Inlet $(m) =$	Weir	Dia	Outflow Pa	ipe Orifice		Minor	Overflow Sp	oillway
Norm	$mal(m^3/ha) = 1$	130	(@ 70%)	Cd =	0.63		Width $(m) =$	0.60	Di	Cd =	0.430		SI	ones $(X \cdot 1) = 1$	3.00
Perm Poo	$m(m^3/ha) = 9$	90		Invert (m) =	174.85	Grate S	lone(X:1) =	4		Invert (m) =	174.85		Minor	Invert $(m) =$	176.65
Perm Pool	$Vol(m^3) = 1$	1.149			17 1100	Inlet Elev	vation $(m) =$	175.60		Overt $(m) =$	175.30		Major I	enoth $(m) = 0$	0.00
Acti	ve Vol (m^3)	511				11100 210	Cd =	1.84		0 / 0 17 (iii)	1,0100		Major	Invert $(m) =$	176.85
25mm 1 Perm. P	$MOEE (m^3)$ Pool Elev. = 1	174.85	m ³ m								MOE Equ MOE Equ	ation 4.10 Dra ation 4.10 Dra	awdown Coef	ficient 'C2' = ficient 'C3' =	1,945 2,939
											M	DE Equation 4	.10 Drawdow	n Time (h) =	28.7
Elevation	Increment Depth	Active Depth	Surface Area	Average Surface Area	Increment Volume	Permanent Volume	Active Volume	Quality Orifice	Ditch Inlet	Max Pipe Orifice	Max Outflow (5yr+15%)	Overflow Spillway	Total Outflow	Average Discharge	Side Slope
	(m)	(m)	(m ²)	(m ²)	(m ³)	(m ³)	(m ³)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(H:V)
173.85	0.50	-1.00	1,077	1 2 9 0	(00	0									
174.35	0.50	-0.50	1.683	1,380	690	690									
171.55	0.50	0.50	1,005	2,006	1,003	0,0									
174.85		0.00	2,329			1,693									PERM
174.85	0.00	0.00	2 0 2 0	2,634	0		0.0	0.000	0.000	0.00		0.00	0.00	0.00	DEDM
1/4.05	0.50	0.00	2,757	3,425	1,713		0.0	0.000	0.000	0.00		0.00	0.00	0.016	5:1
175.35		0.50	3,911				1712.6	0.031	0.000	0.198		0.000	0.031		
175 (0	0.25	0.75	4.250	4,135	1,034		27464	0.040	0.000	0.200		0.000	0.040	0.024	5:1
1/5.60	0.16	0.75	4,359	4,505	721		2/46.4	0.040	0.000	0.298		0.000	0.040	0.067	5.1
175.76		0.91	4,651	.,	,		3467.2	0.044	0.035	0.347		0.000	0.080		
	0.09			4,734	426				0.0.60					0.081	5:1
175.85	0.50	1.00	4,817	5 280	2 645		3893.3	0.047	0.069	0.371	0.083	0.000	0.083	0.083	5.1
176.35	0.50	1.50	5,762	5,207	2,045		6538.0	0.058	0.359	0.486	0.083	0.000	0.083	0.005	5.1
	0.30			6,055	1,816									0.083	5:1
176.65	0.10	1.80	6,348	6 4 4 7	(15		8354.4	0.064	0.594	0.544	0.083	0.000	0.083	0.159	5.1
176.75	0.10	1.90	6.546	0,447	043		8999.1	0.066	0.681	0.561	0.083	0.150	0.233	0.138	5:1
170170	0.10	100	0,010	6,646	665		0,,,,,,,	0.000	01001	01001	01000	01120	01200	0.353	5:1
176.85		2.00	6,746				9663.7	0.068	0.771	0.579	0.083	0.390	0.473		
Nutur	1 0 1 0							1.7 0							

Notes 1. Quality Orifice flow is the orifice controlling for the 24 hour detention period and uses an orifice formula.

2. Pipe Orifice flow is calcuated using an orifice formula on the pipe from the ditch inlet to the outlet and uses the total head on the orifice.

3. Overflow Weir flow is calculated using a trapezondial weir to convey outflow for less frequent storms through the embankment with an emergency spillway.

4. 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

Existing Conditions

Output File (4.7) EX.OUT opened 2023-09-22 9:56 Units used are defined by G = 9.810 24 144 10.000 are MAXDT MAXHYD & DTWIN values Liensee: UPPER CANADA CONSULTANTS 35 COMMENT COMMENT 4 line(s) of comment ROSEDALE SUBDIVISION STORMMATER MANAGEMENT PLAN EXISTING CONDITIONS TO BIEDERMAN DRAIN OCTOBER 2022 35 COMMENT COMMENT 1 line(s) of comment UTILIZED FULL SITE AREA START 1 1=Zero; 2=Define COMMENT 3 line(s) of comment 14 35 * 25MM DESIGN STORM EVENT * 2 STORM 1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic 512.000 I = (Introduct) 2=HUET: /=UBET;
 ID = (Introduct) 2=HUET: /=UBET;
 ID = (Introduct) 2=HUET;
 ID = 240.000 OUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .015 Manning "n" SCS Curve No or C Ia/S Coefficient 98.000 .100 Ia/S Coefficient .518 Initial Abstraction COMMENT 35 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA EX *** *** RODEL CATCHMENT ' ^^^ ID No.ó 99999 1.000 12.770 400.000 2.000 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) .500 400.000 %Imp. with Zero Dpth
Option l=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .000 Option 1=SCS CN/C; 2=Horton; s=Green-Ampt; t=Acpute Manning "n" 3 SCS Curve No or C 1 Ia/S Coefficient 7 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .024 .000 .000 .000 c.m/s .130 .799 .134 C perv/imperv/total 250 .230 77.000 .100 7.587 1 .130 .799 .134 C µ HYDROGRAPH DISPLAY 4 is ⋕ of Hyeto/Hydrograph chosen Volume = .4272098E+03 c.m ADD RUNOFF .024 .000 . ROUTE .024 .000 . 27 15 .000 c.m/s 9 000 Conduit Length .000 No Conduit Length No Conduit defined Zero lag Beta weighting factor .000 Routing timestep No. of sub-reaches .024 .024 .024 0 .024 .024 .024 COMBINE 3 Junction Node No. .024 .024 .024 START 1 1=Zero; 2=Define COMMENT 1 line(s) of comment *** FIELD - DRAINAGE AREA FX *** CATCHMENT 1.000 ID No.6 99999 3.440 Area in hectares .000 c.m/s 17 .024 c.m/s 14 35 4 ID No.o 99999 Area in hectares Length (PERV) metres 3.440 150.000 Length (PEKV) 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 1.000 .500 150.000 .000 . 250 77.000 .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .009 .000 .024 .024 c.m/s .130 .804 .134 C perv/imperv/total ADD RUNOFF 15 .009 .024 .024 c.m/s .009 CHANNEL 11 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % = 052 metre .300 3.000 3.000 .030 .500 1.000 Velocity = .052 metres Velocity = .373 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .039 metres 9 ROUTE 400.000 Conduit Length 400.000 Conduit Length .493 Supply X-factor <.5 401.782 Supply K-lag (sec) .500 Beta weighting factor 600.000 Routing timestep 2 No. of sub-reaches .009 .009 .009 NEXT LINK .009 .009 .009 .024 c.m/s 16 .024 c.m/s COMMENT 35 line(s) of comment *** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** CATCHMENT 1.000 ID No.6 99999

10.840 300.000 1.000 25.000 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 300.000 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=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 48 000 000 004 cm/c .000 250 77.000 .100 7.587 .248 .009 .009 .024 c.m/s .130 .802 .298 C perv/imperv/total .248 ADD RUNOFF .248 CHANNEL DFF 48 .249 .009 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % = 256 metres 15 .024 c.m/s 11 .300 3.000 3.000 .030 .500 1.000 = .256 metres = .909 m/sec Depth Velocity Flow Capacity = 1.222 c.m/s Critical depth = .224 metres ROUTE 200.000 .472 164.970 9 Conduit Length Supply X-factor <.5 Supply K-lag (sec) .500 Beta weighting factor 150.000 Routing timestep 1 No. of sub-reaches .248 .249 .207 NEXT LINK .207 .024 c.m/s .248 .249 .207 .024 c. 16 NEXT LINK .248 .207 .207 .024 c. 35 COMMENT 1 line(s) of comment **** MEADOW HEIGHTS - DRAINAGE AREA MH **** .024 c.m/s 4 CATCHMENT ID No.ó 99999 Area in hectares Length (PERV) metres 1.000 29.250 500.000 2.000 Gradient (%) Per cent Impervious Length (IMPERV) 35.700 500.000 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 indicial Networking 250 77.000 .100 7.587 Initial Abstraction .928 1.135 .207 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .3644621E+04 c.m PIPE DIPE Minimum velocity m/sec 27 5 8 Maximum velocity m/sec Pipe Manning's 'n' 2.920 .013 1.350 Diameter in metres .600 Select Grade in % .600 Select Grade in % Depth = .484 metres Velocity = 2.464 m/sec Pipe Capacity = 4.134 c.m/s Critical depth= .558 metres ROUTE 500.000 Conduit Length 9 Supply X-factor <.5 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .928 1.135 .943 NE .455 152 187 500 150.000 1 .024 c.m/s .928 1.135 .943 . COMBINE JUNCTION NOde No. .928 1.135 .943 . CONFLUENCE JUNCTION NOde No. .928 .951 .943 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .4069800E+04 c.m STAPT 17 3 .951 c.m/s 18 .000 c.m/s 27 14 START 1=Zero; 2=Define 1 COMMENT 3 line(s) of comment 35 * MTO 2 YEAR DESIGN STORM EVENT * STORM 2 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Constant b (min) Exponent c Fraction to peak r 397.149 .000 .699 .450 240.000 Duration ó 240 min 34.451 mm Total depth 3 IMPERVIOUS UUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient .015 98.000 .100 518 Initial Abstraction 35 COMMENT COMMENT 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA EX *** CATCHMENT 1.000 ID No.6 99999 4 ID No.0 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 12.770 400.000 2.000 .500 400.000 .000

Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv .250 77.000 .100 7.587 1 .943 .000 c.m/s .207 C perv/imperv/total .063 .000 .204 .850 .204 .850 .207 C 1 HYDROGRAPH DISPLAY 4 is # of Hyeto/Hydrograph chosen Volume = .91116588+03 c.m ADD RUNOFF .063 .063 .943 . 27 15 .000 c.m/s ROUTE 9 Conduit Length 000 Supply X-factor <.5 Supply K-lag (sec) .500 .000 Beta weighting factor Routing timestep No. of sub-reaches .063 .063 .063 500 600.000 1 .000 c.m/s COMBINE 3 Junction Node No. .063 .063 .063 START 17 .063 c.m/s 14 1=Zero; 2=Define 35 COMMENT CUMMENT 1 line(s) of comment *** FIELD - DRAINAGE AREA FX *** CATCHMENT 1.000 ID No.6 99999 3.440 Area in hectares Length (PERV) metres 150.000 Length (PEKV) 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 L.0 Cheficie int 1.000 . 500 150.000 .000 .250 77.000 .100 Ta/S Coefficient .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 .063 ..m/s .204 .841 .207 C perv/imperv/total ADD RUNOFF 15 .023 .063 .063 c.m/s .023 CHANNEL 11 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % 300 3.000 .030 .500 1.000 Depth = .084 metres Velocity = .488 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .067 metres 9 400.000 Conduit Length .409 Supply X-factor <.5 307.501 Supply X-lag (sec) .500 Beta weighting factor 600.000 Routing timestep 2 No. of sub-reaches .023 .023 .023 .063 c.m/s NEXT LINK .023 .023 .023 .063 c.m/s COMMENT ROUTE 400.000 Conduit Length 16 35 1 line(s) of comment *** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** CATCHMENT 1.000 ID No.ó 99999 10.840 Area in hectare 4 Area in hectares 10.840 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS (DN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning th 300.000 1 000 25.000 300.000 .000 . 250 Manning "n" SCS Curve No or C 77.000 .100 Ta/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .367 .023 .063 c.m/s .204 .849 .365 C perv/imperv/total 7 587 1 ADD RUNOFF 15 .023 .370 .063 c.m/s .367 CHANNEL CHANNEL .300 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1: .030 Manning's "n" .500 O/a Depth in metres 1.000 Select Grade in % Depth = .304 metres Velocity = 1.006 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .270 metres ROUTE 11 9 ROUTE 200.000 Conduit Length
 000
 Conduit Length

 468
 Supply X-factor <.5</td>

 160
 Supply K-lag (sec)

 500
 Beta weighting factor

 000
 Routing timestep

 1
 No. of sub-reaches

 .367
 .370

 .325
 XXT LINK
 .468 149.160 .500 .063 c.m/s NEXT LINK 16 .325 .325 .063 c.m/s .367 COMMENT 35 COMMENT 1 line(s) of comment *** MEADOW HEIGHTS - DRAINAGE AREA MH *** CATCHMENT 1.000 ID No.6 99999 1.000 ID NO.0 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 29.250 500.000 2.000 35.700 500.000 .000

.250

Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv .250 .250 77.000 .100 7.587 1 1.385 .325 .325 .063 c.m/s .204 .841 .431 C perv/imperv/total 15 ADD RUNOFF ADD RUNOFF 1.385 1.710 .325 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .5955855E+04 c.m prop .063 c.m/s 27 8 PTPE Minimum velocity m/sec 500 Maximum velocity m Maximum velocity m Pipe Manning's 'n' Diameter in metres Select Grade in % 2.920 .013 1.350 Current Crade in % Depth = .605 metres Velocity = 2.750 m/sec Pipe Capacity = 4.134 c.m/s Critical depth= .692 metres ROUTE 500.000 Conduit Length .442 cm 4.134 c.m/s .692 metres 9
 500.000
 Conduit Length

 .442
 Supply K-factor <.5</td>

 136.363
 Supply K-lag (sec)

 .500
 Beta weighting factor

 150.000
 Routing timestep

 1
 No. of sub-reaches

 1.385
 1.710
 1.493

 COMBINE
 Comment
 .063 c.m/s COMBINE 3 Junction Node No. 17 3 1.385 1.710 1.493 1.512 c.m/s CONFLUENCE 3 Junction Node No. 1.385 1.512 1.493 HYDROGRAPH DISPLAY 18 .000 c.m/s 27 5 is # of Hyeto/Hydrograph chosen Volume = .6864000E+04 c.m 14 START 1=Zero; 2=Define 1 35 * MTO 5 YEAR DESIGN STORM EVENT * 2 STORM 1 l=Chicago;2=Huff;3=User; 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .450 Fraction to peak r !40.000 Duration ó 240 min 45.530 mm Total depth IMPERVIOUS 1 Oction 5 1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic 524.867 240.000 3 US Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient .015 98.000 .100 Initial Abstraction .518 CUMMENT 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA EX *** CATCHMENT 1.000 ID No.6 99999 12.770 Area in both COMMENT 35 12.770 Area in hectares 400.000 Length (PERV) metres 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 2.000 .500 400.000 .000 .250 Manning "n" SCS Curve No or C Ia/S Coefficient 77.000 100 7.587 Ia/S Coefficient
 Initial Abstraction
 Option l=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
 .147 .000 1.493 .000 c.m/s
 .278 .883 .281 C perv/imperv/total HYDROGRAPH DISPLAY 27 HIDKNUKARAPH DISPLAY 4 is # of Hyeto/Hydrograph chosen Volume = .1632299E+04 c.m ADD RUNOFF .147 1.493 ROUTE .000 15 .000 c.m/s 9 Conduit Length .000 Conduit Length
 Supply X-factor <.5
 Supply K-lag (sec)
 Beta weighting factor
 Routing timestep
 No. of sub-reaches
 .147
 .147 .000 500 600.000 .000 c.m/s 17 COMBINE Junction Node No. 147 .147 .147 3 .147 START 1 .147 .147 c.m/s 14 1=Zero; 2=Define 1 l=zero, 2 ____ COMMENT 1 line(s) of comment *** FIELD - DRAINAGE AREA FX *** 35 4 CATCHMENT 1.000 ID No.ó 99999 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. c C 3.440 150 000 1.000 .500 150.000 .000 1 250 Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 55.000 .147 .147 c.m/s 78 .859 .280 C perv/imperv/total PF 77.000 .100 1 055 278 15 ADD RUNOFF .147 .055 CHANNEL .055 .147 c.m/s

11

.300 3.000

Base Width = Left bank slope 1:

Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % = .129 metres / = .616 m/sec .030 .500 1.000 Depth Velocity velocity = .616 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .106 metres ROUTE 400.000 Conduit Length .492 487.040 Supply X-factor <.5 Supply K-lag (sec) 7.040 Supply K-lag (sec) .500 Beta weighting factor 0.000 Routing timestep 1 No. of sub-reaches .055 .055 .053 NEXT LINK .055 .053 .053 300.000 .147 c.m/s .055 NEXT LINK .055 COMMENT 16 .147 c.m/s 35 COMMENT 1 line(s) of comment *** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** CATCHMENT 1.000 ID No.6 99999 10 0400 4 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 La(S.Coefficient 10.840 300.000 1.000 25.000 300.000 . 250 77.000 .100 Ia/S Coefficient 7.587
 110; Controlence

 7
 Initial Abstraction

 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv

 .515
 .053

 .653
 .147 c.m/s

 .278
 .884

 .429
 C perv/imperv/total
 15 ADD RUNOFF ADD RUNOFF .515 .525 .053 .147 c.m/s CHANNEL .300 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1: .030 Manning's "n" .500 0/a Depth in metres 1.000 Select Grade in % 11 .500 0/a Depth in metres 1.000 Select Grade in % Depth = .352 metres Velocity = 1.098 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .317 metres ROUTE 200.000 Conduit Length .463 Supply X-factor <.5 .453 Supply X-factor <.5 136.564 Supply X-had (sec) .500 Beta weighting factor 120.000 Routing timestep 1 No. of sub-reaches .515 .525 .476 .147 c.m/s NEXT LINK .515 .476 .476 .147 c.m/s COMMENT .515 NEXT LINK .515 COMMENT 16 35 COMMENT 1 line(s) of comment *** MEADOW HEIGHTS - DRAINAGE AREA MH *** CATCHMENT 1.000 ID No.6 99999 29.250 Area in hectares 4 29.250 Area in hectares 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 Marving "x" 500.000 2.000 35.700 500.000 .000 .250 Manning "n" SCS Curve No or C Ia/S Coefficient 77.000 100
 1a/S Coeriscient

 7 Initial Abstraction

 1
 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv

 1.941
 .476

 .476
 .147 c.m/s

 .278
 .882

 .493
 C perv/imperv/total
 7.587 15 ADD RUNOFF 2.416 .476 .147 c.m/s 1.941 1.941 2.416 .476 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .9128701E+04 c.m 27 Volume = .912070150705 c.m PIPE .500 Minimum velocity m/sec 2.920 Maximum velocity m/sec .013 Pipe Manning's 'n' 1.350 Diameter in metres .600 Select Grade in % Depth = .741 metres Velocity = 3.000 m/sec Pipe Capacity = 4.134 c.m/s Critical depth= .829 metres ROUTE 8 ROUTE 500.000 Conduit Length 500.000 Conduit Length .424 Supply K-factor <.5 124.986 Supply K-lag (sec) .500 Beta weighting factor 120.000 Routing timestep 1 No. of sub-reaches 1.941 2.416 2.180 COMBINE .147 c.m/s IOMBINE Junction Node No. 1941 2.416 2.180 2.224 c.m/s 17 COMBINE 1.941 2.416 CONFLUENCE CONFLUENCE 3 Junction Node No. 1.941 2.224 2.180 HYDROGRAPH DISPLAY .000 c.m/s 27 Introverser DisPLAY
5 is # of Hyeto/Hydrograph chosen
Volume = .1075680E+05 c.m
START
1 l=Zero; 2=Define
CONTENT 14 COMMENT 35 3 line(s) of comment * MTO 10 YEAR DESIGN STORM EVENT * 2 STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic 608.845 Coefficient a

3.000

Constant b (min) Exponent c Fraction to peak r 000 .699 240.000 Duration ó 240 min 2.815 mm Total depth 52.815 mm IMPERVIOUS 3 UUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient ⊥ .015 98.000 .100 Initial Abstraction .518 35 COMMENT 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA EX *** CATCHMENT 1.000 ID No.ó 99999 12.770 Area in hectare 400.000 Length (PERV) m 4 Area in hectares Length (PERV) metres 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 2.000 500 400 000 .000 .250 .100 Ia/S Coefficient
7.587 Initial Abstraction
1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
.225 .000 2.180 .000 c.m/s
.320 .897 .322 C perv/imperv/total
HYDROGRAPH DISPLAY
4 is # of Hyeto/Hydrograph chosen
Volume = .21745008+04 c.m
ADD RUNOFF
.225 .000 Manning "n" 27 ныр кunoff .225 .225 2.180 ROUTE 15 .000 c.m/s 9 Conduit Length .000 Supply X-factor <.5 Supply K-lag (sec) .000 1 No. of sub-reaches 225 .225 .225 .225 600.000 .000 c.m/s .225 COMBINE 3 Junction Node No. .225 .225 .225 17cti .225 START 1 . 225 .225 c.m/s 14 1=Zero: 2=Define 1 1 I=ZEIO, Z-L-COMMENT 1 line(s) of comment *** FIELD - DRAINAGE AREA FX *** 35 CATCHMENT 1.000 ID No.ó 99999 ID No.0 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 3.440 1.000 .500 150.000 .000 . 250 Manning "n" Manning "n" SCS Curve No or C Ia/S Coefficient 'Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .079 .000 .225 .225 c.m/s .320 .878 .322 C perv/imperv/total Dances 77.000 .100 7.587 1 15 ADD RUNOFF .079 .079 .225 .225 c.m/s 11 CHANNEL Base Width = Left bank slope 1: Right bank slope 1: .300 3.000 3.000 Right bank stope 1. .030 Manning's *n" .500 O/a Depth in metres 1.000 Select Grade in % Depth = .154 metres Velocity = .679 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .129 metre POUTE .129 metres 9 ROUTE depui = .129 metre 400.000 Conduit Length .491 Supply X-factor <.5 441.992 Supply K-lag (sec) .500 Beta weighting factor 300.000 Routing timestep 1 No. of sub-reaches .079 .079 .077 16 NEXT LINK 070 077 077 .077 .225 c.m/s NEXT LINK .079 .077 .077 .225 c.m/s COMMENT 1 line(s) of comment **** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** 35 4 CATCHMENT 1.000 ID No.ó 99999 1.000 10.840 300.000 1.000 25.000 300.000 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 .000 1 Option 1=SCS CM/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. Reserv .613 .077 .025 c.m/s .320 .897 .464 C perv/imperv/total INOFF .250 77.000 .100 7.587 1 .613 15 ADD RUNOFF .632 .077 .225 c.m/s .613 11 CHANNEL Base Width = Left bank slope 1: Right bank slope 1: .300 3.000 3.000 3.000 Right bank slope 1: .030 Maning's "n" .500 O/a Depth in metres 1.000 Select Grade in % Depth = .381 metres Velocity = 1.150 m/sec Flow Capacity = 1.222 c.m/s

0	Critical depth = .344 metres	
5	200.000 Conduit Length	
	.460 Supply X-factor <.5 130.387 Supply K-lag (sec)	
	.500 Beta weighting factor	
	120.000 Routing timestep 1 No. of sub-reaches	
	.613 .632 .579 .225 c.m/s	
10	.613 .579 .579 .225 c.m/s	
35	COMMENT	
	*** MEADOW HEIGHTS - DRAINAGE AREA MH ***	
4	CATCHMENT	
	29.250 Area in hectares	
	500.000 Length (PERV) metres 2 000 Gradient (%)	
	35.700 Per cent Impervious	
	.000 Length (IMPERV) .000 %Imp. with Zero Dpth	
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	77.000 SCS Curve No or C	
	.100 Ia/S Coefficient	
	 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reser 	v
	2.305 .579 .579 .225 c.m/s .320 .898 .526 C perv/imperv/total	
15	ADD RUNOFF	
27	2.305 2.884 .579 .225 c.m/s HYDROGRAPH DISPLAY	
	5 is # of Hyeto/Hydrograph chosen	
8	VOLUME = .II3/058E+05 C.M PIPE	
	.500 Minimum velocity m/sec	
	.013 Pipe Manning's 'n'	
	1.350 Diameter in metres	
	Depth = .830 metres	
	Velocity = 3.123 m/sec Pipe Capacity = 4.134 c m/s	
	Critical depth= .908 metres	
9	ROUTE 500.000 Conduit Length	
	.407 Supply X-factor <.5	
	.500 Beta weighting factor	
	120.000 Routing timestep	
	2.305 2.884 2.637 .225 c.m/s	
17	COMBINE 3 Junction Node No	
	2.305 2.884 2.637 2.707 c.m/s	
18	CONFLUENCE 3 Junction Node No.	
	2.305 2.707 2.637 .000 c.m/s	
21	5 is # of Hyeto/Hydrograph chosen	
14	Volume = .1353900E+05 c.m	
14	1 1=Zero; 2=Define	
35	COMMENT	

	* MTO 25 YEAR DESIGN STORM EVENT *	
2	STORM	
	<pre>1 l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic 715.568 Coefficient a</pre>	
	.000 Constant b (min)	
	.699 Exponent c .450 Fraction to peak r	
	240.000 Duration ó 240 min	
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 .518 Initial Abstraction	
35	COMMENT	
	1 line(s) of comment *** ROSEDALE - DRAINAGE AREA EX ***	
4	CATCHMENT	
	12.770 Area in hectares	
	400.000 Length (PERV) metres	
	.500 Per cent Impervious	
	400.000 Length (IMPERV)	
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250 Manning "n" 77.000 SCS Curve No or C	
	.100 Ia/S Coefficient	
	 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reser 	v
	.331 .000 2.637 .000 c.m/s	
27	HYDROGRAPH DISPLAY	
	4 is # of Hyeto/Hydrograph chosen Volume = .2929079E+04 c.m	
15	ADD RUNOFF	
9		
	.000 Conduit Length	
	.000 Supply K-lag (sec)	
	.500 Beta weighting factor	
	1 No. of sub-reaches	
17	.331 .331 .331 .000 c.m/s COMBINE	
	3 Junction Node No.	
	.331 .331 .331 .331 c.m/s	
14	START	

1 line(s) of comment *** FIELD - DRAINAGE AREA FX *** CATCHMENT 1.000 ID No.6 99999 4 3.440 Area in hectares Area in nectares 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 150.000 1.000 .500 150.000 .000 1 .250 Manning "n" 77.000 SCS Curve No or C Ia/S Coefficient 100 100 Ia/S Coefficient S7 Initial Abstraction 1 Option l=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .127 .000 .331 .311 c.m/s .367 .898 .369 C perv/imperv/total b pumpers 7.587 15 ADD RUNOFF .127 . 331 .127 .331 c.m/s CHANNEL 11 Base Width = Left bank slope 1: Right bank slope 1: .300 3.000 3.000 Right Dank Slope 1: .030 Manning's "n" .500 O/a Depth in metres 1.000 Select Grade in % Depth = .190 metres Velocity = .766 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .162 metres ROUTE 9 ROUTE Conduit Length 400.000 400.000 Conduit Length .489 Supply X-factor <.5 391.534 Supply K-lag (sec) .500 Beta weighting factor 300.000 Routing timestep 1 No. of sub-reaches .127 .127 .122 .331 c.m/s 16 NEXT LINK .127 .122 .122 .331 c.m/s 35 COMMENT 1 line(s) of comment *** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** 4 CATCHMENT 1.000 ID No.ó 99999 1.000 10.840 300.000 1.000 25.000 300.000 .000 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS (N/C; 2=Horton; 3=Green-Ampt; 4=Repeat Option 1=SCS CM/C? 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C 1a/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SNM HYD; 4=Lin. Reserv .742 .122 .331 c.m/s .367 .911 .503 C perv/imperv/total propose .250 .250 77.000 .100 7.587 1 15 ADD RUNOFF .775 .122 .742 .331 c.m/s CHANNEL 11 Base Width = Left bank slope 1: Right bank slope 1: .300 3.000 3.000 Right Dank Slope 1: .030 Manning's "n" .500 O/a Depth in metres 1.000 Select Grade in % Depth = .415 metres Velocity = 1.211 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .377 metres ROUTER 9 ROUTE ROUTE 200.000 .457 123.848 .500 120.000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep 1 No. of sub-reaches .742 .775 .7 .720 .331 c.m/s .775 16 NEXT LINK .720 .720 .331 c.m/s .742 ./42 ./20 ./20 .331 C. COMMENT 1 line(s) of comment *** MEADOW HEIGHTS - DRAINAGE AREA MH *** 35 CATCHMENT 1.000 ID No.ó 99999 4 1.000 29.250 500.000 2.000 35.700 500.000 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 0.000 Length (IMPERV) 000 % Timp, with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Mamning "n" 0.000 SCS Curve No or C 1.000 Ta/S Coefficient 587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 2.767 .720 .720 .331 c.m/s .367 .911 .561 C perv/imperv/total and plnNoPC .000 .250 77.000 .100 7.587 15 ADD RUNOFF ALD KONOFF 2.767 3.486 .720 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1435864E+05 c.m 3.486 .720 .331 c.m/s 27 8 PIPE Minimum velocity m/sec .500 Maximum velocity m/sec Maximum velocity m/sec Pipe Manning's 'n' Diameter in metres Select Grade in % 2.920 .013 1.350 .600 Depth = .950 metres = 3.238 m/sec Velocity Velocity = Pipe Capacity = Critical depth= ROUTE 500.000 Conduit .377 Supply 2 115.797 Supply 4.134 c.m/s .999 metres

9

Conduit Length Supply X-factor <.5 Supply K-lag (sec)

- COMMENT 35

.500 Beta weighting factor 120.000 Routing timestep 1 No. of sub-reaches 2.767 3.486 3.226 .331 c.m/s COMBINE 17 Junction Node No. 3
 Junction Node No.

 2.767
 3.486
 3.226
 3.340 c.m/s

 CONFLUENCE
 Junction Node No.
 2.767
 3.340
 3.226
 .000 c.m/s

 HYDROGRAPH DISPLAY
 S.240
 S.240
 S.240
 .000 c.m/s
 3.226 3.340 c.m/s 1.8 27 5 is # of Hyeto/Hydrograph chosen Volume = .1728300E+05 c.m 14 START 1=Zero; 2=Define 35 * MTO 50 YEAR DESIGN STORM EVENT * 2 STORM l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Constant b (min) 794.298 .000 .699 Exponent c .699 Exponent c .450 Fraction to peak r 240.000 Duration ó 240 min 68.903 mm Total depth IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 240.000 3 1 Option 1-00-.015 Manning "n" 8.000 SCS Curve No or C 98.000 Initial Abstraction .518 35 COMMENT COMMENT 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA EX *** CATCHMENT 1.000 ID No.ó 99999 ID NO.0 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 12.770 400.000 2.000 400.000 .000 % The second secon . 250 77 000 .100 1 .431 .000 .398 .915 27 HYDROGRAPH DISPLAY HYDROGRAPH DISPLAY 4 is ⋕ of Hyeto/Hydrograph chosen Volume = .3521674E+04 c.m ADD RUNOFF .431 .431 3.226 ROUTE 15 .000 c.m/s 9 Conduit Length .000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .500 .000 500 600.000 1 No. of sub-reaches .431 .431 .431 .000 c.m/s COMBINE 3 Junction Node No. .431 .431 .431 START 17 .431 c.m/s 14 START 1 1-Zero; 2=Define COMMENT 1 line(s) of comment *** FIELD - DRAINAGE AREA FX *** CATCHMENT 35 4 T ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 1.000 3.440 150.000 1.000 .500 150.000 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 In/S Coefficient Initial Abstraction Ortical Jewisraction 2=Destangle; 2=SWM UND: 4-Lin De .000 .250 77.000 .100 7.587 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .161 .000 .431 .431 c.m/s .397 .909 .400 C perv/imperv/total 1 ADD RUNOFF .161 CHANNEL 15 .431 .161 .431 c.m/s 11 .300 Base Width Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % = .211 metres / = .814 m/sec 3.000 3.000 .030 .500 1.000 Depth Velocity Flow Capacity = 1.222 c.m/s Critical depth = .182 metres ROUTE 400.000 .488 368.744 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor .500 Routing timestep No. of sub-reaches .61 .161 .154 NK .61 .154 .154 300.000 1 .161 .431 c.m/s .161 NEXT LINK .161 COMMENT 16 .431 c.m/s 35 line(s) of comment *** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** CATCHMENT Λ 1.000 10.840 TD No.6 99999 Area in hectares Length (PERV) metres Gradient (%) 300.000 1.000

Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 25.000 300.000 .250 Manning "n" Manning 'n' SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .841 .154 .431 c.m/s .397 .917 .527 C perv/imperv/total 77.000 .100 7.587 15 ADD RUNOFF .888 .154 .431 c.m/s .841 11 CHANNEL Base Width = Left bank slope 1: Right bank slope 1: .300 3.000 .030 Manning's "n" O/a Depth in metres .500 .500 O/a Depth in metres 1.000 Select Grade in % Depth = .439 metres Velocity = 1.253 m/sec Flow Capacity = 1.222 c.m/ Critical depth = .400 metr c.m/s .400 metres 9 ROUTE 200.000 Conduit Length 200.000 Conduit Length .455 Supply X-factor <.5 119.694 Supply K-lag (sec) .500 Beta weighting factor Routing timestep 1 No. of sub-reaches 1 No. of sub-reaches .841 .888 .829 16 NEXT LINK .431 c.m/s .829 .829 .431 c.m/s CATCHMENT 1.000 ID No.ó 99999 29.250 Area in hectai 4 1.000 29.250 500.000 2.000 35.700 500.000 ID No.0 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 .000 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=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv
 3.111 .829 .431 c.m/s
 .397 .919 .584 C perv/imperv/total
 FUNNPF .250 77 000 .100 1 15 ADD RUNOFF ADJ KONOPF 3.111 3.940 .829 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1664564E+05 c.m 3.940 .829 .431 c.m/s 27 8 PIPE Minimum velocity m/sec .500 2.920 Maximum velocity m/sec Pipe Manning's 'n' Diameter in metres Select Grade in % .013 1.350 .600 Velocity = 1.053 metres Velocity = 3.288 m/sec Pipe Capacity = 4.134 c.m/s Critical depth= 1.060 metres POUTRE Critical ROUTE 500.000 .344 114.065 .500 120.000 9 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor 0 Routing timestep No. of sub-reaches 3.111 3.940 3. 1 3.669 .431 c.m/s 17 18 3.111 3.824 3.669 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .2016420E+05 c.m .000 c.m/s 27 14 START 1=Zero; 2=Define 1 COMMENT 35 3 line(s) of comment * MTO 100 YEAR DESIGN STORM EVENT * 2 STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic 1 I=Chrcago/2=Huff/3=User/ Coefficient a Constant b (min) Exponent c Fraction to peak r Duration 6 240 min 75.581 mm Total depth IOUS 871.279 .000 240.000 IMPERVIOUS 3 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat ⊥ 015. Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction 98.000 .100 .518 35 COMMENT 1 line(s) of comment
*** ROSEDALE - DRAINAGE AREA EX *** 4 CATCHMENT 1.000 12.770 400.000 2.000 ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious .500 400.000 Length (IMPERV) %lmg. 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 Length (IMPERV) .000

77.000 .100

 87
 Initial Abstraction

 1
 Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv

 .550
 .000
 3.669
 .000 c.m/s

 .425
 .919
 .427
 C perv/imperv/total
 7.587 27 .550 .550 3.669 ROUTE 15 .000 c.m/s 9 Conduit Length .000 .000 Conduit Length .500 Supply X-factor <.5 .000 Supply K-lag (sec) .500 Beta weighting factor 0.000 Routing timestep 1 No. of sub-reaches .550 .550 .550 .550 600.000 .000 c.m/s .550 COMBINE 3 Junction Node No. .550 .550 .550 17 3 .550 .550 START .550 c.m/s 14 START 1 =Zero; 2=Define COMMENT 1 line(s) of comment *** FIELD - DRAINAGE AREA FX *** 35 4 CATCHMENT . ID No.ó 99999 1.000 3.440 150.000 1.000 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 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .196 .000 .550 .550 c.m/s .425 .917 .427 C perv/imperv/total UNOFF .500 150.000 .000 250 77.000 .100 7.587 1 .196 .125 .917 .427 ADD RUNOFF .196 .196 .550 CHANNEL .300 Base Width = 3.000 Left bank slope 1: 3.000 Kight bank slope 1: 0.30 Manning's "n" .500 O/a Depth in metres 1.000 Select Grade in % Depth = .231 metres Velocity = .856 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .200 metres ROUTE 15 .550 c.m/s 11 Critical deptn = ROUTE 400.000 Conduit Length .487 Supply X-factor <.5 350.564 Supply K-lag (sec) .500 Beta weighting factor 300.000 Routing timestep 1 No.of sub-reaches .196 .196 .186 NEXT LINK 186 .186 9 .550 c.m/s 16 NEXT LINK .196 .186 .186 .550 c.m/s COMMENT 1 line(s) of comment *** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** 35 4 CATCHMENT T ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious CATCHM 1.000 10.840 300.000 1.000 25.000 Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; Z=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction 300.000 .000 250 77.000 .100 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .924 .186 .186 .550 c.m/s .425 .922 .549 C perv/imperv/total 7.587 1 15 .550 c.m/s 11 Critical depth = .420 metre ROUTE 200.000 Conduit Length .453 Supply K-factor <.5 116.540 Supply K-lag (sec) .500 Beta weighting factor 120.000 Routing timestep .924 .988 .929 NEXT LINK .924 .929 .929 COMMENT 1 line(s) of comment 9 .550 c.m/s 16 .550 c.m/s 35 . line(s) of comment *** MEADOW HEIGHTS - DRAINAGE AREA MH *** 4 CATCHMENT 1.000 29.250 500.000 ID No.ó 99999 Area in hectares Length (PERV) metres 2.000 Gradient (%) Per cent Impervious 35.700 500.000 Length (IMPERV) %Imp. with Zero Dpth
Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .000

Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction .250 77.000 .100 7.587 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 1 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM μιμ) 4= 3.453 .929 .550 c.m/s .425 .926 .604 C perv/imperv/total 15 ADD RUNOFF 3.453 4.381 .929 .550 c.m/s 27 HYDROGRAPH DISPLAY 5 is # 0f Hyeto/Hydrograph chosen Volume = .1895659E+05 c.m 8 pTPR 8 9 500.000 Conduit Length 500 Supply K-factor <.5 .000 Supply K-lag (sec) .500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches 3.453 4.381 4.381 COMBINE .550 c.m/s 3.453 4.381 COMBINE 3 Junction Node No. 3.453 4.381 17 3 3.453 4.381 4.381 4.585 c.m/s 3.453 4.381 4.381 4 CONFLUENCE 3 Junction Node No. 3.453 4.585 4.381 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .2307839E+05 c.m MANUAL 18 .000 c.m/s 27

.250

Volume 20 MANUAL

Development Conditions without SWM

	Output File (4.7) NOSWM Units used are defined	.OUT opened 2023-09-21 9:54 by G = 9.810
	24 144 10.000	are MAXDT MAXHYD & DTMIN values
35	COMMENT	CONSULTANTS
	4 line(s) of comment	
	STORMWATER MANAGEMENT F	LAN
	FUTURE CONDITIONS TO BI	EDERMAN DRAIN
14	START	
35	1 1=Zero; 2=Define	
55	3 line(s) of comment	
	**************************************	********
	**************************************	**********
2	STORM	uff:3-User:4-Cdplbr:5-Wistoria
	397.149 Coefficient	a
	.000 Constant b	(min)
	.450 Fraction to p	eak r
	240.000 Duration ó 2	40 min Total depth
3	IMPERVIOUS	
	1 Option 1=SCS .015 Manning "n"	CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	98.000 SCS Curve No	or C
	.100 Ia/S Coeffici	ent
35	COMMENT	
	<pre>1 line(s) of comment *** FIELD - DRAINAGE AB</pre>	EA FX ***
4	CATCHMENT	
	1.000 ID No.ó 99999 3.440 Area in hecta	res
	150.000 Length (PERV)	metres
	1.000 Gradient (%) .500 Per cent Impe	rvious
	150.000 Length (IMPER	V)
	.000 %Imp. with Ze 1 Option 1=SCS	ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 Manning "n"	
	.100 SCS Curve No .100 Ia/S Coeffici	or C ent
	7.587 Initial Abstr	action
	.023 .000	ngir; 2=Rectangir; 3=SWM HYD; 4=Lin. Reserv .000 .000 c.m/s
1.5	.204 .841	.207 C perv/imperv/total
12	.023 .023	.000 .000 c.m/s
11	CHANNEL	
	3.000 Base Width 3.000 Left bank sl	e ope 1:
	3.000 Right bank sl	ope 1:
	.030 Manning's "n" .500 O/a Depth in	metres
	1.000 Select Grade	in %
	Velocity = .	488 m/sec
	Flow Capacity = 1.	222 c.m/s
9	ROUTE	007 metres
	400.000 Conduit Lengt	h or c 5
	307.501 Supply K-lag	(sec)
	.500 Beta weightin 600.000 Routing times	g factor tep
	2 No. of sub-re	aches
16	.023 .023 NEXT LINK	.023 .000 c.m/s
	.023 .023	.023 .000 c.m/s
35	1 line(s) of comment	
	*** EXISTING RESIDENTIA	L - DRAINAGE AREA WT ***
4	1.000 ID No.ó 99999	
	10.840 Area in hects	res
	1.000 Length (PERV)	metres
	05 000 D	rvious
	25.000 Per cent impe	VI
	300.000 Per cent impe 300.000 Length (IMPEF .000 %Imp. with Ze	ro Dpth
	25.000 Per cent Impe 300.000 Length (IMPEF .000 %Imp. with Ze 1 Option 1=SCS 250 Mapping Mpt	ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	25.000 Per cent Impe 300.000 Length (IMPEF .000 %Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No	ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C
	25.000 Per cent impe 300.000 Length (IMPER .000 %Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici	or Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action
	25.000 Fer Cent imp 300.000 Length (IMPER .000 % Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Trie	ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	25.000 Fer Cent impe 300.000 & Length (IMPER .000 % Imp. with 2c 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Tria .367 .023 .204 .449	<pre>ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023</pre>
15	25.000 Per cent imp 300.000 Length (IMPER 1 Option 1=SCS .250 Manning *n* 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Tria .367 .023 .204 .849	<pre>ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total</pre>
15	25.000 Per Cent imp 300.000 Length (IMPEF .000 % Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Trie .367 .223 .204 .849 ADD RUNOFF .367 .370 CHANNEL	To Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s
15 11	25.000 Per cent imp 300.000 Length (IMPEF .000 % Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Trie .367 .023 .204 .649 ADD RUNOFF .367 .370 CHANNEL .300 Base Width 2.000 Length (IMPE)	To Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .023 .000 c.m/s = enc 1:
15 11	25.000 Per cent imper 200.000 Length (IMPER 3 mp. with 2c 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Tria .367 .023 .204 .849 ADD RUNOFF .367 .370 CHANNEL .300 Base Width 3.000 Right bank sl	ro Dpth CN/C/ 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: ope 1:
15 11	25.000 Per Cent impe 200.000 Length (IMPER .000 % Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Tris .367 .023 .204 .849 ADD RINOPF .367 .370 CHANNEL .300 Base Width 3.000 Left bank al .030 Manning's "n'	ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: ope 1:
15 11	25.000 Per Cent imp 200.000 Length (IMPER .000 % Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Trie .367 .023 .204 .849 ADD RUNOFF .367 .370 CHANNEL .300 Base Width 3.000 Left bank sl .030 Manning's "n" .500 O/a Depth in 1.000 Select Grade	<pre>co Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr: 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: ope 1: metres in %</pre>
15 11	25.000 Per cent imp 200.000 Length (IMPER .000 % Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Trie .367 .023 .204 .849 ADD RUNOFF .300 Base Width 3.000 Left bank sl 3.000 Keight bank sl .030 Manning's "n" .500 O/a Depth in 1.000 Select Grade Depth =	<pre>ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: ope 1: ope 1: metres in % 304 metres 06 m/cos</pre>
15 11	25.000	<pre>ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: ope 1: metres in % 304 metres 006 m/sec 222 c.m/s</pre>
15 11	25.000	<pre>ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: ope 1: ope 1: metres in % 304 metres 006 m/sec 222 c.m/s 270 metres</pre>
15 11	25.000 Per Cent imp 200.000 Length (IMPEF .000 % Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Tris .367 .023 .204 .649 MDD RNNOFF .300 Base Width 3.000 Right bank al .000 Right bank al .000 Right bank al .000 Ashett bank al .000 Right bank al .000 Select Grade Depth = .000 Valent in .000 Select Grade Depth = .000 Capacity = 1. Flow Capacity = 1. .000 Capacity = . RUTE 200.000 Conduit Lengt	<pre>ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: ope 1: metres in % 304 metres 006 m/sec 222 c.m/s 270 metres h</pre>
15 11	25.000	<pre>vo Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: .023 .000 c.m/s = ope 1: metres in % 304 metres 006 m/sec 222 c.m/s 270 metres h or <.5</pre>
15 11	25.000 Length (IMPER .000 % Imp. with Ze 1 Option 1=SCS .250 Manning *n* 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Tris .367 .023 .204 .849 ADD RINOFF .367 .370 CHANNEL .300 Base Width 3.000 Right bank al .000 Manning's *n' .500 O/a Depth in 1.000 Select Grade Depth = . .Velocity = 1. Flow Capacity = 1. Flow Capacity = 1. Flow Capacity = 1. Critical depth = . .800TE 200.000 Conduit Lengt .468 Supply X-fact 149.160 Supply K-lagg .500 Beta weightin	<pre>co Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: ope 1: metres in % 304 metres 006 m/sec 222 c.m/s 270 metres h or <.5 (sec) g factor</pre>
15 11	25.000 Per Cent imp 200.000 Length (IMPEF .000 % Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Tria .367 .023 .204 .849 ADD RUNOFF .367 .370 CHANNEL .300 Base Width 3.000 Right bank sl .030 Manning's "n' .500 O/a Depth in 1.000 Select Grade Depth = . .Velocity = 1. Flow Capacity = 1. Flow Capacity = 1. Flow Capacity = 1. Critical depth = . ROUTE 200.000 Conduit Lengt .468 Supply X-fact 149.160 Supply X-fact 1.500 Beta weightin 1.500 Beta weightin 5.00 Beta weightin .500 Beta weigh	<pre>vo Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: ope 1: metres in % 304 metres 304 metres 222 c.m/s 270 metres h or <.5 (sec) g factor tep aches</pre>
15 11 9	25.000 Per Cent imp 200.000 Length (IMPEF .000 % Imp. with Ze 1 Option 1=SCS .250 Manning "n" 77.000 SCS Curve No .100 Ia/S Coeffici 7.587 Initial Abstr 1 Option 1=Trie .367 .023 .204 .849 ADD RUNOFF .367 .370 CHANNEL .300 Base Width 3.000 Left bank sl 3.000 Kejht bank sl 3.000 Kejht bank sl 3.000 Kejht bank sl .300 Manning's "n" .500 O/a Depth in 1.000 Select Grade Depth = . .Velocity = 1. Flow Capacity = 1. Flow Capacity = 1. Critical depth = . ROUTE 200.000 Conduit Lengt .468 Supply X-fact 149.160 Supply X-fact 150.000 Routing times 1 No. of sub-re .367 .370	<pre>ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat or C ent action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .023 .000 c.m/s .365 C perv/imperv/total .023 .000 c.m/s = ope 1: ope 1: ope 1: metres in % 304 metres 006 m/sec 222 c.m/s 270 metres h or <-5 (sec) g factor tep aches .325 .000 c.m/s</pre>

.367 .325 .325 .000 c.m/s 35 COMMENT l line(s) of comment *** MEADOW HEIGHTS - DRAINAGE AREA MH *** CATCHMENT 1 000 ID No.ó 99999 in hecta 4 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat 29.250 500.000 2.000 35.700 500.000 .000 1 Option 1=SUS CN/C/ 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n*
 SCS Curve No or C
 Ia/S Coefficient
 Initial Abstraction
 Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv
 1.385 .325 .000 c.m/s
 .204 .841 .431 C perv/imperv/total . 250 77.000 7.587 1 15 ADD RUNOFF 1.385 1.710 .325 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .5951399E+04 c.m 1.710 .325 .000 c.m/s 27 8 PIPE Minimum velocity m/sec Maximum velocity m/sec Pipe Manning's 'n' .500 2.920 2.920 Maximum velocity m/sec .013 Pipe Manning's 'n' 1.350 Diameter in metres .600 Select Grade in % Depth = .605 metres Velocity = 2.750 m/sec Pipe Capacity = 4.134 c.m/s Critical depth= .692 metres ROUTE 1.350 ROUTE 500.000 .442 136.363 Conduit Length Supply X-factor <.5 Supply K-lag (sec)
 Beta weighting factor

 50.000
 Routing timestep

 1
 No.of sub-reaches

 1.385
 1.710

 NEXT LINK
 1.493

 COMMENT
 1.493

 1
 line(s) of cr
 150.000 .000 c.m/s 16 .000 c.m/s 35 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA FUT *** 4 CATCHMENT CATCHM 1.000 12.770 400.000 3.000 70.000 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 400.000 15 27 14 1 I=Zero, 2-Deline COMMENT 3 line(s) of comment 35 * MTO 5 YEAR DESIGN 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 45,530 mm Total depth US 524.867 .000 .699 450 240.000 45.530 um focal ---IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .015 Manning "n" 98.000 SCS Curve No or C 3 .015 98.000 .518 Initial Abstraction 35 COMMENT COMMENT 1 line(s) of comment *** FIELD - DRAINAGE AREA FX *** CATCHMENT ID No.ó 99999 1.000 3.440 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 I=/6 Coefficient 150.000 1.000 .500 150.000 .000 . 250 77.000 SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .055 .000 1.493 .000 c.m/s .278 .859 .280 C perv/imperv/total 100 7.587 15 ADD RUNOFF .055 1.493 .055 .000 c.m/s 11 CHANNEL Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres .300 3.000 3.000 .030 .500

	1.000 Depth	Select =	Grade in .12	1 % 29 metres		
	Velocity Flow Capa	citv =	.61	.6 m/sec 2 c.m/s		
0	Critical	depth =	.10	06 metres		
9	400.000	Conduit	Length			
	.492	Supply	X-factor	<.5		
	.500	Beta we	eighting	factor		
	300.000 1	Routing No. of	g timeste sub-read	p hes		
1.6	.0	55	.055	.053	.000 c.m/s	
10	NEXT LINK	55	.053	.053	.000 c.m/s	
35	COMMENT 1 line	(s) of (comment			
	*** EXIST	ING RESI	IDENTIAL	- DRAINAGE	AREA WT ***	
4	L.000	ID No.d	5 99999			
	10.840	Area in	(DEPV) 7	s		
	1.000	Gradier	nt (%)			
	300.000	Per cer Length	(IMPERV)	lous		
	.000	%Imp. v	vith Zero	Dpth	n: 3-Green-Amnt: 4-Dene	at
	. 250	Manning	1=565 CF g "n"	//// 2=1101/00	n, 2-dicen Ampe, 4-kepe	ac
	77.000	SCS Cui Ia/S Co	rve No or pefficier	t C		
	7.587	Initial	Abstrac	tion	and a community of the	D
	.5	15	.053	.053	.000 c.m/s	Reserv
15	.2 ADD RUNOF	78 F	.884	.429	C perv/imperv/total	
	.5	15	.525	.053	.000 c.m/s	
11	.300	Base Wi	idth	=		
	3.000	Left h	oank slop	e 1:		
	.030	Manning	j's "n"	ж I.		
	.500	0/a Deg Select	oth in me Grade ir	tres		
	Depth	=	.35	2 metres		
	Flow Capa	city =	1.09	2 c.m/s		
9	Critical ROUTE	depth =	.31	.7 metres		
2	200.000	Conduit	Length	_		
	.463 136.564	Supply Supply	X-factor K-lag (s	: <.5 sec)		
	.500	Beta we	eighting	factor		
	120.000	No. of	sub-read	hes		
16	.5 NEXT LINK	15	.525	.476	.000 c.m/s	
25	.5	15	.476	.476	.000 c.m/s	
55	1 line	(s) of d	comment			
		LT TID TOTIC				
4	*** MEADO CATCHMENT	W HEIGHI	rs - drai	NAGE AREA M	H ***	
4	*** MEADO CATCHMENT 1.000	ID No.d	IS - DRAI 5 99999	NAGE AREA M	II ***	
4	*** MEADO CATCHMENT 1.000 29.250 500.000	ID No.d Area ir Length	FS - DRAI 5 999999 1 hectare (PERV) m	NAGE AREA M s etres	H ***	
4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700	ID No.d Area ir Length Gradier Per cer	IS - DRAI 5 99999 1 hectare (PERV) m 1t (%) 1t Imperv	NAGE AREA M es metres vious	<u>H</u> ***	
4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 500.000	ID No.d Area ir Length Gradier Per cer Lengt	S - DRAI 999999 h hectare (PERV) n ht (%) ht Imperv (IMPERV)	NAGE AREA M es netres rious	H ***	
4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 .000 1	ID No.d Area ir Length Gradier Per cer Length %Imp. v Option	CS - DRAI 5 99999 1 hectare (PERV) n nt (%) nt Imperv (IMPERV) vith Zerc 1=SCS CN	NAGE AREA M es metres vious) Dpth N/C; 2=Horto	H *** n; 3=Green-Ampt; 4=Repe	at
4	*** MEADO CATCHMENT 1.000 29.250 500.000 35.700 500.000 .000 1 .250 77.000	ID No.d Area in Length Gradier Per cer Length %Imp. v Option Manning SCS Cup	<pre>S - DRAI 5 99999 1 hectare (PERV) n nt (%) nt Imperv (IMPERV) yith Zerc 1=SCS CN g "n" 've No or</pre>	NAGE AREA M es netres jo Dpth I/C; 2=Horto	H **** n; 3=Green-Ampt; 4=Repe	at
4	*** MEADO CATCHMENT 1.000 29.250 500.000 35.700 500.000 500.000 1 .250 77.000 .100	ID No.d Area in Length Gradier Per cer Length %Imp. v Option Manning SCS Cun Ia/S Co	rs - DRAI 5 99999 h hectare (PERV) n ht (%) ht Imperv (IMPERV) vith Zerce 1=SCS CN g "n" cve No or befficier	NAGE AREA M ss hetres jous o Dpth I/C; 2=Horto c C it	H **** n; 3=Green-Ampt; 4=Repe	at
4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 .000 1 .250 77.000 .100 7.587 1	ID No.d Area ir Length Gradier Per cer Length %Imp. v Option Manning SCS Cun Ia/S CC Initial Option	<pre>CS - DRAI 5 99999 h hectare (PERV) n ht (%) t Imperv (IMPERV) vith Zerc 1=SCS CN g "n" cve No or befficier 1 Abstrac 1=Triang</pre>	NAGE AREA M Netres vious) Dpth I/C; 2=Horto : C ut :tion J/r; 2=Recta	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin.	at
4	*** MEADO CATCHMENT 1.000 29.250 500.000 20.000 35.700 500.000 1 .250 77.000 .100 7.587 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	ID No.ć Area ir Length Gradier Per cer Length %Imp. v Option Manning SCS Cu Initial Option 41 78	<pre>CS - DRAI 5 99999 h hectare (PERV) n ht (%) ht Imperv (IMPERV) with Zeroc J=SCS CN g "n" cve No or befficier 1 Abstrac 1=Triang .476 882</pre>	NAGE AREA M setures vious b Dpth 1/C; 2=Horto : C ut ttion plr; 2=Recta .476 .403	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv(total	at Reserv
15	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1.250 77.000 1.250 77.000 1.00 7.587 1 1.9 2.ADD RUNOF	ID No.6 Area ir Length Gradier Per cer Length %Imp. v Option Manning SCS Cu Initial Option 41 78 F	<pre>S - DRAI 5 99999 1 hectare (PERV) m tt (%) ht Imperv (IMPERV) with Zero 1=SCS CC g "n" vev No or befficier 1 Abstrac 1=Triang .476 .882</pre>	NAGE AREA M esterres rious b Dpth 1/C; 2=Horto : C it tion flr; 2=Recta .493	H **** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total	at Reserv
4 15 27	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 500.000 500.000 1.250 77.000 1.250 77.000 1.00 7.587 1 1.9 .22 ADD RUNOF 1.9 HYDROGRAP	ID No.6 Area ir Length Gradier Per cer Length %Imp. v Option Manning SCS Cun Ia/S CC Initial Option 41 78 F 41 H DISPL/	<pre>rS - DRAI 5 99999 h hectare (%) (PERV) n t (%) tt Imperv (MPERV) vith Zerc 1=SCS CN 4 "n" rve No or befficier Abstraa 1=Triang .476 .882 2.416 W</pre>	NAGE AREA M setres vious b Dpth 1/C; 2=Horto : C tit .476 .493 .476	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at Reserv
4 15 27	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 500.000 10 .250 77.000 100 7.587 1 1.9 .25 ADD RUNOF 1.9 .100 HYDROGRAP 51mm2	ID No.ć Area ir Length Gradier Per cer Length %Imp. v Option Manning SCS Cu Ia/S Cc Initial Option 41 78 F 41 H DISPLJ of Hyet 012727	rs - DRAI 5 99999 h hectare (PERV) n (%) rt Imperv (%) rt Imperv (%) rt Imperv (%) rt Imperv (%) rt Imperv second second second rt (%) rt Imperv (%) rt Imperv (%) (%) rt Imperv (%) (%) rt Imperv (%) (%) rt Imperv (%) (%) (%) (%) (%) (%) (%) (%)	NAGE AREA M setres popth 1/C; 2=Horto : C : C .476 .493 .476 raph chosen	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at Reserv
4 15 27 8	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 500.000 10 .250 77.000 100 7.587 1 1.9 .22 ADD RUNOF 1.9 HYDROGRAP 5 is # Volume = PIPE	ID No.ć Area ir Length Gradier Per cer Length %Imp. v Option Manning SCS Cu Ia/S Cc Initial Option 41 78 F 41 H DISPLJ of Hyet .9127(<pre>rs - DRAI 5 99999 h hectare (PERV) n tt (%) tt Imperv (IMPERV) rith Zerc 1=SCS CC 4 "n" copefficier l Abstrac 1=Triang .476 .882 2.416 Y co/Hydrog 035E+04 c</pre>	NAGE AREA M ss hetres) Dpth 1/C; 2=Horto : C .476 .493 .476 graph chosen .m	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at Reserv
4 15 27 8	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 .000 1 2.250 77.000 .100 1.250 77.000 109 .250 77.000 1.9 HYDROGRAP 1.9 HYDROGRAP 5 is # Volume = PIPE .500 2.920	ID No.ć Area i Length Gradier Per cer Length %Imp. v Option Manning SCS Cuu Ia/S CC Initial Option 41 F 41 H DISPLJ of Hyet .9127(Minimum	<pre>rs - DRAI 5 9999 h hectare (PERV) n tt (%) tt Imperv (IMPERV) rith Zerc 1=SCS CC 4 "n" coefficier l Abstrac 1=Triang .476 .882 2.416 W co/Hydrog 035E+04 c n velocit a velocit</pre>	NAGE AREA M setures flous b Dpth I/C; 2=Horto c C tt ttion lfr; 2=Recta .476 .493 .476 graph chosen .m y m/sec y m/sec	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at Reserv
4 15 27 8	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 .000 1 2.250 77.000 .100 .100 1 1 1.9 .22 ADD RUNOF HYDROGRAP 1.9 HYDROGRAP 5 is # Volume = PIPE .500 2.920 013	ID No.ć Area ir Length Gradier Per cer Length %Imp. v Option Manning SCS Cuu Ia/S Cc Initial Option 41 F 41 H DISPL# of Hyet .9127(Minimum Maximum Picente	<pre>IS - DRAI 5 99999 het (PERV) n ht (%) t Imperv) n ht (%) s "n" rve No or befficier l=SCS CN g "n" tve No or befficier labstrad l=Triang .476 .882 2.416 M 2.416 M co/Hydrog 335E+04 c n velocit an velocit an velocit an velocit an velocit</pre>	NAGE AREA M setures vious b Dpth I/C; 2=Horto : C tt ttion lr; 2=Recta .476 .493 .476 sraph chosen :m :y m/sec 'n'	H **** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at
4 15 27 8	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 500.000 .000 1.250 77.000 1.00 7.587 1 1.9 3.22 ADD RUNOF 1.9 HYDROGRAP 5 is 4 VOLUME = PIPE .500 2.920 .013 1.350 .600	M HEIGH ID No.ć Area ir Length Gradier Per cer Length % Imp. v Option Manning SCS Cun Ia/S Cc Initial Option 41 78 84 H DISPLJ of Hyet .9127(Minimum Maximum Pipe Ma Diamete Select	<pre>IS - DRAI 5 99999 1 hectare (PERV) n it (%) it Imperv) it (%) it Imperv (IMPERV) it Asstract second second second it Asstract (ASS second</pre>	NAGE AREA M setures vious b Dpth I/C; 2=Horto c C tt tion lr; 2=Recta .476 .493 .476 graph chosen .m y m/sec 'n' res 1 %	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at
4 15 27 8	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 500.000 1 .250 77.000 1.00 7.587 1 1 1 9 .22 ADD RUNOF 1.9 9 HYDROGRAP 5 1 9 HYDROGRAP 5 500 2.920 .013 1.350 600 Depth Velocity	<pre>W HEIGH: ID No.6 Area if Length Gradier Per cer Length % Tup. v Option Manning SCS Cun Ia/S CC Initial Option 41 78 41 H DISPLJ of Hyet .9127(Minimum Maximum Pipe Ma Diamete Select = =</pre>	<pre>CS - DRAI 5 99999 a hectare (PERV) n it (%) it Imperv (IMPERV) vith Zerc 1=SCS CN 9 "n" vve No or efficient 4 bastrac 1=Triang .476 .482 2.416 W co./Hydrog 35E+04 c a velocit a velocit in met Grade ir .741 3.000</pre>	NAGE AREA M setures vious b Dpth I/C; 2=Horto C ttion lr; 2=Recta .476 .493 .476 graph chosen .m y m/sec 'n' rres .metres b m/sec	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at
4 15 27 8	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 500.000 1.250 77.000 1.250 77.000 1.250 77.000 1.00 7.587 1.9 9 4.250 79 4.250 7.587 1.9 9 4.250 7.587 1.9 9 4.250 4.000 1.00 7.587 1.9 9 4.250 4.000 1.00 7.587 1.9 9 4.250 4.000 1.00 7.587 1.9 9 4.000 1.00 7.587 1.9 9 4.000 1.00 7.587 1.9 9 4.000 1.00 7.587 1.9 9 4.000 1.000 7.587 1.9 9 4.000 1.000 7.587 1.9 9 4.000 7.500 7.500 7.500 7.500 7.500 7.500 7.500 7.500 7.500 7.500 7.500 7.500 7.9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	<pre>W HEIGH: ID No.d Area if Length Gradier Per cer Length %Imp. v Option Manning SCS Cu Initial Option Ia/S CC Initial Option 41 H DISPLI H DISPLI H DISPLI Minimum Maximum Pipe M& Diamete Select = city =</pre>	<pre>(S - DRAI 5 9999) a hectare (PERV) n it (%) it Imperv (IMPERV) vith Zerc 1=SCS CN 9 "n" vve No or efficier 2.416 2.416 2.416 AV co/Hydrog 335E404 c a velocit a velocit anning's r in met Grade in met Grade 1.413</pre>	NAGE AREA M ss hetres rious 0 Dpth 1/C; 2=Horto : C tt tito .476 .493 .476 .493 .476 .493 .476 .m :y m/sec y m/sec y m/sec i * .m .m	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at Reserv
4 15 27 8	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 50.000 1 2.250 77.000 1.250 77.000 1.250 77.000 1.00 7.587 1 1 9 2.2 ADD RUNOF 1.9 2.2 ADD RUNOF 1.9 1.2 5 0.10 1 4 VDIUME = PIPE 5.500 2.920 .013 1.350 600 Bepth Velocity Pipe Capa Critical	W HEIGH: ID No.d Area in Length Gradier Per cer Length %Imp. v Option Manning SCS Cu Initial Option 41 F 41 H DISPLJ of Hyet .9127C Minimum Maximum Pipe Ma Diamete Select = city = depth=	<pre>S - DRAI 5 99999 a hectare (PERV) n t (%) t Imperv) (IMPERV) t (IMPERV) t (IMPERV)</pre>	NAGE AREA M ss hetres yious b Dpth 1/C; 2=Horto c C tt tit .476 .493 .476 graph chosen .m y m/sec 'n' .metres) m/sec i c.m/s) metres	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at Reserv
4 15 27 8	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1 2.250 77.000 1.250 77.000 1.250 77.000 1.00 7.587 1 .250 7.587 1 .250 4.000 1.00 7.587 1.9 2.200 4.000 1.00 7.587 1.9 4.000 1.00 7.587 1.9 4.000 2.920 0.013 1.350 6.600 Depth Velocity Pipe Capa Critical A ROUTE 500.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.000 2.000 1.000 2.500 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.00000 2.00000 2.00000 2.000000 2.00000000	W HEIGH: ID No.6 Area in Length Gradier Per cer Length %Imp. v Option Manning SCS Cu Initial Option 41 F 41 H DISPLJ of Hyet .9127C Minimum Maximum Pipe Ma Diamete Select = city = depth= Conduit	<pre>S = DRAI 5 99999 h hectare (PERV) n it (%) it Imperv (IMPERV) vith Zercs (IMPERV) vith Zercs (IMPERV)</pre>	NAGE AREA M settres vious b Dpth 1/C; 2=Horto C C C C tit titon 1/C; 2=Horto C 493 .476 .493 .476 .493 .476 .493 .476 .493 .476 .msec	H **** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at
4 15 27 8	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1 2.250 77.000 1.250 77.000 1.250 77.000 1.00 7.587 1 .22 ADD RUNOF 1.9 1.9 1.2 ADD RUNOF 1.9 2.920 .010 2.920 .013 1.350 .600 Depth Velocity Pipe Capa Critical . ROUTE 500.000 .2424 986	W HEIGH: ID No.6 Area in Length Gradier Per cer Length Manning SCS Cu Ia/S CC Initial Option Manning SCS Cu Ia/S CC Initial Option 41 F 41 H DISPLJ of Hyet .91270 Minimum Pipe Me Diametc Select = city = corty = Conduit Supply Supply	<pre>S = DRAI 5 9999 h hectare (PERV) n it if at if if at if if at if if at if if at if y "n" ve No or efficient a velocit a v</pre>	<pre>NAGE AREA M ss tetres vious) Dpth I/C; 2=Horto cc tt tt iti .476 .493 .476 rraph chosen cy m/sec 'n' metres) m/sec t c.m/s) metres :< <.5 iec)</pre>	H **** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s	at
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4 15 27 8	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 500.000 1 2.250 77.000 1.250 77.000 1.250 77.000 1.250 77.000 1.250 77.000 1.250 70.000 7.587 1 1.9 .22 ADD RUNOF 1.9 .22 ADD RUNOF 1.9 .22 ADD RUNOF 1.9 .22 .500 .013 1.350 .600 Depth Velocity Pipe Capa Critical ROUTE 500.000 .2424 124.986 .500 124.986 .500 124.986 .500	W HEIGH: ID No.6 Area in Length Gradier Per cer- length % Imp. V Option Manning SCS Cu Ia/S CC Initial Option 41 78 41 H DISPL ^J of Hyet .91270 Minimum Pipe Me Diamete select = city = conduit Supply Beta we Routing No. of	<pre>rs - DRAI 5 99999 h hectare (PERV) n t t (%) ht Imperv (IMPERV) it Imperv (IMPERV) it approx set (%) set (%) set</pre>	NAGE AREA M setres rious b Dpth I/C; 2=Horto : C : C : 476 .493 .476 .493 .476 rraph chosen :.m :.m :.m :.m :.m :.es .msec :.m/s : <.5 :pc :pc :pc : 2 : 200	<pre>H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin000 c.m/s C perv/imperv/total .000 c.m/s</pre>	at
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4 15 27 8 9 16 35	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1 2.250 77.000 1.250 77.000 1.250 77.000 1.00 7.587 1 1 9 2.2ADD RUNOF 1.9 4 9 4 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 1 9 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 8 7 7 9 7 7 8 7 7 8 7 8	<pre>w HEIGH: ID No.6 Area in Length Gradier Per cer Length %Imp. v Option Manning SCS Cur Initial Option Manning SCS Cur Initial Cor Vir Subert Sclect Conduit Scupply Seta Wc Routing No. of 41 (s) of co Mar Manning SCS Cur Initial SCS Cur Initial SCS Cur Initial Sclect Conduit Sclect (s) Of Conduit Sclect Manning No. of Manning Manning Sclect Manning No. of Manning Manning Sclect</pre>	<pre>CS = DRAI 5 99999 h hectare (PERV) n it (%) it Imperv (IMPERV) vith Zerc 1=SCS CN y 'n' ve No or efficient (IMPERV) of 1=Triang .476 .476 .476 .355+04 c a velocit inming's r in met Grade ir .741 3.000 4.134 .0000 4.134 .0000 4.134 .0000 4.134 .0000 4.134 .0000 4.134 .0000 4.134 .0000 4.134 .0000 4.134 .0000 4.134 .00000 4.134 .00000 4.134 .00000 4.134 .00000 4.134 .00000 4.134 .00000 4.134 .000000 4.134 .000000 4.134 .000000000000000000000000000000000000</pre>	NAGE AREA M set the set of the s	<pre>H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .000 c.m/s</pre>	at
4 15 27 8 9 9 16 35 4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1 2.250 77.000 1.250 77.000 1.250 77.000 7.587 1 1 9 2.20 ADD RUNOF 9 1.9 HYDROGRAP 5 1.9 HYDROGRAP 5 1.9 HYDROGRAP 5 1.9 HYDROGRAP 5 5.00 2.920 0.013 1.350 6.00 Depth Velocity Pipe Capa Critical 800 2.920 0.13 1.350 6.00 Depth Velocity Pipe Capa Critical 800 2.920 1.9 NEXT LINK 1.9 NEXT L	<pre>w HEIGH: ID No.d Area in Length Gradier Per cer Length %Imp. v Option 1a/S CC Initial Option 41 H DISPLI of Hyet .9127(Minimum Maximum Pipe Ma Diamete Select Supply Supply Beta we Routing No. of 41 (s) of c ALE - DE</pre>	<pre>CS = DRAI 5 99999 a hectare (PERV) n it (%) it Imperv (INPERV) vith Zerc 1=SCS CN 9 "n" vve No or efficier a velocit 1=Triang .476 .482 2.416 W 0.0/Hydrog .355+04 c.4134 .355+04 4.134 .825 c.Length X-factor 4.134 .825 c.Length X-factor 2.416 2.180 comment AlNAGE F</pre>	NAGE AREA M ss hetres rious) Dpth I/C; 2=Horto : C tt tit .476 .493 .476 graph chosen .m cy m/sec y m/sec y m/sec inf : m : m : c.s inf : c.s : c : c : c : c : c : c : c : c	<pre>h *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .000 c.m/s</pre>	at Reserv
4 15 27 8 9 16 35 4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1 2.250 77.000 1.250 77.000 1.250 77.000 1.00 7.587 1.9 2.2 ADD RUNOP 1.9 HYDRGRAP 5 is # VOlume = PIPE 500 2.920 .013 1.350 600 Depth Velocity Pipe Capa Critical ROUT 800 2.920 .013 1.350 600 Depth Velocity Pipe Capa Critical ROUT 800 12.500 13.500 13.500 13.500 13.500 13.500 13.500 13.500 13.500 13.500 13.500 13.500 13.500 13.500 13.500 13.500 13.500 14.500 14.500 15.5000 15.5000 15.5000 15.5000 15.5000 15.5000 15.5000 15.5000 15.5000 15.50000 15.50000 15.50000 15.500000 15.5000000 15.50000000000	<pre>w HEIGH: ID No.6 Area in Length Gradier Per cer Length %Imp. v Option Manning SCS Cur Initial Option 41 H DISPL4 of Hyet .9127(Minimur Maximur Pipe Ma Diamete Select = city = city = conduit Supply Beta we Routing No. of 41 (s) of co Area in L No.6 Area in L No.6</pre>	<pre>CS = DRAI 5 99999 h hectare (PERV) n t t(%) t Imperv(ith Zerc l=SCS CN g 'n" vve No or efficier 2.416 Y 2.416 Y 2.416 Y 2.416 Y 2.416 Y 3.352+04 c.43352+04 c.43352+04 c.43352+04 y 3.002 4.13352+04 Ser in met Grade ir .741 3.002 4.134 .825 C.Length X-facton X-facton Sub-reac 2.416 Y 3.002 4.134 .825 C.Length X-facton Sub-reac 2.416 Y 3.002 4.135 .825 C.Length X-facton Sub-reac 2.416 2.416 Y 3.002 4.135 .825 C.Length X-facton Sub-reac 2.416 Y 3.002 4.135 .825 C.Length X-facton Sub-reac 2.416 Y 3.002 4.135 .825 C.Length X-facton Y-135 Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y</pre>	NAGE AREA M set res popth 1/C; 2=Horto C C C C C C C C C C C C C C C	<pre>H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .000 c.m/s</pre>	at
4 15 27 8 9 16 35 4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1 2.250 77.000 1.250 77.000 1.250 77.000 1.00 7.587 1.9 4.250 77.000 1.00 7.587 1.9 4.250 7.587 1.9 4.250 4.250 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 0.013 1.350 5.000 2.920 1.100 1.100 1.250 7.500 2.920 1.100 1.250 7.500 2.920 1.100 1.100 1.250 7.500 2.920 1.100 1.100 7.587 1.100 1.100 7.587 1.100 1.250 7.500 2.920 1.100 7.587 1.100 1.250 7.500 2.920 1.100 7.587 1.100 7.587 1.100 7.587 1.100 7.587 1.100 7.587 1.100 7.587 1.100 7.587 1.100 7.587 1.100 7.587 1.100 7.587 1.100 7.587 1.100 7.500 2.920 0.013 1.350 5.000 2.920 1.100 7.500 2.920 1.100 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.500 2.920 7.5000 7.5000 7.5000 7.5000 7.5000 7.5000 7.5000 7.5000 7.50000 7.50000 7.50000000000	w HEIGH: ID No.6 Area in Length Gradier Per cer Length %Imp. v Option Manning SCS Cu Initial Option 41 H DISPL/ of Hyet .9127(Minimum Maximum Pipe Ma Diamete Select = city = city = city = Conduit Supply Beta w Routing No. of 41 (s) of c Area in Length 	<pre>CS = DRAI 5 99999 h hectare (PERV) n t it (%) t imperv (IMPERV) (IMPER</pre>	NAGE AREA M set res ious) Dpth 1/C; 2=Horto : C : C : 476 . 493 . 476 graph chosen :.m :y m/sec : .m :y m/sec : .m :set :m : es :	<pre>H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .000 c.m/s</pre>	at
4 15 27 8 9 16 35 4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1 2.250 77.000 1.250 77.000 1.250 77.000 1.250 77.000 7.587 1 9.22 ADD RUNOF 1.9 1.9 1.9 1.250 77.000 1.250 77.000 1.250 77.587 1 9.22 ADD RUNOF 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9	W HEIGH ID No.6 Area in Length Gradier Per cer Length %Imp. v Option Manning SCS Cu Initial Option 41 F 41 H DISPLJ of Hyet .9127C Minimum Maximum Pipe Ma Diamete Select = city = city = city = Conduit Supply Beta we Routing No. of 41 ID No.6 Area in Length Gradier Per cer Length Minimum Maximum Pipe Ma Supply Supply Supply Supply Beta we Routing No. of 41 ID No.6 Area in Length Gradier Per cer Length Minimum Maximum Pipe Ma Supply Supply Supply Supply Supply Supply Meta we Routing No. of Area in Length Gradier Per cer Condition Supply	<pre>S = DRAI 5 99999 h hectare (PERV) n t t(%) t Imperv() vith Zercs (IMPERV) vith Zercs 1=SCS CK 9 "n" vve No or efficient 2.416 2.416 2.416 2.416 vve No or efficient a velocit inming's er in met Grade ir .744 3.352+04 c 4.1335+04 c 4.135+04 c</pre>	<pre>NAGE AREA M ss tetres vious) Dpth I/C; 2=Horto .C .C .493 .476 .493 .493 .493 .493 .493 .493 .493 .493</pre>	H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin. .000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .000 c.m/s	at
4 15 27 8 9 16 35 4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1 2.250 77.000 1.250 77.000 7.587 1 .22 ADD RUNOF 1.9 1.22 ADD RUNOF 1.9 4.250 2.920 .013 1.350 2.920 .013 1.350 2.920 .013 1.350 600 Depth Velocity Pipe Capa Critical N ROUTE 500.000 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 125.000 127.770 400.000 12.770 400.000 2.000 7.000 400.000 2.000 7.000 2.000 7.000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.00000 2.00000000	W HEIGH ID No.6 Area in Length Gradier Per cer Length Manning SCS Cu Initial Option Manning SCS Cu Initial Option 41 F 41 H DISPLJ of Hyet .9127(Minimum Pipe Ma Diamete Select = city = city = city = Conduit Supply Beta wet Routing No. of 41 ID No.6 Area in Length Gradier Per cer Length Strem St	<pre>S = DRAI 5 99999 h hectare (PERV) n it (i) t imperv) it (i) t imperv) it (i) t imperv) it negret setficier a veloci a veloci</pre>	NAGE AREA M setres vious b Dpth 1/C; 2=Horto c C c 1 iti iti iti iti iti iti iti it	<pre>H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s</pre>	at Reserv
4 15 27 8 9 16 35 4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1 2.250 77.000 1.250 77.000 7.587 1 .22 ADD RUNOF 1.9 1.2 ADD RUNOF 1.9 1.2 ADD RUNOF 2.920 .013 1.350 .600 Depth Velocity Pipe Capa Critical. ROUTE 500.000 120.000 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 124.986 .500 120.000 121.770 400.000 2.2000 7.000 400.000 2.000 1 1	w Height ID No.6 Area in Length Gradier Per cer Length %Imp. v Option Manning SCS Cun Ia/S CC Initial Option Marine SCS Cun 41 H DISPL of Hyet Supply Select = city = depth= Conduin Supply Beta we Routing No. of Alte - D ID No.6 Area in Length Gradier Per cer Length Minimum Maximum Maximum Maximum Select = Conduit Supply Stata we Routing No. of Alte - D ID No.6 Area in Length %Imp. v Option (s) of cer (s)	<pre>S = DRAI 5 99999 h hectare (PERV) n it (a) t (a)</pre>	<pre>NAGE AREA M ss setres rious) Dpth I/C; 2=Horto .C .G .493 .476 .493 .476 rraph chosenm .m .m .m .m .m .m .m .m .s .m .s .s</pre>	<pre>H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s</pre>	at Reserv
4 15 27 8 9 9 16 35 4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1.250 77.000 1.250 77.000 7.587 1.9 9 .220 ADD RUNOF 9 HYDROGRAP 5 is 4 Volume = PIPE .500 2.920 .013 1.350 .600 Depth Velocity Pipe Capa Critical . ROUTE 500.000 12.000 12.000 12.770 424 124.986 .500 12.000 12.770 400.000 12.7700 400.000 12.770 400.0000 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.7700 12.77000 12.770000 12.7700000000000000000000000000000000000	<pre>w HEIGH: ID No.6 Area in Length Gradier Per cer Length %Imp. v Option Manning SCS Cun Ia/S CC Initial Option 41 H DISPL of Hyset SCS Cun Ia/S CC Initial Option 41 H DISPL SCS Cun Ia/S CC Initial Option 41 H DISPL SCS Cun Pipe M& Diamete Select = city = depth= Conduin Supply Supply Beta wG Routing No. of c Alte - D ID No.6 Area in Length %Imp. v Option Manning SCS Cun Initial SCS Cun Initial Supply Supply Supply Supply Supply Supply ID No.6 Area in Length %Imp. v Option Manning SCS Cun Initial SCS Cun Initial SCS Cun Initial Supply</pre>	<pre>CS - DRAI 5 99999 h hectare (PERV) n it (%) it imperv (IMPERV) vith Zerc 1=SCS CK 9 "n" vve No or befficier (IMPERV) vve No or befficier (IMPERV) s82 2.416 W vve No or befficier (INPERV) s82 2.416 W vve No or befficier (STAC 3.82 2.416 W vve No or befficier (STAC 3.82 2.416 W vve No or befficier (STAC 3.82 2.416 W vve No or befficier (PERV) n it (%) p9999 h hectare (PERV) n it (%) vve No or beficier (IMPERV) vith Zerc 1=SCS CK 9 "n" or ""No or beficier (IMPERV) vith Zerc 1=SCS CK 9 "n" or ""No or """No or """No or """No or """No or """No or """""""""""""""""""""""""""""""""""</pre>	NAGE AREA M setres rious b Dpth I/C; 2=Horto c C c C c C c C c C c C c C c C	<pre>H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s n; 3=Green-Ampt; 4=Repe</pre>	at Reserv
4 15 27 8 9 9 16 35 4	*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1.250 77.000 1.250 77.000 1.00 7.587 1.9 9 9 9 19 9 19 7 9 19 2 2 ADD RUNOF 1.9 9 2 3 ADD RUNOF 1.9 9 4 9 4 9 4 9 4 9 4 9 4 9 4 9 4 9 4 1350 600 2.920 0.013 1.350 600 2.920 0.013 1.350 600 2.920 0.013 1.350 600 2.920 2.920 0.013 1.350 600 2.920 2.920 0.013 1.350 600 2.920 2.920 0.013 1.350 600 2.920 0.013 1.350 600 2.920 0.013 1.350 600 2.920 0.013 1.350 600 2.920 0.013 1.350 7.000 1.250 7.000 1.2 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	<pre>w HEIGH: ID No.6 Area in Cradier Per cer Length %Imp. v Option Manning SCS Cur Ia/S CC Initial Option Maning SCS Cur Ia/S CC Initial Option Al F H DISPL/ of Hyset SCS Cur Ia/S CC Initial Option Al F H DISPL/ Supply Supply Seta w Routing No. of Al E - DF Conduit Supply Supply Beta w Routing No. of Al E - DF Conduit Supply Supply Set Conduit Supply Supply Beta w Routing No. of Al E - DF Conduit Supply Supply Beta w Routing No. of Al E - DF Conduit Supply Supply Supply Supply Beta w Routing No. of Conduit Supply Supply Supply Supply Deta w Routing No. of Conduit Supply Suppl</pre>	<pre>CS - DRAI 5 99999 h hectare (PERV) n it (%) it imperv (IMPERV) vith Zerc 1=SCS CN y 'n' ve No or befficier (IMPERV) it larting .476 .382 2.416 W ve No or befficier .382 2.416 W ve No or befficier .482 2.416 W ve No or befficier .482 2.416 W ve No or comment .482 2.416 W ve No or comment .482 2.416 W ve No or comment comment .413 2.416 2.180 Domment CALLAGE F Sub-reac 2.416 2.180 Domment CALLAGE F Sub-reac 2.416 2.4</pre>	NAGE AREA M setres rious Dpth I/C; 2=Horto C tti .476 .473 .476 graph chosen m ry m/sec y m/sec y m/sec m y m/sec m setres m m ty m/sec m 	<pre>H *** n; 3=Green-Ampt; 4=Repe nglr; 3=SWM HYD; 4=Lin000 c.m/s C perv/imperv/total .000 c.m/s .000 c.m/s .000 c.m/s n; 3=Green-Ampt; 4=Repe</pre>	at Reserv

Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 1 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin 1.643 2.180 2.180 .000 c.m/s .278 .883 .702 C perv/imperv/total ADD RUNOFF 1.643 3.822 2.180 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1320661E+05 c.m STRAFT 15 27 14 START 1=Zero; 2=Define COMMENT 3 line(s) of comment 35 * MTO 10 YEAR DESIGN 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 608.845 .000 .450 240.000 3 98.000 .518 Initial Abstraction COMMENT 1 line(s) of comment *** FIELD - DRAINAGE AREA FX *** 35 4 CATCHMENT ID No.ó 99999 1.000 3.440 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 150.000 1.000 .500 150.000 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/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. Reserv .079 .000 2.160 .000 c.m/s .320 .878 .322 C perv/imperv/total NOFF .000 1 .250 .230 77.000 .100 7.587 1 .079 .079 2.180 .000 c.m/s CHANNEL 15 ADD RUNOFF 11 CHANNEL .300 Base Width = .300 Left bank slope 1: .300 Right bank slope 1: .300 Maning's *n* .500 O/a Depth in metres 1.000 Select Grade in % Depth = .154 metres Velocity = .679 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .129 metres ROUTE 9 ROUTE Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep 400.000 491 441.992 .500 300.000 1 No. of sub-reaches .079 .079 .077 .000 c.m/s 16 NEXT LINK NEXT LINK .079 .077 .077 .000 c.m COMMENT 1 line(s) of comment *** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** .000 c.m/s 35 4 CATCHMENT ID No.ó 99999 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 "* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv 13 .077 .000 c.m/s 1.000 10.840 10.840 300.000 1.000 25.000 300.000 .000 1 .250 77.000 .100 7.587 1 .613 .077 .077 .000 c.m/s .320 .897 .464 C perv/imperv/total .613 15 ADD RUNOFF .077 .632 .000 c.m/s 11 CHANNEL .300 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1: .030 Maning's *n* .500 O/a Depth in metres 1.000 Select Grade in % Depth = .381 metres Velocity = 1.150 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .344 metres ROUTE 9 ROUTE Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor 200.000 460 130.387 120.000 Routing timestep 1 No. of sub-reaches 13 .632 .613 .579 .000 c.m/s .613 .632 .579 .00 NEXT LINK .613 .579 .579 .00 COMMENT 1 line(s) of comment **** MEADOW HEIGHTS - DRAINAGE AREA MH *** 16 .000 c.m/s 35 4 CATCHMENT

Upper Canada Consultants

	1.000	ID No.ó 99999
	29.250 500.000	Area in hectares Length (PERV) metres
	2.000	Gradient (%)
	500.000	Length (IMPERV)
	.000	<pre>%Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat</pre>
	.250	Manning "n"
	.100	Ia/S Coefficient
	7.587	Initial Abstraction Option 1=Trianglr: 2=Rectanglr: 3=SWM HYD: 4=Lin Reserv
	2.3	105 .579 .579 .000 c.m/s
15	ADD RUNOF	20 .898 .526 C perv/imperv/total 7F
27		05 2.884 .579 .000 c.m/s
27	5 is ‡	of Hyeto/Hydrograph chosen
8	Volume = PIPE	: .1136950E+05 c.m
	.500	Minimum velocity m/sec
	.013	Pipe Manning's 'n'
	1.350	Diameter in metres Select Grade in %
	Depth	= .830 metres
	Velocity Pipe Capa	= 3.123 m/sec acity = 4.134 c.m/s
0	Critical	depth= .908 metres
9	500.000	Conduit Length
	.407	Supply X-factor <.5 Supply K-lag (sec)
	.500	Beta weighting factor
	120.000	Routing timestep No. of sub-reaches
16	2.3 NEYT LINK	305 2.884 2.637 .000 c.m/s
10	2.3	305 2.637 2.637 .000 c.m/s
35	COMMENT 1 line	e(s) of comment
4	*** ROSEL	ALE - DRAINAGE AREA FUT ***
4	1.000	ID No.ó 99999
	12.770	Area in hectares Length (PERV) metres
	3.000	Gradient (%)
	70.000 400.000	Per cent Impervious Length (IMPERV)
	.000	%Imp. with Zero Dpth
	.250	Manning "n"
	77.000	SCS Curve No or C Ia/S Coefficient
	7.587	Initial Abstraction
	1.8	Option I=TriangIr; 2=RectangIr; 3=SWM HYD; 4=Lin. Reserv 361 2.637 2.637 .000 c.m/s
	.3	20 .893 .721 C perv/imperv/total
15	ADD RUNOR	34
15	ADD RUNOF 1.8	7F 161 4.498 2.637 .000 c.m/s
15 27	ADD RUNOF 1.8 HYDROGRAF 5 is #	FF 161 4.498 2.637 .000 c.m/s ¹ H DISPLAY • of Hyeto/Hydrograph chosen
15 27	ADD RUNOF 1.8 HYDROGRAF 5 is # Volume =	FF 161 4.498 2.637 .000 c.m/s HDISPLAY # of Hyeto/Hydrograph chosen # .1623196E+05 c.m
15 27 14	ADD RUNOF 1.8 HYDROGRAF 5 is # Volume = START 1 1=Ze	rF 561 4.498 2.637 .000 c.m/s HDISPLAY # Of Hyeto/Hydrograph chosen : .1623196E+05 c.m rro; 2=Define
15 27 14 35	ADD RUNOF 1.8 HYDROGRAE 5 is # Volume = START 1 1=Ze COMMENT 3 line	PF 961 4.498 2.637 .000 c.m/s HDISPLAY 1 of Hysto/Hydrograph chosen : .1623196E+05 c.m pro; 2=Define :(s) of comment
15 27 14 35	ADD RUNOF 1.6 HYDROGRAF 5 is # Volume = START 1 1=Ze COMMENT 3 line *******	<pre>FF 561 4.498 2.637 .000 c.m/s HDISPLAY # of Hyeto/Hydrograph chosen : .1623196E+05 c.m erro; 2=Define :(s) of comment ************************************</pre>
15 27 14 35	ADD RUNOF 1.6 HYDROGRAF 5 is # Volume = START 1 1=Ze COMMENT 3 line ********	PF 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen 5.1623196E+05 c.m 2ro; 2=Define 1(s) of comment YEAR DESIGN STORM EVENT *
15 27 14 35 2	ADD RUNOB 1.6 HYDROGRAH 5 is # Volume = START 1 1=2Z COMMENT 3 line ********* * MTO 25 ********* STORM	<pre>PF 4.498 2.637 .000 c.m/s HDISPLAY t of Hyeto/Hydrograph chosen : .1623196E+05 c.m rro; 2=Define :(s) of comment :: YEAR DESIGN STORM EVENT * T=Chicago;2=Huff;3=Hser;4=Cdnlbr;5=Historic</pre>
15 27 14 35 2	ADD RUNDO 1.8 HYDROGRAF 5 is # Volume = START 1 1=2c COMMENT 3 line ******** * MTO 25 ******** STORM 1 715.568	<pre>PF 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen 1.162196E+05 c.m ero; 2=Define e(s) of comment YEAR DESIGN STORM EVENT * I=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a</pre>
15 27 14 35 2	ADD RUNOB 1.6 HYDROGRAF 5 is # Volume = START 1 1=2c COMMENT 3 line ************************************	<pre>PF 561 4.498 2.637 .000 c.m/s HD ISPLAY 4 of Hyeto/Hydrograph chosen : .1623196E+05 c.m ero; 2=Define 4(s) of comment ************************************</pre>
15 27 14 35 2	ADD RUNOB 1.6 HYDROGRAF 5 is # Volume = START 1 1=2c COMMENT 3 line ******** STORM 1 715.568 .000 .699 .450	<pre>FF 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define eta(s) of comment type type DESIGN STORM EVENT * ***********************************</pre>
15 27 14 35 2	ADD RUNNO 1.6 HYDROGRAH 5 is # Volume = START 1 1=Ze COMMENT 3 line * MTO 25 * STORM 1 715.568 .000 .699 .450 240.000	<pre>FF 661 4.498 2.637 .000 c.m/s HDISPLAY # of Hyeto/Hydrograph chosen = .1623196E+05 c.m *ro; 2=Define *(s) of comment ************************************</pre>
15 27 14 35 2	ADD RUNNO 1.6 HYDROGRAH 5 is # Volume = START 1 1=Ze COMMENT 3 line * MTO 25 * MTO 25 STORM 1 715.568 .000 .699 .450 240.000 IMPERVIOU 1	<pre>FF 561 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m *ro; 2=Define *(s) of comment ************************************</pre>
15 27 14 35 2 3	ADD RUNNO 1.6 HYDROGRAH 5 is # Volume = START 1 1=26 COMMENT 3 line ********* STORM 715.568 .000 .699 .450 240.000 IMPERVIOU .015 0.000	<pre>PF 561 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m *ro; 2=Define *(s) of comment ************************************</pre>
15 27 14 35 2	ADD RUNOC 1.6 HYDROGRAH 5 is # Volume = START 1 1=2¢ COMMENT 3 line * MTO 25 ******** STORM 715.568 .000 .699 .450 240.000 IMPERVIOU 1 .015 98.000 .100	<pre>PF 561 4.498 2.637 .000 c.m/s HDISPLAY # Of Hyeto/Hydrograph chosen : .1623196E+05 c.m *ro; 2=Define *(s) of comment ************************************</pre>
15 27 14 35 2 3	ADD RUNOG 1.6 HYDROGRAH 5 is # START 1 1=2c COMMENT * MTO 25 ******** STORM 1 1=7c COMMENT * MTO 25 ******** STORM 1 1 000 .699 .450 240.000 IMPERVIOU 1 .015 98.000 .518 COMMENT	<pre>vFF 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen 1623196E+05 c.m vro; 2=Define *(s) of comment ************************************</pre>
15 27 14 35 2 3 3	ADD RUNOG 1.6 HYDROGRAF 5 is # Volume = START 1 1=2c COMMENT 1 1=2c COMMENT 1 1=2c COMMENT 1 1=2c COMMENT 1 1=2c COMMENT 1 00 518 COMMENT 1 1100	<pre>PF 561 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen 5 .1623196E+05 c.m ero; 2=Define 2(s) of comment ************************************</pre>
15 27 14 35 2 3 3 35 4	ADD RUNOO 1.6 HYDROGRAT 5 is # START 1 1=2c COMMENT 1 1=2c COMMENT 1 1=2c COMMENT 1 1=2c COMMENT 1 1=2c COMMENT 1 015 98.000 .015 98.000 .015 1 015 1 015 1 100 .518 COMMENT 1 1100 .518 COMMENT 1 1100 .518 COMMENT 1 1100 .518 COMMENT 1 1100 .518 .000 .000 .518 .000 .000 .518 .000 .518 .000 .000 .000 .518 .000 .000 .000 .518 .000	<pre>PF 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hysto/Hydrograph chosen 1623196E+05 c.m ero; 2=Define (s) of comment YEAR DESIGN STORM EVENT * ***********************************</pre>
15 27 14 35 2 3 3 35 4	ADD RUNNO 1.6 HYDROGRAH 5 is # Volume = START 1 1=Ze COMMENT 3 line * MTO 25 * MTO 25 * MTO 25 STORM 1 715.568 .000 .699 .450 240.000 IMPERVIOU 1 .015 98.000 .518 COMMENT 1 line ** FTELL CATCHMENT 1.000 .240	<pre>PF 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define :(s) of comment ************************************</pre>
15 27 14 35 2 2 3 3 35 4	ADD RUNNOG 1.6 HYDROGRAH 5 is # Volume = START 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 15.568 .000 .450 240.000 IMPERVIOU 1 .015 98.000 .518 COMMENT 1 line * FIELI CATCHMENT 1 .000 3.440 150.000	<pre>PF 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define ets) of comment ************************************</pre>
15 27 14 35 2 3 3 35 4	ADD RUNNO 1.6 HYDROGRAH 5 is # Volume = COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze STORM 1 715.568 .000 .450 240.000 IMPERVIOU 1 100 518 COMMENT 1 100 3.440 150.000 150.000 150.000	<pre>PF 4.498 2.637 .000 c.m/s HD ISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define ets) of comment ************************************</pre>
15 27 14 35 2 3 3 35 4	ADD RUNNO 1.6 HYDROGRAH 5 is # Volume = START 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze 000 .699 .450 240.000 IMPERVIOU 1 100 .518 COMMENT 1 100 3.440 150.000 150.000	<pre>PF 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define e(s) of comment ************************************</pre>
15 27 14 35 2 2 3 3 35 4	ADD RUNNO 1.6 HYDROGRAH 5 is # Volume = START 1 1=26 COMMENT 1 100 COMMENT 1 000 1	<pre>FF 4.498 2.637 .000 c.m/s HP DISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define e(s) of comment</pre>
15 27 14 35 2 2 3 35 4	ADD RUNNO 1.6 HYDROGRAH 5 isi 5 isi 5 rar 1 1=26 COMMENT 1 1=26 COMMENT 1 1=26 COMMENT 1 1=26 COMMENT 1 1=26 COMMENT 1 1=26 COMMENT 1 000 .518 COMMENT 1 000 .500 150.000 .000 .500 150.000 .220 7 0.000 .250 .200	<pre>PF 650 4.498 2.637 .000 c.m/s HP DISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define ero; 2=Define ero; 2=Define ero; 2=Define traction STORM EVENT * ***********************************</pre>
15 27 14 35 2 3 3 35 4	ADD RUNDO 1.6 HYDROGRAL 5 is # START 1 1=2¢ COMMENT 715.568 .000 .699 .450 240.000 IMPERVIOU 1 015 98.000 .015 98.000 .015 98.000 .015 1 016 START 1 000 .518 COMMENT 1 000 .500 150.000 150.000 .250 77.000 .100	<pre>PF 651 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define e(s) of comment ************************************</pre>
15 27 14 35 2 3 3 35 4	ADD RUNDO 1.6 HYDROGRAH 5 is 4 Volume = START 1 1=2c COMMENT 715.568 .000 .699 .450 240.000 IMPERVIOU 1 015 98.000 .015 98.000 .015 98.000 .015 1 016 .000 .518 COMMENT 1 1000 .500 150.000 1000 .250 77.000 .100 7.587 1	<pre>FF 651 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen : .1623196E+05 c.m ero; 2=Define ero; 2=Define ero; 2=Define ero; 2=Define traction STORM EVENT * ***********************************</pre>
15 27 14 35 2 3 3 35 4	ADD RUNDO 1.6 HYDROGRAH 5 is # Volume = START 1 1=2c COMMENT 715.568 .000 .699 .450 240.000 IMPERVIOU 1 .015 98.000 .015 98.000 .015 98.000 .015 .015 98.000 .015 .015 98.000 .015 .015 98.000 .015 .015 98.000 .015 .000 .015 .000 .518 COMMENT 1 Line ** FIELE CATCHNENT 1.000 .500 1.000 .500 .000 .000 .250 .000 .250 .000	<pre>FF 4.498 2.637 .000 c.m/s HP DISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define et(s) of comment ************************************</pre>
15 27 14 35 2 3 3 35 4	ADD RUNDO 1.6 HYDROGRAH 5 is # Volume = Volume = Volume = Volume = 1 = 2e COMMENT 1 = 2e COMMENT 1 = 2e Volume = Volume =	<pre>FF 4.498 2.637 .000 c.m/s HP DISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define et(s) of comment ************************************</pre>
15 27 14 35 2 3 3 35 4	ADD RUNNO 1.6 HYDROGRAH 5 is # Volume = START = 26 COMMENT 1 = 26 COMMENT 1 = 26 COMMENT 1 = 26 STORM 1 715.568 .000 .450 240.000 IMPERVIOU 1 .015 98.000 .518 COMMENT 1 line ** FIELI CATCHMENT 1.000 .500 150.000 .100 .500 150.000 .100 .500 150.000 .100 .500 150.000 .100 .500 100 .500 100 .500 .000 .100 .500 .000 .100 .500 .000 .100 .500 .000 .100 .500 .000 .100 .500 .000 .100 .500 .000 .100 .500 .0000 .000 .000 .0000 .0000 .0000 .000	<pre>PF 4.498 2.637 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define ets) of comment ************************************</pre>
15 27 14 35 2 3 35 4 15	ADD RUNDO 1.6 HYDROGRAH 5 is # Volume = START 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 3 1ine * MTO 25 ************************************	<pre>FF 4.498 2.637 .000 c.m/s HP DISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define ets) of comment ************************************</pre>
15 27 14 35 2 3 35 4 15	ADD RUNNOC 1.6 HYDROGRAH 5 is # Volume = START 1 = Ze COMMENT 1 715.568 .000 .450 240.000 IMPERVIOU IMPERVIOU 1 100 .518 COMMENT 1 1 100 .518 COMMENT 1 .000 .450 240.000 IMPERVIOU .015 98.000 .100 .508 COMMENT 1 .000 .500 150.000 .250 .250 .250 .250 .200 .000 .000 .250 .000 .000 .000 .000 .250 .000 .000 .000 .000 .000 .250 .000 .000 .000 .000 .000 .250 .000 .000 .000 .000 .000 .250 .00	<pre>PF 4.498 2.637 .000 c.m/s HP DISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m sro; 2=Define t(s) of comment ************************************</pre>
15 27 14 35 2 3 3 35 4	ADD RUNNO 1.6 HYDROGRAH 5 is # Volume = START 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze 0015 98.000 1.000 .518 COMMENT 1 1000 .518 COMMENT 1 1000 .518 COMMENT 1 000 .500 1.000 .500 1.000 .500 .000 .100 .500 .000 .100 .500 .000 .100 .500 .000 .100 .500 .000 .100 .500 .000 .100 .000 .100 .500 .000 .100 .500 .000 .000 .100 .000 .100 .500 .000 .000 .100 .000 .100 .000 .100 .000 .100 .000 .000 .000 .100 .000 .100 .000 .100 .00	<pre>FF 4.498 2.637 .000 c.m/s HP DISPLAY 4 of Hyeto/Hydrograph chosen = .1623196E+05 c.m sro; 2=Define t(s) of comment</pre>
15 27 14 35 2 3 3 35 4	ADD RUNNO 1.6 HYDROGRAH 5 is # Volume = START 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 1=Ze COMMENT 1 100 .518 COMMENT 1 100 .518 COMMENT 1 100 .518 COMMENT 1 250 77.000 1.000 .500 1.00 .300 3.000 3.000 3.000 1.000 .500 1.000 .500 1.000 .500	<pre>FF 4.498 2.637 .000 c.m/s HP DISPLAY H DISPLAY H OF Hyeto/Hydrograph chosen1623196E+05 c.m ro; 2=Define t(s) of comment</pre>
15 27 14 35 2 3 3 35 4 15 11	ADD RUNNO 1.6 HYDROGRAH 5 is is Volume = START 1 1=26 COMMENT 715.568 .000 .699 .450 240.000 IMPERVIOU .015 98.000 .100 .518 COMMENT 1 1ine ********** STORM 1 100 .518 COMMENT 1 000 3.440 150.000 100 .500 150.000 .100 .500 150.000 .100 .250 77.000 .100 .300 .300 .300 .500 .500 .000 .100 .500 .000 .000 .100 .500 .000 .000 .100 .500 .000 .100 .500 .000 .100 .500 .100 .500 .100 .500 .100 .500 .100 .500 .000 .100 .000 .100 .500 .100 .500 .000 .100 .500 .000 .100 .500 .100 .500 .100 .500 .100 .500 .100 .500 .100 .500 .100 .500 .100 .500 .100 .500 .100 .500 .100 .100 .500 .100 .500 .100 .100 .100 .500 .1000 .000	<pre>FF 4.498 2.637 .000 c.m/s HP DISPLAY H DISPLAY H OF Hyeto/Hydrograph chosen = .1623196E+05 c.m ero; 2=Define e(s) of comment</pre>
15 27 14 35 2 3 3 35 4 15 11	ADD RUNNO 1.6 HYDROGRAH 5 is is Volume = START 1 1=26 COMMENT 715.568 .000 .699 .450 240.000 IMPERVIOU .015 98.000 .100 .518 COMMENT 1 1ine ************************************	<pre>FF 4.498 2.637 .000 c.m/s HP DISPLAY H DISPLAY H OF Hyeto/Hydrograph chosen = .1623196E+05 c.m rro; 2=Define t(s) of comment</pre>

9 ROUTE Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep 400.000 .489 391.534 .500 300.000 1 No. of sub-reaches .127 .122 .127 .000 c.m/s 16 NEXT LINK .127 .122 .000 c.m COMMENT 1 line(s) of comment *** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** .122 .122 .000 c.m/s 35 *** EX10... CATCHMENT ' 000 ID No.ó 99999 '- bectar 4 ID No.5 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 10.840 300.000 1.000 25.000 300.000 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. Reserv 42 122 000 c m/s .000 .250 77.000 .100 7.587 1 .742 .122 .122 .000 c.m/s .367 .911 .503 C perv/imperv/total .742 15 ADD RUNOFF .742 CHANNEL .300 .775 .122 .000 c.m/s 11 Base Width .300 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1: .030 Manning's *n* .500 O/a Depth in metres 1.000 Select Grade in % Depth = .415 metres Velocity = 1.222 c.m/s Critical depth = .377 metres ROUTE .300 3.000 ROUTE 200.000 .457 123.848 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor .500 120.000 Routing timestep 1 No. of sub-reaches .742 .775 .720 .000 c.m/s 16 .742 NEXT LINK .742 COMMENT .720 .720 .000 c.m/s 35 1 line(s) of comment *** MEADOW HEIGHTS - DRAINAGE AREA MH *** 4 CATCHMENT 1.000 29.250 500.000 2.000 ID No.ó 99999 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 35.700 500.000 .000 .250 77.000 .100 7.587 Initial Abstraction
 Option
 I=Driaglr;
 2=Rectanglr;
 3=SWM HYD;
 4=Lin.
 Reserv

 2.767
 .720
 .000 c.m/s
 .367
 .911
 .561
 C perv/imperv/total
 1 .367 .911 .561 ADD RUNOFF 2.767 3.486 .720 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1435674E+05 c.m prop 15 .000 c.m/s 27 8 PIPE .500 Minimum velocity m/sec Maximum velocity m/sec Pipe Manning's 'n' 2.920 9 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 2.767 3.486 3.226 .377 .115.797 500 .500 120.000 1 .000 c.m/s 2.767 NEXT LINK 2.767 COMMENT 16 3.226 3.226 .000 c.m/s CUMMENT 5.220 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA FUT *** CATCHMENT 1.000 ID No.6 99999 12.770 Area in hectares 10.000 35 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Ouvies No. c. C. 400.000 3.000 70.000 400.000 .250 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Ta/s Coefficient
 Tinitial Abstraction
 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
 2.199
 3.226
 .000 c.m/s
 .367
 .901
 .740
 C perv/imperv/total 15 ADD RUNOFF 2.199 5.425 3.226 .000 c.m/s

27	HYDROGRAP	H DISPLA	Y /Wydrogra	nh chose	n		
	Volume =	.20226	03E+05 c.m	ph chose			
14	START		e i				
35	COMMENT	ro, z=be	Line				
	3 line	(s) of c	omment				
	* MTO 50	YEAR DES	IGN STORM	EVENT *			
	*******	*******	*******	******			
2	STORM 1	1=Chica	qo;2=Huff;	3=User;4	=Cdn1hr;5:	=Historic	
	794.298	Coeffic	ient a				
	.000	Constan	tb (m tc	in)			
	.450	Fraction	n to peak	r			
	240.000	Duration	nó 240 m nota	in 1 depth			
3	IMPERVIOU	S	1004	i depen			
	1	Option Manning	1=SCS CN/C	; 2=Hort	on; 3=Gree	en-Ampt; 4=Rep	eat
	98.000	SCS Cur	ve No or C				
	.100	Ia/S Co	efficient				
35	COMMENT	initial	ADSTRACTI	on			
	1 line	(s) of c	omment				
4	*** FIELD CATCHMENT	- DRAIN	AGE AREA F	X ***			
-	1.000	ID No.ó	99999				
	3.440	Area in	hectares	****			
	1.000	Gradien	(PERV) met t (%)	Les			
	.500	Per cen	t Impervio	us			
	.000	%Imp. w	(IMPERV) ith Zero D	pth			
	1	Option	1=SCS CN/C	; 2=Hort	on; 3=Gree	en-Ampt; 4=Rep	eat
	77.000	SCS Cur	ve No or C				
	.100	Ia/S Co	efficient				
	7.587	Initial Option	Abstracti 1=Trianglr	on ; 2=Rect	anglr; 3=9	SWM HYD; 4=Lin	Reserv
	.1	61	.000	3.226	.000	c.m/s	
15	ADD RUNOF	97 F	.909	.400	C perv,	/imperv/total	
	.1	61	.161	3.226	.000	c.m/s	
11	CHANNEL . 300	Base Wi	dth =				
	3.000	Left b	ank slope	1:			
	3.000	Right ba Manning	ank slope 's "n"	1:			
	.500	0/a Dep	th in metr	es			
	1.000 Depth	Select (Grade in %	metres			
	Velocity	=	.814	m/sec			
	Flow Capa	city =	1.222	c.m/s			
9	ROUTE	depen -	.102	meeres			
	400.000	Conduit	Length	r.			
	.488 368.744	Supply I	K-factor < K-laq (sec	.5)			
	.500	Beta we	ighting fa	ctor			
	300.000	No. of :	timestep sub-reache	s			
	.1	61	.161	.154	.000	c.m/s	
10	NEXT LINK	61	.154	.154	.000	c.m/s	
35	COMMENT	() 6					
	*** EXIST	(S) OI CO ING RESI	DENTIAL -	DRAINAGE	AREA WT	***	
4	CATCHMENT						
	1.000	ID No.o Area in	999999 hectares				
	300.000	Length	(PERV) met	res			
	1.000	Gradien Per cen	t (%) t Tmpervio	us			
	300.000	Length	(IMPERV)				
	.000	%Imp. w	ith Zero D 1=SCS CN/C	pth ; 2=Hort	on; 3=Gree	en-Ampt; 4=Rep	Pat
	.250	Manning	"n"				
	77.000	SCS Cur	ve No or C efficient				
	7.587	Initial	Abstracti	on			
	1 8	Option 3 41	l=Trianglr 154	; 2=Rect 154	anglr; 3=5 000	SWM HYD; 4=Lin	. Reserv
	. 3	97	.917	.527	C perv,	/imperv/total	
15	ADD RUNOF	F 41	888	154	000	c m/s	
11	CHANNEL						
	.300	Base Wie	dth =	1.			
	3.000	Right b	ank slope	1:			
	.030	Manning	's "n" th in metr				
	1.000	Select (Grade in %	es			
	Depth	=	.439	metres			
	Flow Capa	city =	1.222	c.m/s			
0	Critical	depth =	.400	metres			
9	200.000	Conduit	Length				
	.455	Supply 1	X-factor <	.5			
	.500	Supply Beta we	⊾-⊥ag (sec ighting fa	, ctor			
	120.000	Routing	timestep				
	1	NO. Of : 41	sub-reache .888	s .829	.000	c.m/s	
16	NEXT LINK					,	
35	. 8 COMMENT	41	.829	.829	.000	c.m/s	
	1 line	(s) of c	omment				
4	*** MEADO CATCHMENT	W HEIGHT:	S - DRAINA	GE AREA	MH ***		
-	1.000	ID No.ó	99999				
	29.250	Area in Length	hectares	res			
	2.000	Gradien	(
	35.700	Per cen	t Impervio	us			

500.000 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 .000 . 250 77.000 .100 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
 3.11
 .829
 .829
 .000 c.m/s

 .337
 .919
 .584
 C perv/imperv/total

 ADD RUNOFF
 3.111
 3.940
 .829
 .000 c.m/s
 15 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1664438E+05 c.m 27 PIPE .500 2.920 8 Minimum velocity m/sec Maximum velocity m/sec Pipe Manning's 'n' Diameter in metres Pipe Manning's 'n Diameter in metre: Select Grade in % .013 1.350 .600 Depth = Velocity = Pipe Capacity = Critical depth= = 1.053 metres = 3.288 m/sec tity = 4.134 c.m/s lepth= 1.060 metres ROUTE ROUTE 0.000 Conduit Length .344 Supply X-factor <.5 4.065 Supply K-lag (sec) .500 Beta weighting factor 0.000 Routing timestep 1 No. of sub-reaches 3.111 3.940 3.669 VEXT LINK 500.000 114.065 .500 .000 c.m/s NEXT LINK 16 3.111 3.669 3.669 .000 c.m/s COMMENT 35 COMMENT 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA FUT *** CATCHMENT 1.000 ID No.6 99999 12.770 Area in hectares 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" CSC Ourse No. cs C 12.770 400.000 3.000 70.000 400.000 .000 .250 Manning 'n' SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv 2.448 3.669 .000 c.m/s .398 .903 .752 C perv/imperv/total UNOFF 77.000 100 7.587 ADD RUNOFF 15 6.117 3.669 .000 c.m/s 2.448 6. HYDROGRAPH DISPLAY 27 HYDROGRAPH DISPLAY is # of Hyeto/Hydrograph chosen Volume = .2325709E+05 c.m 14 START 1=Zero; 2=Define COMMENT 35 line(s) of comment * MTO 100 YEAR DESIGN STORM EVENT * 2 STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 75.581 mm Total depth JS 871.279 .000 .450 IMPERVIOUS 3 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 1 .015 Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction 98.000 .100 .518 35 COMMENT line(s) of comment *** FIELD - DRAINAGE AREA FX *** 4 CATCHMENT ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 1.000 3.440 150.000 .500 Per cent Impervious Length (IMPRRV) %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 150.000 .250 77.000 .100
 Iars Coefficient

 Initial Abstraction

 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv

 196
 .000

 .000
 3.669

 .000
 .../s

 .425
 .917

 .427
 C perv/imperv/total
 7.587 .196 .4: .196 .196 3.66 CHANNEL .3000 Left bank slope 1: .3000 Right bank slope 1: .3000 Right bank slope 1: .300 Manning's "n" .500 O/a Depth in metres 1.000 Select Grade in % Depth = .231 metres Velocity = .855 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .200 metres ROUTE 400.000 Conduit Length .4: .425 ADD RUNOFF .196 CHANNEL 15 .196 3.669 .000 c.m/s 11 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor .500

	300.000	Routing t	imestep			
	.1	96 .	196	.186	.000	c.m/s
16	NEXT LINK					
25	.1	96 .	186	.186	.000	c.m/s
55	1 line	(s) of com	ment			
	*** EXIST	ING RESIDE	NTIAL - DH	RAINAGE A	REA WT	***
4	CATCHMENT 1.000	TD No.ó 9	9999			
	10.840	Area in h	ectares			
	300.000	Length (P	ERV) metre	es		
	25 000	Gradient Per cent	(%) Impervious	-		
	300.000	Length (I	MPERV)			
	.000	%Imp. wit	h Zero Dpi	h		a benetic de Demont
	.250	Manning "	n"	2=Horton	; 3=Gree	n-Ampt; 4=Repeat
	77.000	SCS Curve	No or C			
	.100	Ia/S Coef	ficient			
	1	Option 1=	Trianglr;	2=Rectan	glr; 3=S	SWM HYD; 4=Lin. Reserv
	.9	24 .	186	.186	.000	c.m/s
15	ADD RUNOF	25 . F	522	. 545	C perv/	Imperv/cocar
	.9	24 .	988	.186	.000	c.m/s
11	CHANNEL . 300	Base Widt	h =			
	3.000	Left ban	k slope :	1:		
	3.000	Right ban	k slope :	1:		
	.030	0/a Depth	in metres	5		
	1.000	Select Gr	ade in %			
	Depth Velocity	=	.458 me	etres /sec		
	Flow Capa	city =	1.222 c	.m/s		
0	Critical	depth =	.420 me	etres		
9	200.000	Conduit L	ength			
	.453	Supply X-	factor <.!	5		
	116.540	Supply K-	lag (sec)	or		
	120.000	Routing t	imestep			
	1	No. of su	b-reaches	0.20	000	a m/a
16	.9 NEXT LINK	24 .	988	.929	.000	c.m/s
	. 9	24 .	929	.929	.000	c.m/s
35	COMMENT	(s) of com	ment			
	*** MEADO	W HEIGHTS	- DRAINAGI	E AREA MH	***	
4	CATCHMENT					
	1.000	ID No.0 9 Area in h	9999 ectares			
	500.000	Length (P	ERV) metre	es		
	2.000	Gradient	(%)			
	35.700	Length (I	1mpervious MPERV)	5		
	.000	%Imp. wit	h Zero Dpi	h		
	250	Option 1=	SCS CN/C;	2=Horton	; 3=Gree	en-Ampt; 4=Repeat
	.250 77.000	Option 1= Manning " SCS Curve	SCS CN/C; n" No or C	2=Horton	; 3=Gree	en-Ampt; 4=Repeat
	.250 77.000 .100	Option 1= Manning " SCS Curve Ia/S Coef	SCS CN/C; n" No or C ficient	2=Horton	; 3=Gree	en-Ampt; 4=Repeat
	1 .250 77.000 .100 7.587 1	Option 1= Manning " SCS Curve Ia/S Coef Initial A Option 1=	SCS CN/C; n" No or C ficient bstraction Trianglr;	2=Horton	; 3=Gree glr; 3=S	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv
	1 .250 77.000 .100 7.587 1 3.4	Option 1= Manning " SCS Curve Ia/S Coef Initial A Option 1= 53	SCS CN/C; n" No or C ficient bstraction Trianglr; 929	2=Horton 2=Rectang .929	; 3=Gree glr; 3=S .000	en-Ampt; 4=Repeat SWM HYD; 4=Lin. Reserv c.m/s
15	1 .250 77.000 .100 7.587 1 3.4 .4 ADD RUNOF	Option 1= Manning " SCS Curve Ia/S Coef Initial A Option 1= 53 25 F	SCS CN/C; n" No or C ficient bstraction Trianglr; 929 926	2=Horton 2=Rectany .929 .604	; 3=Gree glr; 3=S .000 C perv/	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total
15	1 .250 77.000 .100 7.587 1 3.4 .4 ADD RUNOF 3.4	Option 1= Manning " SCS Curve Ia/S Coef Initial A Option 1= 53 F 53 4.	SCS CN/C; n" No or C ficient bstraction Trianglr; 929 926 381	2=Horton 2=Rectang .929 .604 .929	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat SWM HYD; 4-Lin. Reserv c.m/s 'imperv/total c.m/s
15 27	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAD 5 is #	Option 1= Manning ": SCS Curve Ia/S Coef Initial A Option 1= 53 . F 53 4. H DISPLAY of Hyeto/	SCS CN/C; n" No or C ficient bstraction Trianglr; 929 926 381 Hydrograph	2=Horton 2=Rectang .929 .604 .929	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s
15 27	1 .250 77.000 .100 7.587 1 ADD RUNOF 3.4 HYDROGRAP 5 is # Volume =	Option 1= Manning ": SCS Curve Ia/S Coef Initial A Option 1= 53 . F 53 4. H DISPLAY of Hyeto/. .1895466	SCS CN/C; n" No or C ficient bstraction Trianglr; 929 926 381 Hydrograph E+05 c.m	2=Horton 2=Rectang .929 .604 .929 n chosen	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s
15 27 8	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # Volume = PIPE PIPE	Option 1= Manning ". SCS Curve Ia/S Coef Initial A Option 1= 53 . F 53 4. H DISPLAY of Hyeto/ .1895466	SCS CN/C; n" No or C ficient bstraction Trianglr; 929 926 381 Hydrograph E+05 c.m	2=Horton 2=Rectang .929 .604 .929 h chosen	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s
15 27 8	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920	Option 1= Manning ". SCS Curve Ia/S Coef Initial A Option 1=' 53 . 25 . F 53 4. H DISPLAY of Hyeto/'. 1895466 Minimum v Maximum v	SCS CN/C; n" No or C ficient bstraction Trianglr; 929 926 381 Hydrograph E+05 c.m elocity r elocity r	2=Horton 2=Rectang .929 .604 .929 h chosen m/sec m/sec	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s
15 27 8	1 .250 77.000 .100 7.587 1 3.4 ADD RUNOF 3.4 HYDROGRAP 5 is # Volume = PIPE .500 2.920 .013	Option 1= Manning ": SCS Curve Ia/S Coef Initial A Option 1= 53 25 53 4. H DISPLAY of Hyeto/ .1895466 Minimum v Pipe Mann	SCS CN/C; n" No or C ficient bstraction Trianglr; 929 926 381 Hydrograph E+05 c.m elocity r elocity r ing's 'n'	2=Horton 2=Rectans .929 .604 .929 n chosen m/sec m/sec	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s 'imperv/total c.m/s
15 27 8	1 .250 77.000 .100 7.587 1 3.4 ADD RUNOF 3.4 HYDROGRAP 5 is # Volume = PIPE .500 2.920 .013 1.350 .600	Option 1= Manning ": SCS Curve Ia/S Coef Initial A Option 1= 53 . 25 . F 53 4. H DISPLAY of Hyeto/ .1895466 Minimum v Pipe Mann Diameter Select Gr	SCS CN/C; n" No or C ficient bstraction Trianglr; 929 381 Hydrograph E+05 c.m elocity r ing's 'n' in metres ade in %	2=Horton 2=Rectan: .929 .604 .929 n chosen n/sec	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s
15 27 8	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge	Option 1= Manning " SCS Curve Ia/S Coef Initial A Option 1=' 53 4. H DISPLAY of Hyeto/ .1895466 Minimum v Maximum v Pipe Mann Diameter Select Gr. d HGL=	SCS CN/C; n* No or C ficient bstraction Triang1r; 929 926 381 Hydrograph E+05 c.m elocity r elocity r elocity r ing's 'n' 'in metres ade in %	2=Horton 2=Rectan: .929 .604 .929 a chosen n/sec n/sec	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat
15 27 8	1 .250 77.000 .100 7.587 1 .4D2 RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipo C	Option 1= Manning ": SCS Curve Ia/S Coef Initial A Option 1=' 53 . F 53 4. H DISPLAY of HyteJo'. .1895466 Minimum v Pipe Mann Diameter Select Gr d HGL= = city -	SCS CN/C; n* No or C ficient bstraction Dstraction 2929 381 Hydrograph 4+05 c.m elocity r elocity r elocity r in metres ade in % .674 % 3.061 m/; 4.124 -	2=Horton 2=Rectan: .929 .604 .929 a chosen m/sec m/sec	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s
15 27 8	1 .250 77.000 .100 7.587 1 3.4 ADD RUNOF 3.4 HYDROGRAP 5 is # Volume = PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical	Option 1= Manning". SCS Curve Ia/S Coeff Initial A Option 1= 53 . 25 . 53 4. H DISPLAY of Hysto/ .1895466 Minimum v Maximum v Pipe Mann Diameter Select Gr d HGL= = city = depth=	SCS CN/C; n' No or C ficient betraction g22 926 381 Hydrograph E+05 c.m elocity r elocity r elocity r in metres ade in % .674 % .3061 m/i 4.134 c.t 1.13 met	2=Horton 2=Rectan; .929 .604 .929 1 chosen n/sec n/sec sec n/s rres	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s
15 27 8	1 .250 77.000 .100 7.587 1 3.4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE	Option 1= Manning ** SCS Curve Ia/S Coeff Initial A Option 1= 53 . 25 . 53 4. H DISPLAY DISPLAY Naximum v Maximum v Pipe Mann Diameter Select Gr H dHCL= = city = depth=	SCS CN/C; n* No or C ficient betraction performation perf	2=Horton 1 2=Rectan; 929 .604 .929 1 chosen n/sec n/sec n/s tres	; 3=Gree glr; 3=5 .000 C perv/ .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s 'imperv/total c.m/s
15 27 8	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500	Option 1= Manning*: SCS Curve Ia/S Coef Initial A Option 1=' 53 . .25 . .1395466 Minimum v HoISPLAY Maximum v Maximum v Maximu	SCS CN/C; n* No or C ficient betraction Detraction 292 926 381 Hydrograp] E+05 c.m elocity r in metres ade in % .674 % 3.061 m/. 4.134 c.r 1.113 met ength	2=Horton 2=Rectany .929 .604 .929 h chosen m/sec m/sec m/s rres 5	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat
15 27 8	1 .250 77.000 .100 7.587 1 .4 ADD RUNNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500	Option 1= Manning". SCS Curve In/S Coeff Initial A Option 1= 53 . 25 . 1395466 Minimum v Pipe Mann Diameter select Gr d HGL= = city = depth= Conduit L Supply X- Supply X-	SCS CN/C; n* No or C ficient betraction g29 926 926 926 9381 Hydrograple E+05 c.m elocity r elocity r ing's 'n' in metres ade in % .674 % 3.061 m/t 4.134 c.r. 1.113 met ength factor <.!!	2=Horton 1 2=Rectan; 929 .604 .929 1 chosen n/sec n/sec n/sec sec	; 3=Gree glr; 3=S .000 C per/ .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s
15 27 8	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 .000 .500 .000	Option 1= Manning". SCS Curve IA/S Coeff Initial A Option 1= 53 . 25 . 53 4. H DISPLAY of Hyeto/ .1895466 Minimum v Maximum v Pipe Mann Diameter Select Gr d HGI= city = depth= Conduit L Supply X- Supply X- Beta weig Routing +	SCS CN/C; n* No or C ficient betraction 77 72 92 926 926 8381 Hydrograph E+05 c.m elocity r elocity r elocity r 100 m/t 4.134 c.t 1.113 met ength factor <.! factor <	2=Horton 1 2=Rectan, 929 .604 .929 1 chosen n/sec n/sec sec 5 5 cor	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat
15 27 8	1 .250 77.000 .100 7.587 1 .4DD RUNOF 3.4 HYDROGRAP 5 is # Volume = PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 600.000 1	Option 1= Manning". SCS Curve IA/S Coeff Initial A Option 1= 53 . 25 . 53 4. H DJSPLAY of Hysto/ .1895466 Minimum v Maximum v Pipe Mann Diameter Select Gr d HGL= city = depth= Conduit L Supply X- Supply X- Supply K- Supply K- Supply K- Supply K- Supply K- Supply K- Supply K-	SCS CN/C; n' No or C ficient betraction g29 926 381 Hydrograpl E+05 c.m elocity r elocity r elocity r elocity r 1.013 met 3.061 m% 	2=Horton 2=Rectany .929 .604 .929 h chosen n/sec n/sec sec n/sec 5 5 5 5 5 5	; 3=Gree glr; 3=55 .000 C perv/ .000	n-Ampt; 4=Repeat
15 27 8 9	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 Volume = PTPE .500 2.920 .013 1.350 600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 600.000 1 .4 AUDE .500	Option 1= Manning". SCS Curve IA/S Coef Initial A Option 1= 53 . .25 . .353 4. H DISPLAY of Hysto/ .1895466 Minimum v Maximum	SCS CN/C; n* No or C ficient betraction betraction 229 926 381 Hydrograpl E+05 c.m elocity r ing's 'n' in metres ade in % .674 % 3.061 m/; 4.134 c.t 1.113 met ength factor <.! lag (sc) htning factor .826 metres add in %	2=Horton 1 2=Rectany .929 .604 .929 1 chosen n/sec n/sec n/sec 	; 3=Gree glr; 3=S .000 C perv/ .000	n-Ampt; 4=Repeat
15 27 8 9	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 600.000 1 3.4 NEXT LINK NEXT LINK 3.4	Option 1= Manning". SCS Curve Initial A Option 1= 53 . 25 . 1895466 Minimum v Pipe Mann Diameter select Gr d HGL= = = city = depth= Conduit L Supply K- Beta weig Routing t No f su 53 4.	SCS CN/C; n' No or C ficient betraction Trianglr; 929 926 9361 Hydrograple E+05 c.m elocity r elocity r elocity r elocity r 1.013 met ade in % .674 % 1.013 met ength factor <.1 lag (sec) hring facl imestep b-reaches 381	2=Horton 1 2=Rectany .929 .604 .929 1 chosen n/sec n/sec .sec .sec .cor 4.381 4.381	; 3=Gree glr; 3=S .000 C perv/ .000 .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s c.m/s
15 27 8 9 16 35	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE 500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000	Option 1= Manning": SCS Curve IA/S Coeff Initial A Option 1= 53 . 25 . 1395466 Minimum v Maximum v HolSPLAY of Hysto/. .1895466 Minimum v Maximum v Pipe Mann Diameter Select Gr d HGL= = conduit L Supply X- Supply X- Beta weig Souting t No. of su 53 4.	SCS CN/C: n* No or C ficient batraction 239 926 926 9361 Hydrograpl E+05 c.m elocity r elocity r elocity r 1.013 met * 3.061 m/t 4.134 c.rt 1.113 met ength factor <.!! hting fact imestep b-reaches 381	2=Horton 1 2=Rectan; 929 .604 .929 1 chosen n/sec n/sec sec 	; 3=Gree glr; 3=S .000 C perv/ .000 .000	<pre>m-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s c.m/s c.m/s</pre>
15 27 8 9 16 35	1 .250 77.000 .100 7.587 1 .4DD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 .000 .0000 .000 .0000 .000 .00000 .00000 .0000 .0000 .0000 .00000 .0000 .0000 .0000 .00000 .00000 .0000 .0000 .0000 .00000 .0000 .0000 .0000 .0000 .00000 .00000 .00000 .00000 .00000 .000000	Option 1= Manning". SCS Curve IA/S Codef Initial A Option 1= 53 . 25 . 53 4. H DISPLAY of Hysto/. .1895466 Minimum v Maximum v Pipe Mann Diameter Select Gr d HGL= city = depth= Conduit L Supply X- Supply K- Beta weig Routing t No. of su 53 4. (s) of com	SCS CN/C; n' No or C ficient betraction g29 926 381 Hydrograpl E+05 c.m elocity r elocity r elocity r elocity r 1.113 met ength factor <.! had c: 1.113 met b-reaches 381 4 381 5 381 5 381 5 381 5 5 5 5 5 5 5 5 5 5 5 5 5	2=Horton 2=Rectan; 929 .604 .929 n chosen n/sec n/sec .sec .sec .sec .sec .sec .sec .sec .sec .sec .sec .sec .ses .sec .ses .sec .ses .sec .ses .sec .ses .sec .ses .sec .ses .sec .ses .sec .ses .sec .ses .sec .ses .sec	; 3=Gree glr; 3=S .000 C perv/ .000 .000	n-Ampt; 4=Repeat
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 3.4 ADD RUNOF 9 PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 600.000 1.4 NEXT LINK 3.4 NEXT LINK 3.4 NEXT LINK 3.4 NEXT LINK 3.4 NEXT LINK 3.4 NEXT LINK 3.4	Option 1= Manning": SCS Curve IA/S Coef Initial A Option 1= 53 53 54 54 54 54 54 54 55 54 4. H DISPLAY of Hysto/ .1895466 Minimum v Maximum v Maxi	SCS CN/Cr n' NO or C ficient betraction 292 926 381 Hydrograpl E+05 c.m elocity r elocity r elocity r elocity r elocity r 1.013 met metras 3.061 m/, 4.134 c.t 1.113 met ength factor <.! lag (sc) htning factor 381 	2=Horton 2=Rectan: 929 .604 .929 1 chosen a/sec a/sec a/sec a/sec cor 4.381 FUT ***	; 3=Gree glr; 3=S .000 C perv/ .000 .000	nn-Ampt; 4=Repeat
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 1 .500 600.000 1 .3.4 NEXT LINK 3.4 COMMENT 1 line ** ROSED CATCHMENT 1 line	Option 1= Manning". SCS Curve Initial A Option 1= 53 . 25 . 1395466 Minimum v Pipe Mann Diameter select Gr d HGL= = = depth= Conduit L Supply K- Supply K-	SCS CN/C; n' No or C ficient betraction Trianglr; 929 926 926 926 926 926 926 841 Hydrograple E+05 c.m elocity r elocity r elocity r elocity r ing s'n' in metres ade in % .674 % 1.113 met ength b-reaches 381 .6388 .63888 .638888 .638888 .638888 .638888 .63888 .638888 .638888 .638888 .638888 .638888 .638888 .638888 .638888 .638888 .638888 .638888 .638888 .638888 .6388888 .638888 .63888888 .638888888 .6388888888 .638888888 .63888888888888888888888888888888888888	2=Horton 1 2=Rectany .929 .604 .929 1 chosen n/sec .sec	; 3=Gree glr; 3=S .000 C perv/ .000 .000	n-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s c.m/s c.m/s
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 1 .4 ADD RUNNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 1 .500 600.001 1 .3.4 NEXT LINK 3.4 COMMENT 1 line CATCHMENT 1.000 12.770 400.000	Option 1= Manning". SCS Curve IA/S Coeff Initial A Option 1= 53 . 25 . 1395466 Minimum v Pipe Mann Diameter select Gr d HBL= = etity = depth= Conduit L Supply X- Supply X- Supply X- Supply X- Supply X- Supply X- Star 4. (s) of com (s) of su 53 4. (s) of com ID No.6 9 Area in h Length (P	SCS CN/C; n* No or C ficient betraction 2/2 3/2 3/2 Hydrograpl E+05 cm elocity r elocity r ing's 'n' in metres ade in % .674 % 3.061 m/t 4.134 cr. 1.113 met ength factor <.!! 1.03 % 3/81 % ment MAGE AREA 9999 ectares EV) metres	2=Horton 1 2=Rectan: .929 .604 .929 1 chosen n/sec n/sec .sec .sec 4.381 FUT ****	; 3=Gree glr; 3=S .000 C perv/ .000 .000	n-Ampt; 4=Repeat
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE 500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 .500 .000 .000 .500 .000 .500 .000 .500 .000 .500 .000 .000 .500 .000 .500 .0000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .0000 .0000 .00000 .00000 .0000 .0000 .00000 .0000 .0000 .0000 .00000 .0000 .0000 .0000 .00000 .0000 .0000 .0000 .00000 .00000 .0000 .00000 .00000 .000000	Option 1= Manning". SCS Curve IA/S Coeff Initial A Option 1=' 53 . 25 . S3 4. H DISPLAY of Hysto/ 1895466 Minimum v Maximum v Pipe Mann Diameter Select Gr d HGL= city = depth= Conduit L Supply X- Supply K- Beta weig S0 4. (s) of com ALE - DRAI I D No.6 9 Area in h Length (P Gradient	SCS CN/C: n* No or C ficient betraction 77:anglr; 929 926 8381 Hydrograph E+05 c.m elocity r elocity r elocity r elocity r 1.113 met ength factor <.! 1.113 met b-reaches 381 4 381 5 5 8 8 8 8 8 8 8 8 8 9 9 9 9 9 1.113 1.1	2=Horton 2=Rectane .929 .604 .929 a chosen a/sec a/sec 	; 3=Gree glr; 3=S .000 C perv/ .000 .000	n-Ampt; 4=Repeat
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 3.4 ADD RUNOF 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 600.000 3.4 NEXT LINK 3.4 NEXT LINK 3.4 NEXT LINK 3.4 NEXT LINK 3.4 COMMENT 1 line *** ROSED CATCHMENT 1 line *** ROSED CATCHMENT 1.000 12.770	Option 1= Manning". SCS Curve IA/S Codef Initial A Option 1= 53 . 25 . 53 4. H DISPLAY of Hysto// .1895466 Minimum v Maximum v Pipe Mann Diameter Select Gr d HGL= city = depth= Conduit L Supply X- Supply K- Supply X- Supply X- Supply X- Supply X- Supply X- Supply X- Supply A- Supply A-	SCS CN/C; n' No or C ficient betraction g29 926 381 Hydrograpl E+05 c.m elocity r elocity r elocity r ing's n' in metres ade in % .674 % 3.061 m/; 4.134 c.r 1.113 met factor <.1 lag (sec) btragfact imestres 381 .4 .381 .4 .381 .4 .381 .4 .381 .4 .381 .4 .381 .4 .381 .4 .381 .4 .381 .4 .381 .4 .381 .4 .381 .4 .381 .4 .4 .34 (c.m) .574 % .381 .4 .381 .4 .381 .4 .4 .34 (c.m) .574 % .381 .4 .381 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4	2=Horton 2=Rectany, .929 .604 .929 h chosen n/sec n/sec n/sec sec 1/s .res 5 	; 3=Gree glr; 3=S .000 C perv/ .000 .000	nn-Ampt; 4=Repeat
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 .500 2.920 .013 1.350 600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 1 .500 .500 600.000 1 .500 .500 .500 600.000 1 .1 .4 NEXT LINK 3.4 NEXT LINK 3	Option 1= Manning". SCS Curve IA/S Coeff Initial A Option 1= 53 . .25 . .353 4. H DJSPLAY of Hysto/ .1895466 Minimum v Maximum	SCS CN/C; n' No or C ficient bstraction Trianglr; 929 926 926 926 926 841 Hydrograpl E+05 c.m elocity r elocity r elocity r elocity r ing's 'n' in metres ade in % .674 % 3.061 m/; 4.134 c.r 1.113 met ength b-reaches 381 381 ment NAGE AREA 9999 ectares EEV) metro (%) Impervious MPERV) h Zero Dpin	2=Horton 2=Rectany .929 .604 .929 1 chosen a/sec a/soc a/soc a/soc a/soc a/s	; 3=Gree glr; 3=S .000 C perv/ .000 .000	n-Ampt; 4=Repeat
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 600.000 1 3.4 NEXT LINK 3.4 COMMENT 1 line ** ROSED CATCHMENT 1.000 12.770 400.000 3.000 70.000 400.000 .000 .000 .000 .000	Option 1= Manning". SCS Curve IA/S Coeff Initial A Option 1= 53 . 25 . 1395466 Minimum v Maximum v Pipe Mann Diameter select Gr d HGL= = etity = depth= Conduit L Supply X- Beta weig Routing t Supply X- Beta weig Routing t (s) of com ALE - DRAI ID No.6 9 Area in h Length (P Gradient Per cent Length (I \$Imp. vit) a Supply (S)	SCS CN/C; n* No or C ficient betraction g29 926 381 Hydrograpl E+05 cm elocity r ing's 'n' in metres ade in % .674 % 3.061 m/t 4.134 cr. 1.113 met ength factor <.! 1.03 % 381 4.134 cr. 381 4.134 cr. 1.03 % Betros Satures Betros Satures Betros Satures Betros Satures Betros Satures Betros Satures Betros Satures Betros Satures Betros Satures Betros Sature	2=Horton 1 2=Rectan: .929 .604 .929 1 chosen a/sec ./sec 	; 3=Gree glr; 3=S .000 C perv/ .000 .000 .000 .000	<pre>m-Ampt; 4=Repeat WW HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s c.m/s c.m/s c.m/s en-Ampt; 4=Repeat</pre>
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE 500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 .000 .2,770 40.000 .2,770 40.000 .2,700 .000 .2,770 .000	Option 1= Manning." SCS Curve IA/S Coeff Initial A Option 1= 53 . 25 . 25 . 1895466 Minimum v Maximum v Pipe Mann Diameter Select Gr d HGL= = ety depth= Conduit L Supply X- Supply X- Supply X- Supply X- State - DRAI ID No.6 9 Area in h Length (P Gradient Per cent Length (C SC Surve	SCS CN/C; n* No or C ficient betraction g29 926 381 Hydrograph E+05 c.m elocity r elocity r elocity r elocity r elocity r ing's 'n' in metres ade in % .674 % 3.061 m// 4.134 c.r 1.113 met ength factor <.! 1.03 met b-reaches 381 381	2=Horton 2=Rectany .929 .604 .929 a chosen a/sec a/sec a/sec 5 cor 4.381 4.381 FUT *** s th 2=Horton	; 3=Gree glr; 3=S .000 C perv/ .000 .000 .000 ; 3=Gree	nn-Ampt; 4=Repeat
15 27 8 9 9 16 35 4	1 .250 77.000 .100 7.587 3.4 ADD RUNOF 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 600.000 3.4 NEXT LINK 3.4 COMMENT 1 line *** ROSED CATCHMENT 1.000 12.770 400.000 3.000 70.000 400.000 .250 77.000 .100 .100 .100 .100 .100 .100	Option 1= Manning." SCS Curve IA/S Coeff Initial A Option 1= 53 . 25 . 53 4. H DISPLAY of Hysto/ .1895466 Minimum V Maximum V Pipe Mann Diameter Select Gr d HGL= city = depth= Conduit L Supply X- Supply K- Supply K- Supply K- Supply K- Supply K- State - DRAI I DN 0.6 of su 53 4. (s) of com ALE - DRAI D DN.6.4 ge Area in h Length (P Gradient Per cent Length (C) Gradient Per cent Length (C) Gradient Per cent Length (C) SCS Curve	SCS CN/C; n* No or C ficient betraction g29 926 381 Hydrograpl P405 c.m elocity r elocity r elocity r elocity r elocity r 1.113 met ength factor <.! 1.113 met b-reaches 381 4 3.061 m/; 4.134 c.r 1.113 met pb-reaches 381 4 381 4 SCS CN/C; n* NAGE AREA 9999 ectares ERV) metr((\$) Impervious MPERV) h Zero Dpi SCS CN/C; n* No or C ficient	2=Horton 2=Rectany, .929 .604 .929 h chosen m/sec m/sec m/sec m/sec for 4.381 4.381 FUT ****	; 3=Gree glr; 3=S .000 C perv/ .000 .000 .000 .000	en-Ampt; 4=Repeat
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 1 4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 1 .500 600.000 1 .500 600.000 1 .1 is 8.4 NEXT LINK 3.4 COMMENT 1 line *** ROSED CATCHMENT 1 line *** ROSED CATCHMENT 1.000 12.770 400.000 3.000 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 7.587 1	Option 1= Manning". SCS Curve IA/S Coeff Initial A Option 1= 53 . .25 . .353 4. H DJSPLAY of Hysto/. .1895466 Minimum v Maximum v Maximu	SCS CN/C; n' No or C ficient bstraction Trianglr; 929 926 926 926 841 Hydrograpl E+05 c.m elocity r elocity r elocity r elocity r ing's 'n' in metres ade in % .674 % 3.061 m/; 4.134 c.r .1.113 met ength breaches 381 .385 .381 .385 .381 .385 .385 .385 .385 .385 .39	2=Horton 1 2=Rectany .929 .604 .929 1 chosen a/sec a/sec a/sec a/s cor 4.381 FUT *** 2=Horton 1 2=Horton	; 3=Gree glr; 3=S .000 C perv/ .000 .000 .000 ; 3=Gree	<pre>m-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s c.m/s c.m/s c.m/s c.m/s c.m/s c.m/s c.m/s c.m/s</pre>
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 1 .4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 600.000 1 .3.4 NEXT LINK 3.4 COMMENT 1 line ** ROSED CATCIMENT 1.000 12.770 400.000 .200 77.000 .100 7.587 2.6	Option 1= Manning". SCS Curve Ia/S Coeff Initial A Option 1= 53 . 25 . 1395466 Minimum v Pipe Mann Diameter select Gr d HGL= = = toty = depth= Conduit L Supply K- Beta weig Routing t No. of su 53 4. (s) of com ALE - DRAI ID No.6 9 Area in h Length (P Gradient Per cent Length (I Stor, 1) SCS Curve Ia/S Coeff Initial A Option 1= 88 4. Sta 4.	SCS CN/C; n* No or C ficient betraction g29 926 381 Hydrograpl E+05 cm elocity r elocity r elocity r elocity r ing's 'n' in metres ade in % .674 % 3.061 m/; 4.134 c.r. 1.113 met ength factor <.! 1ag (sec) hting fact imestep b-reaches 381 .6388 .63888 .63888 .63888 .63888 .63888 .63888 .63888 .63888 .638888 .638888 .638888 .638888 .638888 .638888 .63888888 .63888888 .63888888888888888888888888888888888888	2=Horton 1 2=Rectan: .929 .604 .929 1 chosen a/sec ./sec 	; 3=Gree glr; 3=S .000 C perv/ .000 .000 .000 ; 3=Gree glr; 3=S .000	<pre>m-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s c.m/s c.m/s c.m/s c.m/s c.m/s c.m/s c.m/s c.m/s c.m/s</pre>
15 27 8 9 9 16 35 4	1 .250 77.000 .100 7.587 1 4 ADD RUNNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 1 3.4 NEXT LINK NEXT LINK ACOMMENT 1 110 8 **** ROSED CATCHMENT 1.000 2.50 6 .000 2.920 .000 1 .500 6 .500 6 .500 6 .500 6 .500 6 .500 .000 1 .500 .000 .500 .500 .000 .500 .000 .500 .000 .500 .000 .500 .500 .000 .500 .000 .500 .500 .000 .500 .000 .500 .500 .500 .000 .500 .500 .500 .500 .000 .500 .000 .500 .500 .000 .500 .500 .500 .000 .500 .500 .000 .500 .000 .500 .000 .500 .500 .000 .500 .000 .500 .500 .500 .500 .500 .500 .500 .500 .500 .500 .500 .500 .500 .500 .000 .500 .25000 .25000 .25000 .25000 .25000 .25000 .250000 .2500000 .250000000000	Option 1= Manning." SCS Curve IA/S Coeff Initial A Option 1= 53 . 25 . 1395466 Minimum v Maximum v Pipe Mann Diameter Select Gr d HGL= city = depth= Conduit L Supply X- Supply K- Beta weig Routing t ALE - DRAI ID No.6 9 Area in h Length (I % leng. wit Option 1= Maning . SCS Curve Ia/S Coeff Initial A Option 1= Maning . SCS Curve Ia/S Coeff Initial A Option 1= 88 4. 25	SCS CN/C: n* No or C ficient betraction J23 926 381 Hydrograpl E+05 c.m elocity r elocity r elocity r elocity r elocity r ing's 'n' in metres ade in % .674 % 3.061 m// 4.134 c.r 1.113 met breaches 381 .381 .381 .381 .381 .4 .381 .4 .574 % .054 % .574 % .054 % .574 % .054 % .574 % .054 % .574 % .054 % .574 % .574 % .574 % .574 % .574 % .574 % .574 % .574 %	2=Horton 2=Rectany .929 .604 .929 a chosen a/secta/sec a/sec a/sec a/sec a/sec a/sec a/sec a/sec a/sec a/sec a/sec a/secta/sec a/se	; 3=Gree glr; 3=S .000 C perv/ .000 .000 .000 ; 3=Gree glr; 3=S .000 C perv/	<pre>m-Ampt; 4=Repeat WW HYD; 4=Lin. Reserv c.m/s imperv/total c.m/s c.m/s c.m/s c.m/s en-Ampt; 4=Repeat WW HYD; 4=Lin. Reserv c.m/s 'imperv/total</pre>
15 27 8 9 9 16 35 4	1 .250 77.000 .100 7.587 3.4 ADD RUNOF 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 .500 .000 .500 .000 .500 600.000 1 .3.4 NEXT LINK 3.4 COMMENT 1 line *** ROSED CATCHMENT 1.000 12.770 400.000 3.000 70.000 400.000 .250 77.000 .100 7.587 2.6 .4 ADD RUNOF 2.6 .4 ADD RUNOF 2.6 .4 ADD RUNOF 2.6 .4 ADD RUNOF 2.6 .4 ADD RUNOF 2.6 .4 ADD RUNOF	Option 1= Manning." SCS Curve IA/S Coeff Initial A Option 1=' 53 . 25 . S3 4. H DISPLAY of Hysto/ .1895466 Minimum V Maximum V Pipe Mann Diameter Select Gr d HGL= city = depth= Conduit L Supply X- Supply K- Beta weig Routing t No. of su 53 4. (s) of com ALE - DRAI ID No.6 9 Area in h Length (P Gradient Per cent Length (C) SCS Curve Ia/S Coeff Initial A Option 1= 88 4. 25 7.	SCS CN/C: n* No or C ficient betraction J29 926 381 Hydrograph E+O5 c.m elocity r elocity r elocity r elocity r ing's n' in metres ade in % .674 % 3.061 m/t 4.134 c.r 1.113 met ength factor <.! 1.04 % Base for the second b-reaches 381 .04 .04 .04 .04 .04 .04 .04 .04	2=Horton 2=Rectane .929 .604 .929 a chosen a/sec a/se	; 3=Gree glr; 3=S .000 C perv/ .000 .000 .000 ; 3=Gree glr; 3=S .000 C perv/ .000	<pre>m-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s 'imperv/total c.m/s c.m/s c.m/s c.m/s m-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s c.m/s</pre>
15 27 8 9 16 35 4	1 .250 77.000 .100 7.587 1 4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 1 .500 .500 600.000 1 .4 NEXT LINK 3.4 COMMENT 1 line *** ROSED CATCHMENT 1 line *** ROSED CATCHMENT 1.000 12.770 400.000 12.250 77.000 .100 7.587 1 .250 7.000 1 .250 7.000 1 .250 7.000 1 .250 7.000 1 .250 7.000 1 .250 7.000 1 .250 7.000 1 .250 7.000 1 .250 7.000 7.587 7.587 7.597 7.587 7.597 7.587 7.597 7.587 7.597 7.587 7.597 7.587 7.597 7.597 7.587 7.597	Option 1= Manning". SCS Curve IA/S Coeff Initial A Option 1=' 53 . .25 . .353 4. H DJSPLAY of Hysto/ .1895466 Minimum v Maximum v Maximu	SCS CN/C; n' No or C ficient bstraction Trianglr; 929 926 926 926 926 926 841 Hydrograpl E+05 c.m elocity r ing's'n' in metres ade in % .674 % 3.061 m/; 4.134 c.r 1.113 met ength b-reaches 381 .674 % 3.061 m/; 4.134 c.r 1.113 met ength b-reaches 381 .674 % 3.061 m/; 4.134 c.r 1.113 met ength b-reaches 381 .674 % .67	2=Horton 1 2=Rectany .929 .604 .929 1 chosen a/sec a/sec a/sec a/s cor 4.381 FUT *** 2=Horton 1 2=Rectany .381 -2=Horton 1 2=Rectany .381 -2=Horton 1 .381 .760 4.381 .760 .381 .760 .381 .760 .381 .760 .381 .760 .381 .760 .381 .760 .381 .770 .381 .770 .381 .770 .381 .770 .381 .770 .381 .770	; 3=Gree glr; 3=S .000 C perv/ .000 .000 ; 3=Gree glr; 3=S .000 C perv/ .000	<pre>m-Ampt; 4=Repeat WM HYD; 4=Lin. Reserv c.m/s c.m/s</pre>
15 27 8 9 16 35 4 15 27	1 .250 77.000 .100 7.587 1 4 ADD RUNOF 3.4 HYDROGRAP 5 is # PIPE .500 2.920 .013 1.350 .600 Surcharge Velocity Pipe Capa Critical ROUTE 500.000 1 3.4 NEXT LINK 3.4 COMMENT 1 line *** ROSED CATCHMENT 1 line *** ROSED CATCHMENT 1 line *** ROSED CATCHMENT 1.250 77.000 .000 3.000 70.000 400.000 3.000 70.000 400.000 1.250 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 .000 1.250 77.000 .000 .000 .000 .000 .000 .000	Option 1= Manning". SCS Curve IA/S Coeff Option 1= 53 . 25 . 1353 4. H DSSPLAY Maximum v Pipe Mann Diameter select Gr d HGL= = = depth= Conduit L Supply X- Supply X- Supply X- Supply K- Beta weig Routing t No. of su 53 4. (s) of com ALE - DRAL ID No.6 9 Area in h Length (P Gradient Per cent Length (I % 10, 12 SCS Curve IA/S Curve IA/S Curve II Sta 4. S8 7. B DSSPLAY S8 7. B DSSPLAY	SCS CN/C; n* No or C ficient batraction Trianglr; 929 926 9361 Hydrograpl E+05 c.m elocity r elocity r elocity r elocity r elocity r elocity r 1.113 met eagth 1.674 % 3.061 m/; 4.134 c.r 1.113 met eagth factor <.1 alg (sec) hting fact imestep b-reaches 381 381 381 381 674 8 674 % 3.061 m/; 4.134 c.r 1.113 met eagth b-reaches 381 381	2=Horton 1 2=Rectany .929 .604 .929 1 chosen a/sec 	; 3=Gree glr; 3=S .000 C perv/ .000 .000 .000 ; 3=Gree glr; 3=S .000 C perv/ .000	<pre>m-Ampt; 4=Repeat WW HYD; 4=Lin. Reserv c.m/s c.m/s</pre>

Development Conditions with SWM

	Output F:	ile (4.7) SWM	OUT	opene	d 2023-10-06 13:45	
	Units use 24	144 10.000	iby G:)	= 9.8 are MA	IU XDT MAXHYD & DTMIN values	
25	Licensee	UPPER CANADA	A CONSUL	LTANTS		
35	4 line	e(s) of commen	nt			
	ROSEDALE	SUBDIVISION	DIAN			
	FUTURE CO	ONDITIONS TO P	BIEDERM	AN DRAIN		
14	OCTOBER 2	2022				
14	1 1=Ze	ero; 2=Define				
35	COMMENT	(a) of common	.+			
	*******	*****	*****			
	* 25MM DI	ESIGN STORM E	/ENT *			
2	STORM					
	1	1=Chicago;2: Coefficient	Huff;3=	=User;4=0	Cdnlhr;5=Historic	
	6.000	Constant b	(mi1	1)		
	.800	Exponent c Fraction to	peak 1	c		
	240.000	Duration ó	240 min	1		
3	IMPERVIO	25.035 mm JS	Total	depth		
	1	Option 1=SCS	G CN/C;	2=Horton	n; 3=Green-Ampt; 4=Repeat	
	.015 98.000	Manning "n" SCS Curve No	o or C			
	.100	Ia/S Coeffic	lient			
4	CATCHMEN	Initial Abs [raction	1		
	1.000	ID No.ó 9999	99			
	400.000	Length (PER)	tares 7) metre	es		
	2.000	Gradient (%		_		
	400.000	Length (IMP)	ERV)	5		
	.000	%Imp. with :	Zero Dpt	h	n . 2 Gurre Brents A Dresset	
	. 250	Manning "n"	S CN/C,	Z=HOFLO	n, s=green-Ampt, 4=Repeat	
	77.000	SCS Curve No	o or C			
	7.587	Initial Abst	raction	1		
	1	Option 1=Tr:	ianglr;	2=Rectar	nglr; 3=SWM HYD; 4=Lin. R	eserv
		130 .799	, ,	.598	C perv/imperv/total	
15	ADD RUNO	7F 0.01		000	000 a m/a	
27	HYDROGRAI	PH DISPLAY	-	.000	.000 с.ш/з	
	5 is i	<pre># of Hyeto/Hyd = 1907682E+0</pre>	drograph	ı chosen		
10	POND	.190700221				
	9 Depth -	Discharge - V	/olume :	sets 0		
	175.350	.0310	171	3.0		
	175.600	.0400	2740	5.0		
	175.850	.0829	3893	3.0		
	176.350	.0830	6538	3.0 4 0		
	176.750	.233	8999	9.0		
	176.850 Peak Out	.473 flow =	966	3.0 m/s		
	Maximum I	Depth = 1'	75.306 r	netres		
	Maximum 8	Storage = 321 .821	1562. (.028	.000 c.m/s	
14	START					
35	L L=Ze COMMENT	ero; 2=Define				
	3 line	e(s) of commen	ıt			
	* MTO 2 1	FAR DESTGN S	ORM EVI	***** 2NT *		
	******	*****	*****	****		
2	STORM 1	1=Chicago;2:	Huff;3	-User;4=	Cdnlhr;5=Historic	
	397.149	Coefficient	а			
	.000	Constant b Exponent c	(m11	1)		
	.450	Fraction to	peak 1	c		
	240.000	Duration o 34.451 mm	240 min Total	ı depth		
3	IMPERVIO	JS				
	.015	Manning "n"	S CN/C;	2=Horto	n; 3=Green-Ampt; 4=Repeat	
	98.000	SCS Curve No	orC			
	.518	Initial Abst	raction	1		
35	COMMENT					
	*** FIELI	e(s) oi commen D - DRAINAGE A	AREA FX	***		
4	CATCHMEN	r TD N= 5 0000				
	3.440	Area in hect	ares			
	150.000	Length (PER)	7) metre	es		
	.500	Per cent Imp	, pervious	5		
	150.000	Length (IMP)	ERV)	- h		
	.000	ormp. with 5 Option 1=SCS	S CN/C;	2=Horton	n; 3=Green-Ampt; 4=Repeat	
	.250	Manning "n"	or a			
	.100	Ia/S Coeffic	ient			
	7.587	Initial Abst	raction	2=Pector	nalr: 3=SWM UVD: 4-tin D	AGA****
	± .(023 .000))	.028	.000 c.m/s	Caerv
15		204 .843 7F	L	.207	C perv/imperv/total	
10	.(.023	3	.028	.000 c.m/s	
11	CHANNEL	Base Width	=			
	3.000	Left bank :	slope :	1:		
	3.000	Right bank : Manning's "	slope : 1"	1:		
		-				

.500 1.000 Depth Velocity O/a Depth in metres Select Grade in % = .084 metres = .488 m/sec Flow Capacity = Critical depth = 1.222 c.m/s .067 metres 9 ROUTE Conduit Length 400.000 .489 307.501 .500 600.000 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep 2 No. of sub-reaches .023 .023 .023 .000 c.m/s .000 C.W/S .023 .023 .023 .000 c.m/S COMMENT 16 NEXT LINK 35 1 line(s) of comment *** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** CATCHMENT 1 000 ID No.ó 99999 - bectar 4 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=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 367 .023 .000 c.m/s 10.840 10.840 300.000 1.000 25.000 300.000 .000 .250 77.000 .100 7.587 1 .367 .023 .023 .000 c.m/s .204 .849 .365 C perv/imperv/total .367 ADD RINOFF .367 .370 .023 .000 c.m/s CHANNEL .300 Base Width = 3.000 Left bank slope 1: 3.000 Aight bank slope 1: 3.000 O/a Depth in metres 1.000 Select Grade in % Depth = .304 metres Velocity = 1.026 c.m/s Critical depth = .270 metres ROUTE 15 ADD RUNOFF 11 9 ROUTE ROUTE 200.000 .468 149.160 .500 150.000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep 1 No. of sub-reaches .367 .325 .370 .000 c.m/s 16 NEXT LINK .000 c.m/s 35 COMMENT 1 line(s) of comment *** MEADOW HEIGHTS - DRAINAGE AREA MH *** MEADOW HEIGHTS - DRAINAGE / CATCHMENT 1.000 ID No.6 99999 29.250 Area in hectares 00.000 Length (PERV) metres 2.000 Gradient (%) 35.700 Per cent Impervious 00.000 Length (IMPERV) 4 CATCHM 1.000 29.250 500.000 2.000 35.700 500.000 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. Reserv 95. 000 c m/c .000 .250 77.000 .100 7.587 1 1.385 .385 .325 .325 .000 c.m/s .204 .841 .431 C perv/imperv/total 15 ADD RUNOFF ADD KNNOFF 1.385 1.710 .325 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .5951403E+04 c.m 27 8 PTPE Minimum velocity m/sec Maximum velocity m/sec Pipe Manning's 'n' Diameter in metres Select Grade in % 1PE .500 2.920 .013 1.350 .600 Velocity = .605 metres Velocity = 2.750 m/sec Pipe Capacity = 4.134 c.m/s Critical depth= .692 metres Depth Velocity = Pipe Capacity = Critical depth= ROUTE 500.000 Conduit .442 Supply 136.363 Supply 500 Pata m Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor .500 Beta weighting factor 150.000 Routing timestep 1 No. of sub-reaches 1.385 1.710 1.493 .000 c.m/s COMBINE 1 Junction Node No. 1.385 1.710 1.493 1.493 c.m/s START 1 1-72000 C.C. 150.000 17 1 14 1=Zero; 2=Define 1 l=2eru, ... COMMENT 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA FUT *** 35 CATCHMENT ' ^^^ ID No.ó 99999 - hecta 4 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 14.230 400.000 3.000 70.000 400.000 %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .000 1

	.250	Manning "n	10. or (1			
	.100	Ia/S Coeff:	icient			
	7.587	Initial Abs	straction	n 2-D	-las 2-000 UND 4-1 in	D
	1.3	42 .00)0	2=Rectan 1.493	1.493 c.m/s	. Reserv
16	.2	04 .85	52	.657	C perv/imperv/total	
10	1.3	42 1.34	42	1.493	1.493 c.m/s	
27	HYDROGRAP	H DISPLAY	drograph	h abagan		
	Volume =	.3222296E-	+04 c.m	n chosen		
35	COMMENT					
	*** SITE	- EX FLOWS (DF 63 L/:	S DURING	2 YR ***	
10	POND	Dissbauer	17-1			
	174.850	.000	vorume	.0		
	175.350	.0310	171	3.0		
	175.760	.0800	346	0.0 7.0		
	175.850	.0829	389	3.0		
	176.350	.0830	653	8.0 4.0		
	176.750	.233	899	9.0		
	176.850 Peak Outf	.473 low =	966	3.0 c.m/s		
	Maximum D	epth = 3	175.591 1	metres		
	Maximum S	torage = 42 1.34	2711. (42	c.m .040	1.493 c.m/s	
17	COMBINE					
	1 June	tion Node No 42 1 34). 12	040	1 512 c m/s	
35	COMMENT	12 1.5		.010	1.512 0.00	
	1 line	(s) of comme	ent VS OF 15	12 T/S DI	DTNC 2 VD ***	
18	CONFLUENC	E EA FLO	15 OF 15.	12 1,5 00	KING Z IK	
	1 Junc	tion Node No	5. 12	040	000 a m/a	
14	START	42 1.5	12	.040	.000 C.m/S	
25	1 1=Ze	ro; 2=Define	2			
35	3 line	(s) of comme	ent			
	********	**********	*******	*****		
	* MTO 5 Y ********	EAR DESIGN :	STORM EV:	ENT * *****		
2	STORM					
	1 524.867	I=Chicago;; Coefficient	2=Huff;3: a	=User;4=C	dnlhr/5=Historic	
	.000	Constant 1	o (min	n)		
	.699	Exponent of Fraction to	n peak :	r		
	240.000	Duration ó	240 min	n		
3	IMPERVIOU	45.530 mm S	Total	depth		
	1	Option 1=S0	CS CN/C;	2=Horton	; 3=Green-Ampt; 4=Repe	eat
	.015 98.000	Manning "n' SCS Curve 1	No or C			
	.100	Ia/S Coeff:	icient			
35	.518 COMMENT	Initial Abs	straction	n		
	1 line	(s) of comme	ent			
4	CATCHMENT	- DRAINAGE	AREA FX	***		
	1.000	ID No.ó 999	999			
	3.440	Area in hee Length (PE	ctares RV) metro	A 9		
	1.000	Gradient (t)			
	.500	Per cent In Length (IM	nperviou:	S		
	.000	%Imp. with	Zero Dp	th		
	250	Option 1=S0	CS CN/C;	2=Horton	; 3=Green-Ampt; 4=Repe	eat
	77.000	SCS Curve 1	No or C			
	.100	Ia/S Coeff:	icient	n		
	1.587	Option 1=Ti	rianglr;	2=Rectan	glr; 3=SWM HYD; 4=Lin	. Reserv
	.0	55 .00	00	.040	.000 c.m/s	
15	ADD RUNOF	78 .85 F	29	.280	C perv/imperv/total	
	.0	55 .05	55	.040	.000 c.m/s	
11	.300	Base Width	=			
	3.000	Left bank	slope	1:		
	.030	Manning's	"n"	1.		
	.500	0/a Depth :	in metre	s		
	1.000 Depth	Select Grad	1e 1n % .129 m	etres		
	Velocity	=	.616 m	/sec		
	Flow Capa Critical	city = depth =	1.222 c	.m/s etres		
9	ROUTE					
	400.000	Conduit Lei Supply X-fa	ngth actor <.!	5		
	487.040	Supply K-la	ag (sec)			
	.500	Beta weight Routing tir	ing fac mestep	tor		
	1	No. of sub-	-reaches			
16	. U NEXT LINK	55 .05	55	.053	.000 c.m/s	
	. 0	55 .05	53	.053	.000 c.m/s	
35	COMMENT 1 line	(s) of comme	ent			
	*** EXIST	ING RESIDEN	FIAL - DI	RAINAGE A	REA WT ***	
4	1.000	ID No.ó 999	999			
	10.840	Area in he	tares			
	1.000	Gradient (S	ະv, metro ຮ)	e5		
	25.000	Per cent In	mperviou	s		
	000.000 .000	Length (IM) %Imp. with	Zero Dp	th		
	1	Option 1=S0	CS CN/C;	2=Horton	; 3=Green-Ampt; 4=Repe	eat
	.250	Manning "n' SCS Curve 1	No or C			
	.100	Ia/S Coeff:	icient			

Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .515 .053 .053 .000 c.m/s .278 .884 .429 C perv/imperv/total 7.587 15 .053 .000 c.m/s 11 0/a Depth in metres 1.000 Select Grade in % Depth = .352 metres Velocity = 1.098 m/sec Flow Capacity = 1.222 c.m/s Critical depth = .317 metres ROUTE 200.000 Conduit Lence* 9 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .515 .525 .4' .463 136.564 .500 120.000 1 .476 .000 c.m/s .515 .525 .476 .000 c.m/s NEXT LINK .515 .476 .476 .000 c.m/s COMMENT 16 COMMENT 1 line(s) of comment *** MEADOW HEIGHTS - DRAINAGE AREA MH *** CATCHMENT 1.000 ID No.6 99999 29.250 Area in hectares 500,000 35 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Ouvies No. c. C. 500.000 2.000 35.700 500.000 .250 77.000 SCS Curve No or C Ia/S Coefficient .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option l=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 1.941 .476 .000 c.m/s .278 .882 .493 C perv/imperv/total ADD RUNOFF 1.941 2.416 .476 .000 c.m/s .100 15 2.416 .476 .000 c.m/s Volume = .9127035E+04 c.m 27 PIPE .500 Minimum velocity m/sec Maximum velocity m/sec Dime Manning's 'n' 2.920 2.920 Maximum velocity m/sec .013 Pipe Manning's 'n' 1.350 Diameter in metres .600 Select Grade in % Depth = .741 metres Velocity = 3.000 m/sec Pipe Capacity = 4.134 c.m/s Critical depth= .829 metres POUTCE 9 ROUTE 500.000 Conduit Length .424 Supply X-factor <.5 124.986 Supply K-lag (sec) .500 Beta weighting factor 120.000 Routing timestep 1 No. of sub-reaches ROUTE 1 No. of sub-reaches
 1
 NO. OF SUD-Feaches

 1.941
 2.416
 2.180
 .000 c.m/s

 FILE HYDROGRAPH
 2.1820
 .000 c.m/s
 .000 c.m/s

 1
 1=READ: 2=WRITE
 .001 c.m/s
 .001 c.m/s
 .001 c.m/s

 3
 1=0verland: 2=Inflow: 3=0utflow: 4=Temp'ary
 1.844
 .428
 2.086
 2.086 c.m/s

 1.941
 2.416
 2.180
 .000 c.m/s
 .000 c.m/s
 22 1.941 COMBINE 0 Junction Node No. 1.941 2.416 2.180 2.180 c.m/s START 1 1=Zero; 2=Define 17 14 35 . line(s) of comment *** ROSEDALE - DRAINAGE AREA RD *** 4 CATCHMENT T ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 1.000 12.770 400.000 2.000 70.000 Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; Z=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Difial Abstraction 400.000 .000 .250 77.000 15 27 35 *** SITE - EX FLOWS OF 147 L/S DURING 5 YR *** 10 POND 9 Depth - Discharge - Volume sets 9 Depth - Discharge - Vo. 174.850 .000 175.350 .0310 175.600 .0400 175.760 .0800 175.850 .0829 176.350 .0830 176.550 .0831 .0 1713.0 2746.0 3467.0 3893.0 6538.0 .0831 176.650 176.750 8354.0 .233 8999.0

Upper Canada Consultants

176.850 .473 9663.0 176.850 .473 9663.0 Peak Outflow = .072 c.m/s Maximum Depth = 175.729 metres Maximum Storage = .3327. c.m 1.643 1.643 .072 FILE HYDROGRAPH 2.180 c.m/s 22 1=READ: 2=WRITE ROSEDAL .5YR
 RAILD
 J-MAIL

 ROSEDAL
 .5YR
 is Filename

 1=0verland:
 2-Inflow:
 3=0utflow:
 4=Temp'ary

 1.844
 .428
 2.086
 2.086 c.m/s

 1.643
 1.643
 .072
 2.180 c.m/s
 ŝ 17 COMBINE 0 Junction Node No. .072 2.206 c.m/s 1.643 1.643 35 18 14 . 1=Zero; 2=Define COMMENT 3 line(s) of comment 35 * MTO 10 YEAR DESIGN STORM EVENT * 2 STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Constant b (min) Exponent c 608 845 .000 Fraction to peak r 450 240.000 Duration ó 240 min 52.815 mm Total depth 3 IMPERVIOUS S Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C .015 98.000 .100 Ia/S Coefficient .518 Initial Abstraction 35 COMMENT l line(s) of comment *** FIELD - DRAINAGE AREA FX *** 1 CATCHMENT 1.000 ID No.ó 99999 3.440 Area in hectar Area in hectares Length (PERV) metres 150.000 Lengtn (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; Z=Horton; 3=Green-Ampt; 4=Repeat Manning "n" COL Ourse No. or C 1.000 500 150.000 250 77.000 SCS Curve No or C SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .079 .000 .072 .000 c.m/s .320 .878 .322 C perv/imperv/total wrep .100 7 587 15 ADD RUNOFF .079 .072 .079 .000 c.m/s CHANNEL 11 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres .300 3.000 3.000 .030 .sud O/a Depth in metres 1.000 Select Grade in % Depth = .154 metres Velocity = .679 m/sec Plow Capacity = 1.222 c.m/s Critical depth = .129 metres 9 ROUTE Conduit Length 400.000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .079 .079 .077 NK .491 441.992 500 300.000 1 .000 c.m/s 16 NEXT LINK .079 COMMENT .000 c.m/s .077 .077 35 COUPLENI 1 line(s) of comment *** EXISTING RESIDENTIAL - DRAINAGE AREA WT *** CATCHMENT 1.000 ID No.6 99999 4 10.840 Area in hectares 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 Magning ** 300.000 25.000 300.000 .000 250 Manning "n" 77.000 SCS Curve No or C 100 Ia/S Coefficient Ia/S Coefficient
Initial Abstraction
Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
.613 .077 .000 c.m/s
.320 .897 .464 C perv/imperv/total
.ven 7.587 15 ADD RUNOFF .632 .077 .613 .000 c.m/s CHANNEL 11 Base Width = Left bank slope 1: Right bank slope 1: .300 3.000 3.000
 3.000
 Manning's *n*

 .030
 Manning's *n*

 .500
 O/a Depth in metres

 1.000
 Select Grade in %

 Depth
 =

 .81 metres

 Velocity
 =

 Flow Capacity
 =

 .222 c.m/s

 Critical depth
 =

 .344 metres
 9 ROUTE Conduit Length 200.000

.460 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep 130.387 500 120.000 No. of sub-reaches 1 .579 .000 c.m/s .613 .613 NEXT LINK .613 COMMENT 16 .579 .579 .000 c.m/s 35 l line(s) of comment *** MEADOW HEIGHTS - DRAINAGE AREA MH *** CATCHMENT ID No.ó 99999 1.000 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* 29.250 29.250 500.000 2.000 35.700 500.000 .000 .250 SS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 77.000 7.587 1 2.305 2.305 .579 .579 .000 c.m/s .320 .898 .526 C perv/imperv/total ADD RUNOFF 15 2.884 .579 2.305 .000 c.m/s L305 2.864 .5/9
HYDROGRAPH DISPLAY
5 is # of Hyeto/Hydrograph chosen
Volume = .1136950E+05 c.m 27 8 PIPE Minimum velocity m/sec .500 2.920
 2.920
 Maximum velocity m/se

 .013
 Pipe Manning's 'n'

 1.350
 Diameter in metres

 .600
 Select Grade in %

 Depth
 =
 .830 metres

 Velocity
 =
 3.123 m/sec

 Pipe Capacity =
 4.134 c.m/s
 Critical depth=

 ROUTE
 .908 metres
 Maximum velocity m/sec 1.350 .600 Depth ROUTE 500.000 .407 120.096 9 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor .500 120.000 Routing timestep 1 No. of sub-reaches 05 2.884 2.637 .000 c.m/s 2.305 2.305 2.684 2.637 .000 c.m/s 2.305 2.637 2.637 .000 c.m/s COMMENT 16 35 COMMENT 1 line(s) of comment ** DIVERSION OF 5 YEAR FLOWS + 15% TO STORM SEWER ** 2180L/S + 15% = 2507L/S ** ** ALL FLOWS GREATER THAN THE 5YR+15% DIRECTED TO WETPOND ** ** ALL FLOWS GREATER THAN THE DIRECTAD DIVERT 1 U/S Node No.6 99999 2.507 Threshold Discharge 2.507 Max. Outflow reqd. Cmax & Vol.Diverted = .130 c.m/s The Comparison of 12 78.1 c.m No flow diverted 2.305 2.637 2.507 .000 c.m/s COMBINE 17 COMBINE 1 Junction Node No. 2.305 2.637 FILE HYDROGRAPH 2.507 2.507 c.m/s 22 FILE HYDROGRAPH 1 1=READ: 2=WRITE DIV00001.010 is Filename 2 1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary 2.305 .130 2.507 2.507 c.m/s COMMENT 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA FUT *** 12 2 35 *** KOSL_ CATCHMENT ' 000 ID No.ó 99999 '- bectai 4 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 12.770 400.000 3.000 70.000 Length (IMPERV) 400.000 Length (IMPEXV) %Inp. with Zero Dpth Option 1=SCS (N/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Greinerle: 2=County 12=County 14=Lin Pr .000 . 250 .250 77.000 .100 7.587 Option l=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .861 .130 2.507 2.507 c.m/s .320 .893 .721 C perv/imperv/total 1 1.861 .320 .893 .721 C perv/imperv ADD RUNOFF 1.861 1.991 2.507 2.507 c.m/s HYDRORRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .4940556E+04 c.m COMMENT 15 27 35 line(s) of comment *** SITE - EX FLOWS OF 225 L/S DURING 10 YR *** POND 9 Depth - Discharge - Volume sets 10 174.850 .000 175.350 .0310 175.600 .0400 .0 1713.0 2746.0 175.850 175.850 176.350 176.650 .0800 3467.0 3893.0 .0829 .0830 6538.0 8354.0 176.750 .233 8999.0

 176.850
 .473
 50000000

 Peak Outflow
 =
 0.83 c.m/s

 Maximum Depth
 =
 175.870 metres

 Maximum Storage
 4001. c.m
 .083

 1.861
 1.991
 .083
 2.507 c.m/s

 COMBINE
 1
 Junction Node No.
 1.861
 1.991
 .083
 2.540 c.m/s

 17 1

35	COMMENT					
	1 line *** OVER	e(s) of c	omment FLOWS OF 2	707 T./S F	NIRING 10 VR **	*
18	CONFLUENC	CE DI	1 20110 01 1		011110 10 11	
	1 Juno	tion Nod	e No.	0.00		
14	START	561	2.540	.083	.000 C.m/s	
	1 1=Ze	ero; 2=De	fine			
35	COMMENT 3 line	a(e) of a	omment			
	*******	******	********	******		
	* MTO 25	YEAR DES	IGN STORM	EVENT *		
2	STORM	******	********	******		
-	1	l=Chica	go;2=Huff;	3=User;4=	Cdnlhr;5=Histor	ic
	715.568	Coeffic	ient a			
	.699	Exponen	tc (ii	1111)		
	.450	Fractio	n to peak	r		
	240.000	Duratio	nő 240 m m Tota	l denth		
3	IMPERVIOU	JS		ucpen		
	1	Option	1=SCS CN/C	2; 2=Horto	n; 3=Green-Ampt	; 4=Repeat
	.015	Manning SCS Cur	"n" ve No or (,		
	.100	Ia/S Co	efficient			
25	.518	Initial	Abstracti	on		
35	1 line	e(s) of c	omment			
	*** FIELI	D - DRAIN	AGE AREA F	X ***		
4	CATCHMENT	r				
	3.440	Area in	hectares			
	150.000	Length	(PERV) met	res		
	1.000	Gradien	t (%)			
	150.000	Length	(IMPERV)	ous		
	.000	%Imp. w	ith Zero I	pth		
	1	Option	1=SCS CN/C	2: 2=Horto	n; 3=Green-Ampt	; 4=Repeat
	77.000	SCS Cur	ve No or C	2		
	.100	Ia/S Co	efficient			
	7.587	Initial	Abstracti	on : 2-Regta	nalr: 3-SMM UVD	: 4-Lin Peceru
	. I	L27	.000	.083	.000 c.m/s	/ 4-bin. Reserv
		367	.898	.369	C perv/imperv	/total
15	ADD RUNOR	27	.127	.083	.000 c.m/s	
11	CHANNEL					
	.300	Base Wi	dth =			
	3.000	Right b	ank slope	1:		
	.030	Manning	's "n"			
	.500	0/a Dep	th in metr Grade in 8	es		
	Depth	serect =	.190	metres		
	Velocity	=	.766	m/sec		
	Flow Capa Critical	denth -	1.222	c.m/s		
9	ROUTE	depen -	.102	incer co		
	400.000	Conduit	Length			
	.489	Supply	X-Iactor < K-lag (sec	1)		
	.500	Beta we	ighting fa	ictor		
	300.000	Routing	timestep			
	.1	L27	.127	.122	.000 c.m/s	
16	NEXT LINE	C				
35	COMMENT	127	.122	.122	.000 c.m/s	
55	1 line	e(s) of c	omment			
4	*** EXIST	TING RESI	DENTIAL -	DRAINAGE	AREA WT ***	
4	1.000	ID No.ó	99999			
	10.840	Area in	hectares			
	300.000	Length	(PERV) met + (%)	res		
	25.000	Per cen	t Impervio	ous		
	300.000	Length	(IMPERV)			
	.000	%⊥mp. w Option	1th Zero L 1=SCS CN/C	ptn 1; 2=Horto	n; 3=Green-Ampt	; 4=Repeat
	.250	Manning	"n"		- -	
	77.000	SCS Cur	ve No or C efficient	2		
	7.587	Initial	Abstracti	.on		
	1	Option	1=Trianglr	; 2=Recta	nglr; 3=SWM HYD	; 4=Lin. Reserv
		/42 367	.122	.122	.000 C.m/s C perv/imperv	/total
15	ADD RUNOR	F			- p,p	,
		742	.775	.122	.000 c.m/s	
11	.300	Base Wi	dth =			
	3.000	Left b	ank slope	1:		
	3.000	Right b	ank slope 's "n"	1:		
	.500	0/a Dep	th in metr	es		
	1.000	Select	Grade in %	:		
	Velocity	=	1.211	metres m/sec		
	Flow Capa	acity =	1.222	c.m/s		
0	Critical	depth =	.377	metres		
5	200.000	Conduit	Length			
	.457	Supply	X-factor <	.5		
	123.848	Supply Beta Wo	K-lag (sec	:)		
	120.000	Routing	timestep			
	1	No. of	sub-reache	s	000	
16	NEXT LINK	/42 (.775	.720	.000 c.m/s	
		742	.720	.720	.000 c.m/s	
35	COMMENT	(a) -f	ommor +			
	*** MEADO	:(S) OI C DW HEIGHT	S - DRAINA	GE AREA M	H ***	
4	CATCHMENT	с				
	1.000	ID No.ó	99999 bectarec			
		TT BOALT	ures			

500.000 Length (PERV) metres 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 2.000 35.700 500.000 .000 . 250 Manning "n" 77.000 SCS Curve No or C SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv 2.767 .720 .000 c.m/s .367 .911 .561 C perv/imperv/total 100 7.587 ADD RUNOFF 15 3.486 .720 .000 c.m/s 2.767 HYDROGRAPH DISPLAY
5 is # of Hyeto/Hydrograph chosen
Volume = .1435674E+05 c.m 27 8 PIPE .500 Minimum velocity m/sec Maximum velocity m/sec 2.920 Maximum velocity m/sec .013 Pipe Manning's 'n' 1.350 Diameter in metres .600 Select Grade in % Depth = .950 metres Velocity = 3.238 m/sec Pipe Capacity = 4.134 c.m/s Critical depth= .999 metres ROUTRE .013 1.350 .600 Depth ROUTE 500.000 .377 115.797 9 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor .500 120.000 Routing timestep No. of sub-reaches 2.767 3.486 3.226 1 .000 c.m/s 2.767 3.486 3.226 .000 C.m/s 2.767 3.226 3.226 .000 c.m/s COMMENT 16 CUMMENT 5.226 .000 c.m/s CUMMENT 5.226 .000 c.m/s 1 line(s) of comment ** DIVERSION 0F 5 YEAR FLOWS + 15% TO STORM SEWER ** ** 2180L/S + 15% = 2507L/S ** ** ALL FLOWS GREATER THAN THE 5YR+15% DIRECTED TO WETPOND ** DIVERT 1 U/S Node No.6 99999 2.507 Threshold Discharge 2.507 ** 35 12 RT 1 U/S Node No.6 99999 7 Threshold Discharge 7 Max. Outflow regd. Qmax & Vol.Diverted = .719 c.m/s 431.6 c.m 2.507
 Qmax & vol.luverted =
 .19 c.m/s
 43

 No flow diverted
 2.767
 3.226
 2.507
 .000 c.m/s

 COMEINE
 1
 Junction Node No.
 2.767
 3.226
 2.507
 2.507 c.m/s

 PILE HYDROGRAPH
 2.507
 2.507 c.m/s
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 1</td 17 22 FILE HYDROGRAPH 1 aFRAD: 2=WRITE 1 aFRAD: 2=WRITE 2 DIV00001.025 is Filename 2 1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary 2.767 .719 2.507 2.507 c.m/s COMMENT 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA FUT *** CONCUMENT 12 35 *** KUSELL. CATCHMENT ' ^^^ ID No.ó 99999 4 CATCHM 1.000 12.770 400.000 3.000 70.000 400.000 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 CM/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. Reserv 2.199 .719 2.507 2.507 c.m/s .367 .901 .740 C perv/imperv/total NOFF .000 .250 77.000 .100 7.587 1 2.199 .367 .901 .740 C perv/imper ADD RUNOFF 2.199 2.918 2.507 2.507 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .6300912E+04 c.m COMMENT 15 27 35 COMMENT *** SITE - EX FLOWS OF 331 L/S DURING 25 YR *** **** SITE - EX FLOWS OF 551 2... POND 9 Depth - Discharge - Volume sets 174.850 .000 .0 175.350 .0310 1713.0 175.600 .0400 2746.0 175.760 .0800 3467.0 175.850 .0829 3493.0 176.350 .0830 6538.0 176.650 .0831 8354.0 176.750 .233 8999.0 10
 175.350
 .0310
 1713.0

 175.600
 .0400
 2746.0

 175.760
 .0800
 3467.0

 175.750
 .0829
 3893.0

 176.350
 .0830
 6538.0

 176.350
 .0831
 8354.0

 176.750
 .233
 899.0

 176.850
 .473
 9663.0

 176.850
 .473
 9663.0

 176.850
 .473
 9663.0

 176.850
 .473
 9663.0

 176.75
 .233
 899.0

 176.76
 .233
 .083

 CMMAINE Depth
 =
 .083 c.m/s

 Maximum Depth
 =
 176.107 metrzes

 Maximum Depth
 2.918
 .083

 COMBINE
 1
 Junction Node No.

 2.199
 2.918
 .083
 2.507 c.m/s 17 .083 2.199 2.918 2.545 c.m/s COMMENT 35 COMMENT 1 line(s) of comment *** OVERALL - EX FLOWS OF 3340 L/S DURING 25 YR *** CONFLUENCE 1 Junction Node No. 2.199 2.545 .083 .000 c.m/s 18 14 START 1=Zero; 2=Define 35 COMMENT line(s) of comment * MTO 50 YEAR DESIGN STORM EVENT * 2 STORM

	794.298	Coefficient	: a	00001/1-00		
	.000	Constant k Exponent of) (min	1)		
	.450	Fraction to	opeak r	,		
	240.000	Duration ó	240 min Total	denth		
3	IMPERVIOU	IS				
	.015	Option 1=S0 Manning "n'	S CN/C;	2=Horton;	3=Green-Amp	t; 4=Repeat
	98.000	SCS Curve 1	No or C			
	.100	Ia/S Coeffi Initial Abs	.cient			
35	COMMENT	initial Aba	,craction			
	1 line	(s) of comme	ant	***		
4	CATCHMENI) - DRAINAGE	AREA FA			
	1.000	ID No.ó 999	99			
	3.440	Length (PEF	∶tares RV) metre	s		
	1.000	Gradient (1	5)			
	.500	Per cent In Length (IM	Npervious			
	.000	%Imp. with	Zero Dpt	h		
	250	Option 1=SC	lS CN/C;	2=Horton;	3=Green-Amp	t; 4=Repeat
	77.000	SCS Curve 1	lo or C			
	.100	Ia/S Coeffi	lcient			
	1.587	Option 1=Th	; ianglr;	2=Rectang	lr; 3=SWM HY	D; 4=Lin. Reserv
	.1	.61 .00	00	.083	.000 c.m/s	
15	ADD RUNOF	97 .90 F)9	.400	C perv/imper	v/total
	.1	.61 .16	51	.083	.000 c.m/s	
11	CHANNEL 300	Base Width	=			
	3.000	Left bank	slope 1	:		
	3.000	Right bank	slope 1	:		
	.500	0/a Depth i	in metres			
	1.000	Select Grad	ie in %			
	Velocity	=	.211 me .814 m/	sec		
	Flow Capa	city =	1.222 c.	m/s		
9	Critical ROUTE	depth =	.182 me	tres		
	400.000	Conduit Ler	ıgth			
	.488	Supply X-fa	actor <.5			
	.500	Beta weight	ing fact	or		
	300.000	Routing tim	nestep			
	.1	.61 .16	51	.154	.000 c.m/s	
16	NEXT LINK	61 10	- 4	164	000 a m/a	
35	COMMENT	.01 .13)4	.154	.000 C.m/s	•
	1 line	(s) of comme	ent pp			
4	CATCHMENT	ING RESIDENT	IAL - DR	AINAGE AR	EA WI ***	
	1.000	ID No.ó 999	999			
	10.840	Area in heo Length (PEF	:tares ?V) metre	s		
	1.000	Gradient (\$)			
	25.000	Per cent In	apervious			
	.000	%Imp. with	Zero Dpt	h		
	250	Option 1=S0 Manning "n	IS CN/C;	2=Horton;	3=Green-Amp	t; 4=Repeat
	77.000	SCS Curve 1	No or C			
	.100		cient			
	7 607	Ia/S Coeffi	1 E 10 O C E 1 O D			
	7.587 1	Ia/S Coeffi Initial Abs Option 1=Tr	ianglr;	2=Rectang	lr; 3=SWM HY	D; 4=Lin. Reserv
	7.587	Ia/S Coeffi Initial Abs Option 1=Th 41 .15	straction sianglr; 54 7	2=Rectang .154	lr; 3=SWM HY .000 c.m/s	D; 4=Lin. Reserv
15	7.587 1 .8 .3 ADD RUNOF	Ia/S Coeffi Initial Abs Option 1=Tr 41 .15 97 .91 'F	straction rianglr; 54 17	2=Rectang .154 .527	lr; 3=SWM HY .000 c.m/s C perv/imper	D; 4=Lin. Reserv v/total
15	7.587 1 .8 ADD RUNOF .8	Ia/S Coeffi Initial Abs Option 1=Tr 441 .15 97 .91 'F 441 .88	straction rianglr; 54 17 38	2=Rectang .154 .527 .154	lr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	D; 4=Lin. Reserv v/total
15 11	7.587 1 .8 ADD RUNOF .8 CHANNEL .300	Ia/S Coeffi Initial Abs Option 1=Tr 841 .15 97 .91 'F '41 .88 Base Width	straction rianglr; 54 17 38 =	2=Rectang .154 .527 .154	lr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	D; 4=Lin. Reserv v/total
15 11	7.587 1 .8 ADD RUNOF .8 CHANNEL .300 3.000	Ia/S Coeffi Initial Abb Option 1=Th 41 .11 97 .91 F 41 .86 Base Width Left bank	straction rianglr; 54 17 38 = slope 1	2=Rectang .154 .527 .154	lr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	D; 4=Lin. Reserv v/total
15 11	7.587 1 .3 ADD RUNOF .8 CHANNEL .300 3.000 3.000 .030	Ia/S Coeffi Initial Abb Option 1=Th 41 .11 97 .91 F 41 .88 Base Width Left bank Manning's '	straction rianglr; 54 17 38 = slope 1 slope 1 'n"	2=Rectang .154 .527 .154 .154 :	(lr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	D; 4=Lin. Reserv v/total
15 11	7.587 1 .8 ADD RUNOF .8 CHANNEL .300 3.000 3.000 .030 .500	Ia/S Coeffi Initial Abo Option 1=Tr 41 .11 197 .91 F 41 .86 Base Width Left bank Right bank Manning's ' O/a Depth i	straction rianglr; 54 17 38 = slope 1 slope 1 'n" .n metres	2=Rectang .154 .527 .154 :	(lr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	D; 4=Lin. Reserv v/total
15	7.587 1 .8 .3 ADD RUNOEL .300 3.000 3.000 0.030 .500 1.000 Depth	Ia/S Coeffi Initial Abs Option 1=Tr 441 .11 1977 .91 Fr 441 .88 Base Width Left bank Right bank Manning's ' O/a Depth is Select Grae	straction rianglr; 54 17 38 = slope 1 slope 1 'n" .n metres le in % .439 me	2=Rectang .154 .527 .154 : :	llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	D; 4=Lin. Reserv v/total
15	7.587 1 .8 .3 ADD RUNOE .8 CHANNEL .300 3.000 3.000 .030 .500 1.000 Depth Velocity	IA/S Coeffi Initial Abb Option 1=Tr 141 .11 197 .97 F 41 .68 Base Width Left bank Manning's ' O/a Depth i Select Grac = =	straction rianglr; 54 17 38 = slope 1 slope 1 'n" in metres de in % .439 met 1.253 m/	2=Rectang .154 .527 .154 : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15	7.587 1 .3 ADD RUNOF .8 CHANNEL .300 3.000 3.000 .500 1.000 Depth Velocity Flow Capac Critical	IA/S Coeffi Initial Abs Option 1=Th 141 .11 197 .97 79 79 744 .86 8 8 8 8 8 9 7 7 8 141 .66 8 8 8 8 9 7 8 141 .66 8 8 8 8 9 7 9 7 9 7 9 7 9 7 9 7 9 7 9 7	straction rianglr; 54 17 38 = slope 1 slope 1 'n" in metress ie in % .439 me 1.253 m/ 1.222 c. .400 me	2=Rectang .154 .527 .154 : : : : sec m/s :tres	<pre>ilr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9	7.587 1 .8 .3 ADD RUNOF .8 CHANNEL .300 3.000 3.000 .030 .030 .030 .500 1.000 Depth Velocity Flow Capa Critical ROUTE	Ia/S Coeff; Initial Abs Option 1=TD 141 .15 197 .99 FF .41 .88 Base Width Left bank Right bank Manning's ' O/a Depth i Select Gace = city = depth =	straction rianglr; 54 17 38 = slope 1 slope 1 'n" in metres ie in % .439 me 1.253 m/ 1.222 c. .400 me	2=Rectang .154 .527 .154 : : : sec m/s tres	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9	7.587 1 3.3 ADD RUNOF CHANNEL .300 3.000 .030 .500 1.000 Depth Velocity Flow Capa Critical ROUTE 200.000 455	Ia/S Coeffi Initial Abs Option 1=Th 141 .15 197 .91 FF	straction rianglr; 54 17 38 = slope 1 slope 1 slope 1 in metres le in % .439 me 1.253 m/ 1.222 c. .400 me	2=Rectang .154 .527 .154 : : : : sec m/s : tres	lr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	D; 4=Lin. Reserv v/total
15 11 9	7.587 1 3 ADD RUNOF 3.000 3.000 3.000 1.000 Depth Velocity Flow Capa Critical ROUTE 200.000 .455 119.694	Ia/S Coeffi Initial Abs Option 1=T1 141 .11 197 .91 7F .41 .661 Base Width Left bank Manning's ' O/a Depth i Select Grac = city = depth = Conduit Ler Supply X-Ia Supply K-Ia	straction rianglr; 54 17 38 = lope 1 slope 1 'n" in metres le in % .439 me 1.253 m/ 1.252 c. .400 me ugth cctor <.5 g (sec)	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : :	lr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s	D; 4=Lin. Reserv v/total
15 11 9	7.587 1 3. ADD RUNOF .8 CHANNEL .300 3.000 3.000 1.000 Depth Velocity Flow Capa Critical ROUTE 200.000 .455 119.694 .500	Ia/S Coeffi Initial Abd Option 1=T3 197 .91 F Base Width Left bank Manning's ' J/a Depth i Select Grac = city = depth = Conduit Ler Supply X-Ia Beta weight	straction rianglr; 54 17 38 = lope 1 'n" in metres le in % .439 me 1.253 m/ 1.222 c. .400 me ugth cctor <.5 ig (sec) ing fact	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>lr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9	7.587 . 8 . 3 ADD RUNNOE . 3 CHANNEL . 300 . 300 . 300 . 500 1.000 Depth Velocity Flow Capa Critical ROUTE 200.000 . 454 . 500 120.000 1	IA/S Coeffi Initial Abs Option 1=TD 141 .1; 197 .97 FF 141 .88 Base Width Left bank Manning's ' O/a Depth ' Select Grac = city = depth = Conduit Ler Supply X-fa Supply X-fa S	straction cianglr; 54 17 38 = slope 1 slope 1 'n" in metres le in % .439 me 1.253 m/ 1.222 c. .400 me gth ctor <.5 ug (sec) ing fact westep reaches	2=Rectang .154 .527 .154 : : : : sec m/s ttres or	<pre>ilr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9	7.587 . 8 . 3 ADD RUNNOR . 300 . 300 . 300 . 500 . 030 . 500 . 030 . 500 . 030 . 030 . 000 Depth Velocity Flow Capa Critical ROUTE 200.000 . 455 119.694 . 500 120.000 . 8 . 8 . 8 . 9 . 9 . 9 . 9 . 9 . 9 . 9 . 9	IA/S Coeffi Initial Abs Option 1=TD 141 .1; 197 .97 FF 441 .88 Base Width Left bank Right bank Right bank Right bank Right bank Right bank Select Grac = ccity = depth = Conduit Ler Supply X-fa Supply X-fa Supply X-fa Supply X-fa Supply X-fa Supply K-fa Supply K-fa Supply K-fa Supply X-fa Supply K-fa Supply K-fa Suppl	straction sinaglr; 54 17 38 = 1 slope 1 slope 1 slope 1 slope 1 slope 1 1.253 m/ 1.222 c. .400 me ing fact step reaches 18	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>.lr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9	7.587 . 8 . 3 ADD RUNDE . 300 3.000 . 300 . 500 1.000 Depth Velocity Flow Capa Critical ROUTE 200.000 . 455 119.694 120.694 . 8 NEXT LINK . 8 . 8 . 8 . 8 . 8 . 8 . 8 . 8	IA/S Coeffi Initial Abs Option 1=TD 141 .1; 197 .9; FF Base Width Left bank Right bank Manning's ' O/a Depth i Select for Galet and the conduit Ler Supply X-fa Supply X-fa Su	straction rianglr; 54 17 38 = slope 1 in" in metres ie in % .439 me 1.253 m/ 1.222 c. .400 me gth 1.222 c. .400 me gth <. totor <. totor <. stop stop 1.222 c. .400 me gth <. stop 1.222 c. .400 me .225 m/ .225 m/ .235 m/	2=Rectang 154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35	7.587 . 8 . 3 ADD RUNOE . 300 3.000 . 300 . 500 1.000 Depth Velocity Flow Capa Critical ROUTE 200.000 . 455 119.694 . 500 . 200 . 8 NEXT LINK . 8 COMMENT . 8 . 8 . 8 . 8 . 8 . 8 . 8 . 8	Ia/S Coeffi Initial Abs Option 1=T1 141 .11 197 .91 7F .41 .864 Base Width Left bank Manning's ' 0/a Depth i Select Grac = city = depth = Conduit Ler Supply X-1c Beta weight Routing tin No. of sub- 141 .82	straction singlr; 54 17 38 = slope 1 n" in metres i. 439 me 1.253 m/ 1.222 c. . 400 me 9gth . .222 c. . 400 me sigh . .225 sig (sec) :ing fact uestep reaches 18	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35	7.587 1 3.4DD RUNOF 3.300 3.000 3.000 3.000 3.000 1.000 Depth Velocity Flow Capa Critical ROUTE 200.000 120.0000 120.000 120.0000 120.0000 120.0000 120.0000 120.0000 120.0000 120.00000 120.0000 120.00000 120.000	Ia/S Coeffi Initial Abd Option 1=T1 141 .11 197 .91 F Base Width Left bank Manning's " J(al Depth i Select Grac = city = depth = Conduit Ler Supply X-Li Beta weight No. of sub- 11 .84 (s) of comme HEIGHTS -	straction cianglr; f4 l7 slope 1 'n" in metres le in % .439 me l.253 m/ l.253 m/ l.252 d/ .400 me ustor <.5 ustor <.5 ustor <.5 g(sec) 'reaches % ustor eaches % ustor DRAINAGE	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv
15 11 9 16 35 4	7.587 	Ia/S Coeffi Initial Abd Option 1=T3 141 .11 197 .91 FF Base Width Left bank Manning's ' 0/a Depth ' Select Grac = city = depth = Conduit Ler Supply X-16 Beta weight Routing tim No. of sub 141 .82 : (s) of comme W HEIGHTS -	straction rianglr; f4 17 38 = slope 1 in" in metres is in % .439 me 1.253 m/ 1.222 c. .400 me igth kctor <.5 g (sec) ing fact nestep reaches 18 9 9 mt DRAINAGE	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35 4	7.587 . 8 . 3 ADD RUNNOE . 300 . 300 . 300 . 500 . 500 . 030 . 500 . 030 . 500 . 030 . 500 . 1000 Depth Velocity Flow Capa Critical ROUTE 200.000 . 455 119.694 . 500 120.000 . 8 . 8 COMMENT 1 line *** MEADC CATCIMMENT 1 line *** MEADC CATCIMMENT 1 .000 29.250	IA/S Coeffi Initial Abs Option 1=TD 141 .15 197 .97 FF 441 .88 Base Width Left bank Manning's ' O/a Depth i Select Grac = ccity = depth = Conduit Ler Supply X-fz Supply X-fz	straction cianglr; f4 17 38 = slope 1 slope 1 in" in metres is in % .439 me 1.253 m/ 1.252 m/ 1.252 m/ 1.252 c. .400 me sgth sctor <.5 ing fact step -reaches 38 !9 mt DRAINAGE 199 :tares	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35 4	7.587 . 8 . 3 ADD RUNNOE . 300 3.000 . 300 . 500 1.000 Depth Velocity Flow Capa Critical ROUTE 200.000 . 455 119.694 . 500 120.000 1 8 MEXT LINK . 200 . 20	IA/S Coeffi Initial Abs Option 1=TD 141 .1; 197 .97 F Hall .88 Base Width Left bank Right bank Right bank Right bank Right bank Select Gra = colty = depth = Conduit Ler Supply X-fa Supply X-fa Suppl	straction cianglr; f4	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35 4	7.587 . 8 . 3 ADD RUNDE . 300 3.000 . 300 . 500 1.000 Depth Velocity Flow Capp Critical ROUTE 200.000 . 455 119.694 . 8 NEXT LINK . 8 COMMENT 1 line *** MEADC CATCHMENT 1.000 29.250 500.000 2.000 35.700	Ia/S Coeffi Initial Abd Option 1=T1 141 .11 197 .91 7F .41 .681 Base Width Left bank Manning's ' 0/a Depth i Select Grac = city = depth = Conduit Ler Supply X-16 Supply X-16 Supply X-16 Supply X-16 .5 441 .82 (s) of comme W HEIGHTS - D No.6 995 Area in hec Length (PEF Gradient (PEF Gradient (PEF	straction cianglr; fagl	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35 4	7.587 . 8 . 3 ADD RUNOF . 300 3.000 . 300 . 500 1.000 Depth Velocity Flow Capa Critical ROUTE 200.000 . 455 119.694 . 500 . 500 . 1 . 8 NEXT LINK . 8 COMMENT 1 Line . 8 COMMENT 1 Line . 8 COMMENT 1 . 1000 29.250 500.000 2.000 500.000 . 2000 . 500 . 600 . 8 . 8 . 8 . 8 . 8 . 8 . 8 . 8	Ia/S Coeffi Initial Abd Option 1=TD 141 .11 197 .91 F Base Width Left bank Manning's ' 0/a Depth i Select Grac = city = depth = Conduit Ler Supply X-1c Beta weight No. of sub- 141 .82 (s) of comme W HEIGHTS - ' ID No.6 999 Area in hec Length (PEF Gradient (PEF Gradient (PEF	straction cianglr; ianglr; ianglr; slope 1 in" metres le in % .439 me 1.253 m/ 1.253 m/ 1.252 m/ 1.252 d/ .400 me uster reaches 38 29 mt DRAINAGE 199 ttares i) pervious Servious	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35 4	7.587 . 8 . 3 ADD RUNNOE . 3 CHANNEL . 3000 . 3000 . 3000 . 500 10000 Depth Velocity Flow Capa Critical ROUTE 200.000 . 455 119.694 . 500 120.000 1 000 . 8 MEXT LINK . 8 COMMENT 1 line *** MEADC CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 . 000 . 000	<pre>IA/S Coeffit Initial Abd Option 1=T1 101 tial Abd Option 1=T2 101 time 101 time</pre>	straction rianglr; f4 17 38 = slope 1 in" in metres is in performance in metres in metres in metres in metres ing factor ing ing ing ing ing ing ing ing ing ing	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s *** 3=Green-Amr</pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35 4	7.587 . 8 . 3 ADD RUNNOE . 300 . 3000 . 3000 . 500 . 500 . 030 . 500 . 030 . 500 . 1000 Depth Velocity Flow Capa Critical ROUTE 200.000 . 455 119.694 . 500 120.000 . 455 . 8 . 8 . 8 . 8 . 8 . 8 . 8 . 9 . 9 . 9 . 9 . 9 . 9 . 9 . 9	IA/S Coeffi Initial Abs Option 1=TD 141 .11 197 .92 FF 441 .84 Base Width Left bank Maning's ' O/a Depth i Select Grac = ccity = depth = Conduit Ler Supply X-fa Supply X-fa S	straction cianglr; f4 17 slope 1 in" in metres in metres in metres is in % .439 met 1.253 m/ 1.253 m/	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s </pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35 4	7.587 	IA/S Coeff; Initial Abs Option 1=TD 141 .1; 197 .91 F Hall .88 Base Width Left bank Manning's ' O/a Depth : Select far e could bank Manning's ' O/a Depth : Select Grad e could bank Supply K-fa Supply K-fa Suppl	straction cianglr; faglr; slope 1 slope 1 n" in metres is in % .439 me 1.253 m/ 1.253 m/ 1.25	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s ***</pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35 4	7.587 . 8 . 3 ADD RUNNOE . 300 3.000 . 300 . 500 1.000 Depth Velocity Flow Capa Critical ROUTE 200.000 . 455 119.694 . 500 120.000 1 . 8 MEXT LINK . 8 COMMENT 1 line *** MEADC CATCHMENT 1 line *** MEADC 500.000 29.250 500.000 29.250 500.000 29.250 500.000 29.250 500.000 29.250 500.000 29.250 500.000 29.250 500.000 1.250 77.000 . 100 7.587	Ia/S Coeffi Initial Abs Option 1=T1 141 .11 197 .91 7F .41 .68 Base Width Left bank Maning's ' O/a Depth i Select Grac = city = depth = Conduit Ler Supply X-1c Beta weight Routing tin No. of sub- 141 .82 (s) of comme w HEIGHTS - ' ID No.6 999 Area in hec Length (PE Gradient (PE	straction cianglr; faglr; faglr; slope 1 slope 1 n" in metres is in % .439 met. 1.253 m/ 1.253 m/ 1.25	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv v/total
15 11 9 16 35 4	7.587 . 8 . 8 . 3 ADD RUNDE . 300 3.000 . 300 . 500 . 030 . 500 . 030 . 500 . 030 . 500 . 030 . 500 . 030 . 500 . 1000 . 455 119.694 . 8 COMMENT . 1 line *** MEADC CATCHMENT 1 line *** MEADC CATCHMENT 1 line *** MEADC CATCHMENT 1 000 29.250 500.000 . 250 77.000 . 100 7.587 1 . 3 1 . 3 1	Ia/S Coeffi Initial Abd Option 1=T1 141 .11 197 .91 F Base Width Left bank Manning's ' 0/a Depth i Select Grac = conduit Ler Supply X-1c Beta weight Conduit Ler Supply X-1c Beta weight Routing tin No. of sub- 141 .82 (s) of comme W HEIGHTS - ' ID No.6 999 Area in hec Cradient (PEF Gradient (PEF Gradient (PEF Gradient (PEF Gradient (I Per cent In Length (IMM * Imp. with Option 1=SC Manning "m' IsCS Corre N Ia/S Coeffi Initial Abd	straction cianglr; ianglr; slope 1 in metres le in % .439 me 1.253 m/ 1.253	2=Rectang .154 .527 .154 : : : : : : : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s *** 3=Green-Amp llr; 3=SWM HY</pre>	D; 4=Lin. Reserv v/total t; t; t; 4=Repeat D; 4=Lin. Reserv
15 11 9 16 35 4	7.587 	IA/S Coeffi Initial Abd Option 1=T1 141 .11 197 .91 F Base Width Left bank Manning's ' 0/a Depth i Select Grac e city = cloty = depth = Conduit Ler Supply X-fa depth = Conduit Ler Supply X-fa Beta weight No. of sub- ti .1 .82 (s) of comme Gradient (A Per cent I Net Condit Ler Supply X-fa Beta weight No. of sub- ti .1 .83 (s) of comme Gradient (A Per cent I Der cent I Der cent I SCS Curve N IA/S Coeffi Initial Abd Option 1=SC Manning "n'	straction rianglr; ianglr; slope 1 slope 1 in" in metres is in the in % .439 me 1.253 m/ 1.253 m/ 1.252 d/ .400 me igth ing fact westep reaches ig (sec) ing fact mestep reaches ig (sec) ing fact mestep reaches is SCN/C; is On CC .cient itraction in or traction in or traction	2=Rectang 154 .527 .154 : : : : : : : : : : : : :	<pre>llr; 3=SWM HY .000 c.m/s C perv/imper .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s .000 c.m/s</pre>	D; 4=Lin. Reserv v/total t; t; t; t; 4=Repeat D; 4=Lin. Reserv v/total

3.111 3.940 .829 .000 c.m/s HYDROGRAPH DISPLAY
5 is # of Hyeto/Hydrograph chosen
Volume = .1664438E+05 c.m 27 8 PIPE Minimum velocity m/sec .500 Minimum Velocity m/sec Maximum velocity m/sec Pipe Manning's 'n' Diameter in metres Select Grade in % = 1.053 metres = 3.288 m/sec 2.920 .013 1.350 600 Depth Velocity Pipe Capacity = Critical depth= 4.134 c.m/s 1.060 metres 9 ROUTE ROUTE 500.000 .344 114.065 .500 120.000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 3.111 3.940 3.669 LINK 1 .000 c.m/s COMMENT COM 16 35 12 DIVERT 1 U/S Node No.6 99999 2.507 Threshold Discharge 2.507 Max. Outflow regd. Qmax & Vol.Diverted = 1.162 c.m/s 720.0 c.m No flow diverted 3.111 3.669 2.507 .000 c.m/s COMBINE 1 Junction Node No. 3.111 3.669 2.507 2.507 c.m/s FILE HYDROGRAPH 1 =READ: 2=WRITE 17 22 1=READ: 2=WRITE DIV00001.050 12 is Filename 12 DIV00001.050 is Filename 2 1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary 3.111 1.162 2.507 2.507 c.m/s COMMENT 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA FUT *** 35 *** KUSSE CATCHMENT ' 000 ID No.ó 99999 '> becta 4 1.000 12.770 400.000 3.000 70.000 ID No.ô 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 400.000 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/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. Reserv 2.448 1.162 2.507 2.507 c.m/s .398 .903 .752 C perv/imperv/total NOFF .000 .250 77.000 .100 7.587 1 2.448 15 ALD RUNOFF 2.448 3.610 2.507 2.507 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .7332710E+04 c.m COMMENT ADD RUNOFF 27 35 COMMENT 1 line(s) of comment
*** SITE - EX FLOWS OF 431 L/S DURING 50 YR ***
 POND
 9
 Depth - Discharge - Volume sets
 174.850
 .000
 .0
 10 .000 .0 .0310 1713.0 175.350 175.600 .0400 2746.0 175.760 3467.0 175.850 176.350 176.650 .0829 .0830 .0831 3893.0 6538.0 8354.0 176.750 176.850 .233 8999.0 1/6.850 .473 9663.0 Peak Outflow = .083 c.m/s Maximum Depth = 176.295 metres Maximum Storage = 6247. c.m 2.448 3.610 .083 COMBINE 1 Junction Node No. 2.448 3.610 .023 9663.0 2.507 c.m/s 17 - 3.610 .083 2.590 c.m/s COMMENT 1 line(s) of comment *** OVERALL - EX FLOWS OF 3824 L/S DURING 50 YR *** CONFLUENCE 1 Junction Node No. 2.448 2.590 .083 000 START 1 = 72000 35 18 14 1=Zero; 2=Define COMMENT 35 * MTO 100 YEAR DESIGN STORM EVENT * 2 STORM 1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic l=Chicago;2=Huff;3=User;4 Coefficient a Constant b (min) Exponent c Fraction to peak r Duration 6 240 min 75.581 mm Total depth Total depth 871.279 .000 .699 .450 240.000 3 IMPERVIOUS S Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction .015 98.000 .100 .518 35 COMMENT

	1 line((s) of comment	
4	CATCHMENT	DRAINAGE RICH FR	
	1.000	ID No.ó 99999	
	150.000	Length (PERV) metres	
	1.000	Gradient (%) Per cent Impervious	
	150.000	Length (IMPERV)	
	.000	%Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250	Manning "n"	
	77.000	SCS Curve No or C Ia/S Coefficient	
	7.587	Initial Abstraction	
	1.19	Option 1=TriangIr; 2=RectangIr; 3=SWM HYD; 4=Lin. Reserv 96 .000 .083 .000 c.m/s	
	.42	25 .917 .427 C perv/imperv/total	
15	ADD RUNOFF	96 .196 .083 .000 c.m/s	
11	CHANNEL		
	3.000	Hase Width = Left bank slope 1:	
	3.000	Right bank slope 1:	
	.500	O/a Depth in metres	
	1.000 Depth	Select Grade in %	
	Velocity	= .856 m/sec	
	Flow Capac Critical d	city = 1.222 c.m/s depth = .200 metres	
9	ROUTE		
	400.000	Conduit Length Supply X-factor <.5	
	350.564	Supply K-lag (sec)	
	300.000	Beta Weighting Tactor Routing timestep	
	1	No. of sub-reaches	
16	NEXT LINK	90 .190 .180 .000 C.m/S	
25	.19	96 .186 .186 .000 c.m/s	
55	1 line((s) of comment	
4	*** EXISTI	ING RESIDENTIAL - DRAINAGE AREA WT ***	
-	1.000	ID No.ó 99999	
	10.840	Area in hectares Length (PERV) metres	
	1.000	Gradient (%)	
	25.000	Per cent Impervious Length (IMPERV)	
	.000	%Imp. with Zero Dpth	
	.250	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n"	
	77.000	SCS Curve No or C	
	7.587	Initial Abstraction	
	1	Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv	
	02	24 186 186 000 cm/c	
	.92	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total	
15	.92 .42 ADD RUNOFF .92	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s	
15 11	.92 .42 ADD RUNOFF .92 CHANNEL	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s	
15 11	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1:	
15 11	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 3.000 3.000	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Numringi	
15 11	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 3.000 .030 .500	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres	
15	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 3.000 .030 .500 1.000 Depth	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % - 458 metres	
15	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 3.000 .030 .500 1.000 Depth Velocity	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec	
15	.92 42 ADD RUNOFF .92 CHANNEL .300 3.000 3.000 .500 1.000 Depth Velocity Flow Capac Critical d	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Maning's *n* O/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec rity = 1.222 c.m/s Hertes	
15 11 9	.92 .42 ADD RUNOPF .92 CHAINEL .300 3.000 .3000 .500 1.000 Depth Velocity Flow Capac Critical d ROUTE	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Maning's "n" 0/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec city = 1.222 c.m/s lepth = .420 metres	
15 11 9	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 .030 .500 1.000 Depth Velocity Flow Capac Critical 6 ROUTE 200.000 .453	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/A Depth in metres Select Grade in % = .458 metres = 1.287 m/sec bity = 1.222 c.m/s depth = .420 metres Conduit Length Supply X-factor <.5	
15 11 9	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 .030 .030 .030 Lopoth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Night bank slope 1: Naning's "n" 0/A Depth in metres Select Grade in % = .458 metres = 1.287 m/sec tity = 1.222 c.m/s Hepth = .420 metres Conduit Length Supply K-actor <.5 Supply K-lag (sec) Supply K-lag (sec)	
15 11 9	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 .030 .030 .030 .000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Maning's "n" 0/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec rity = 1.222 c.m/s depth = .420 metres Conduit Length Supply X-factor <.5 Supply K-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep	
15 11 9	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 .030 .500 1.000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 1	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Maning's "n" 0/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec rity = 1.222 c.m/s Hepth = .420 metres Conduit Length Supply X-factor <.5 Supply X-factor <.5 Supply X-factor Routing flactor Routing timestep No. of sub-reaches 24 .000 c.m/s	
15 11 9	.92 42 ADD RUNOFF 92 CHANNEL 300 3.000 500 500 1.000 Depth Velocity Flow Capac Critical d ROUTE 200.000 120.000 12.000 12.000	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" 0/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec ity = 1.222 c.m/s depth = .420 metres Conduit Length Supply X-factor <.5 Supply X-factor <.5 Supply Lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 24 .988 .929 .000 c.m/s	
15 11 9 16 35	.92 42 ADD RUNOFF .92 CHANNEL .300 .03,000 .030 .000 bepth Velocity Flow Capac Critical d ROUTE 200,000 .500 120,000 120,000 120,000 120,000	<pre>24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Solect Grade in %</pre>	
15 11 9 16 35	.92 42 ADD RUNOFF 92 CHANNEL 300 3.000 .030 .030 .030 .000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 1.22 .000 1.22 .000 1.22 .000 .122 .000 .122 .000 .122 .000 .122 .000 .122 .000 .122 .000 .122 .000 .122 .000 .000	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Maning's "n" 0/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec fity = 1.222 c.m/s depth = .420 metres Conduit Length Supply X-factor <.5 Supply X-factor <.5	
15 11 9 16 35 4	.92 44 ADD RUNOFF .92 CHANNEL .300 3.000 .030 .500 1.000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 1 .92 NEXT LINK .92 COMMENT 1 line(** MEADO CATCHMENT	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Assamt and the stores Select Grade in % 0/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec bity = 1.222 c.m/s lepth = .420 metres Conduit Length Supply X-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 24 .929 .929 .000 c.m/s (s) of comment N HEIGHTS - DRAINAGE AREA MH ***	
15 11 9 16 35 4	.92 44 ADD RUNOFF 92 CHANNEL 3.000 3.000 0.030 500 1.000 Depth Velocity Flow Capac Critical 6 ROUTE 200.000 453 116.540 500 120.000 1 92 NEXT LINK 92 COMMENT 1 1 line(** MEADO CATCHMENT 1,000	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" 0/A Depth in metres Select Grade in % = .458 metres = 1.287 m/sec bity = 1.222 c.m/s depth = .420 metres Conduit Length Supply X-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 24 .929 .929 .000 c.m/s (s) of comment W HEIGHTS - DRAINAGE AREA MH **** ID No.6 99999	
15 11 9 16 35 4		24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Nanning's "n" 0/A Depth in metres Select Grade in % = .458 metres = 1.287 m/sec tity = 1.222 c.m/s Hether and the set Supply K-factor <.5 Supply K-factor	
15 11 9 16 35 4	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 .030 .500 1.000 Depth Velocity Flow Capac Critical & ROUTE 200.000 .453 116.540 .500 120.000 1 .92 COMMENT 1 line(*** MEADOW 2.50 500.000 2.500 2.500 500 2.500 500 2.500 500 2.500 500 2.500 500 2.5000 2.5000 2.5000 2.5000 2.5000 2.5000 2.50000 2.50000 2.50000 2.50000000 2.50000000000	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Night bank slope 1: Night bank slope 1: Maning's 'n* O/A Depth in metres Select Grade in % = .458 metres = 1.287 m/sec tity = 1.222 c.m/s Hepth = .420 metres Conduit Length Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 24 .928 .929 .000 c.m/s 24 .929 .929 .000 c.m/s 24 .929 .929 .000 c.m/s 24 .929 .929 .000 c.m/s 24 .929 .929 .000 c.m/s (s) of comment / HEIGHTS - DRAINAGE AREA MH *** ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Der cent Umpervious	
15 11 9 16 35 4	.92 42 ADD RUNOFF .92 CHANNEL .300 .03.000 .030 .500 1.000 Depth Velocity Flow Capac Critical d ROUTE 200.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 20.000 20.000 29.250 500.000 2.000 35.700 500.000	<pre>24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Select Grade in %</pre>	
15 11 9 16 35 4	.92 .42 ADD RUNOFF .92 CHANNEL .300 .030 .030 .030 .030 .000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 120.000 10.000 .92 COMMENT 1 line *** MEADOM CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 .000	<pre>24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Select Grade in %</pre>	
15 11 9 16 35 4		24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slo	
15 11 9 16 35 4	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 .030 .500 1.000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 120.000 120.000 120.000 120.000 129.250 500.000 500.000 500.000 12.250 77.000 .100	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Maning's "n" 0/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec city = 1.222 c.m/s Hepth = .420 metres Conduit Length Supply X-factor <.5 Supply X-factor <.5 A .929 .000 c.m/s (M) A .929 .000 c.m/s (M) A .929 .929 .000 c.m/s (M) A .920 .920 .000 c.m/s (M) A .920 .920 .920 .920 .920 .920 .920 .920	
15 11 9 16 35 4	.92 44 ADD RUNOFF 92 CHANNEL 3.000 3.000 .030 .500 1.000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 1 92 NEXT LINK .92 COMMENT 1 line(*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1 2.550 77.000 100 7.587	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Maning's "n" 0/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec bity = 1.222 c.m/s lepth = .420 metres Conduit Length Supply X-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 24 .929 .929 .000 c.m/s (s) of comment N HEIGHTS - DRAINAGE AREA MH *** ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Imperious Length (IMPERV) %Inp. wit Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Maning ** SCS Curve No or C Ia/S Coefficient Initial Abstraction	
15 11 9 16 35 4	.92 44 ADD RUNNEP .92 CHANNEL .300 3.000 .030 .500 1.000 Depth Velocity Flow Capac Critical 6 ROUTE 200.000 .453 116.540 .500 120.000 1 .92 COMMENT 1 1 line(*** MEADO 500.000 2.000 25.00 500.000 1 .250 77.000 .001 .345	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" 0/A Depth in metres Select Grade in % = .458 metres = 1.287 m/sec bity = 1.222 c.m/s depth = .420 metres Conduit Length Supply X-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 24 .929 .929 .000 c.m/s 24 .929 .929 .000 c.m/s (s) of comment W HEIGHTS - DRAINAGE AREA MH *** ID No.6 99999 Area in hectares Length (FPRV) metres Gradient (%) Per cent Imperious Length (IMPERV) %Ing. with Zero Dpth Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triangle; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 53 .929 .929 .000 c.m/s	
15 11 9 16 35 4		24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Manning's "n" 0/A Depth in metres Select Grade in % = .458 metres = 1.287 m/sec city = 1.222 c.m/s depth = .420 metres Conduit Length Supply X-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 24 .929 .929 .000 c.m/s (s) of comment M HEIGHTS - DRAINAGE AREA MH **** ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Inp. 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. Reserv 53 .926 .604 C perv/imperv/total	
15 11 9 16 35 4	.92 42 ADD RUNOFF .92 CHANNEL .300 .03.000 .03.000 .030 .000 Depth Velocity Flow Capac Critical d ROUTE 200.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 10.000 29.250 500.000 20.000 20.000 1.000 29.250 500.000 2.000 35.700 500.000 1.000 1.250 77.000 1.000 1.000 7.587 1.000 3.454 4.420 ADD RUNOFF	<pre>24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s 24 .988 .186 .000 c.m/s 24 .988 .186 .000 c.m/s 25 .922 c.m/s 26 .000 c.m/s 27 27 28 .988 .929 .000 c.m/s 29 .929 .000 c.m/s 29 .929 .000 c.m/s 29 .929 .000 c.m/s 20 .929 .929 .000 c.m/s 21 .920 .929 .929 .000 c.m/s 22 .929 .929 .000 c.m/s 23 .929 .929 .000 c.m/s 24 .929 .929 .000 c.m/s 25 .926 .604 C perv/imperv/total 25 .926 .604 C perv/imperv/total 26 .929 .929 .000 c.m/s 27 .926 .000 c.m/s 28 .929 .929 .000 c.m/s 29 .929 .000 c.m/s 29 .929 .000 c.m/s 20 .929 .929 .000 c.m/s 21 .929 .929 .000 c.m/s 22 .929 .929 .000 c.m/s 23 .4.381 .929 .000 c.m/s 24 .921 .922 .000 c.m/s 25 .926 .604 C perv/imperv/total 25 .926 .000 c.m/s 25 .926 .004 C perv/imperv/total 25 .926 .000 c.m/s 25 .926 .004 C perv/imperv/total 25 .926</pre>	
15 11 9 16 35 4 15 27	.92 42 ADD RUNOFF .92 CHANNEL .300 .030 .500 1.000 Depth Velocity Flow Capac Critical d ROUTE 200.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 120.000 10.000 2.000 35.700 500.000 2.250 77.000 1.000 77.000 1.000 77.000 1.000 77.000 3.45 4.42 ADD RUNOFF 3.45 HYDROGRAPH 5.15 is #	<pre>24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Select Grade in %</pre>	
15 11 9 16 35 4 15 27	.92 42 ADD RUNOFF .92 CHANNEL .300 .030 .500 1.000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 120.000 120.000 120.000 .453 116.540 .500 120.000 .453 120.000 .200.000 .250 77.000 .200 .200 .000 .255 77.000 .100 .255 77.587 1 .3.45 .42 ADD RUNOFF 3.45 HUTROGRAPH 5 .42 ADD RUNOFF 3.45 HUTROGRAPH 5 .42 ADD RUNOFF 3.45 HUTROGRAPH	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Anning's "n* 0/A Depth in metres Select Grade in % = .458 metres = 1.287 m/sec fity = 1.222 c.m/s depth = .420 metres Conduit Length Supply X-factor <.5 Supply K-factor <.5	
15 11 9 16 35 4 15 27 8		<pre>24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Select Grade in %</pre>	
15 11 9 16 35 4 15 27 8	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 .030 .500 1.000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 120.000 .453 116.540 .500 120.000 120.000 120.000 120.000 120.000 122.50 500.000 500.000 500.000 125.50 77.000 10.250 77.000 10.250 77.000 10.250 77.587 1 .425 50.0000 50.0000 50.0000 50.0000 50.0000 50.0000 50.0000 50.0000 50.0000 50.0000 50.0000 50.0000 50.0000 50.0000 50.00000 50.000000 50.00000000	24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Maning's "n" 0/a Depth in metres Select Grade in % = .458 metres = 1.287 m/sec city = 1.222 c.m/s Hepth = .420 metres Conduit Length Supply X-factor <.5 Supply X-factor <.5 Supply X-factor e.5 Supply X-factor e.5 Maning "m" e.5 SC Curve No or C IA/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HTD; 4=Repeat Maning "m" SCS Curve No or C IA/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HTD; 4=Lin. Reserver 3 .929 .000 c.m/s 5 .926 .604 C perv/imperv/total F 10DSPLAY of Hyeto/Hydrograph chosen .18954668+05 c.m	
15 11 9 16 35 4 15 27 8	.92 .42 ADD RUNOFF .92 CHANNEL .300 3.000 .030 .500 1.000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 1.92 NEXT LINK .92 COMMENT 1 line(*** MEADO CATCHMENT 1.000 29.250 500.000 2.000 35.700 500.000 1.250 77.000 1.250 77.000 1.250 77.587 1.3.45 .42 ADD RUNOFF 3.45 .42 ADD RUNOFF 3.45 .42 ADD RUNOFF 3.45 .42 .42 ADD RUNOFF 3.45 .42 .42 .500 .001 .100 7.587 .42 .42 .42 .42 .42 .42 .42 .42 .42 .42	<pre>24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Select Grade in %</pre>	
15 11 9 16 35 4 15 27 8	.92 .42 ADD RUNOFF .92 CHANNEL .300 .030 .030 .030 .000 .030 .000 Pepth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 2.000 550.000 2.000 .000 .000 .00	<pre>24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Assamption of the state of the st</pre>	
15 11 9 16 35 4 15 27 8	.92 .42 ADD RUNOFF .92 CHANNEL .300 .030 .000 .030 .000 .000 Depth Velocity Flow Capac Critical d ROUTE 200.000 .453 116.540 .500 120.000 2.000 2.000 35.700 500.000 2.000 .200 .250 77.000 .100 77.000 .100 77.000 .100 77.000 .100 75.87 13.45 HDROGRAPF 5.15 # Volume = PIPE .500 2.920 .013 .350 .600 Surcharged Velocity	<pre>24 .186 .186 .000 c.m/s 25 .922 .549 C perv/imperv/total 7 24 .988 .186 .000 c.m/s Pase Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Solect Grade in %</pre>	

9 ROUTE Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep 500.000 .500 .000 500 600.000 ĩ No. of sub-reaches 53 4.381 4.381 3.453 .000 c.m/s 3.453 4.381 4.381 .000 c.m/s NEXT LINK 3.453 4.381 4.381 .000 c.m/s CCOMMENT 3 line(s) of comment ** DIVERSION OF 5 YEAR FLOWS + 15% TO STORM SEWER ** ** 2180L/S + 15% = 2507L/S ** ** ALL FLOWS GREATER THAN THE 5YR+15% DIRECTED TO WETPOND ** DIVERT 1 U/S Node No.6 99999 16 35 ** ALL FLONS GREATER THAN THE 5YR+15% DIRECTED TO WETPOND * DIVERT 1 U/S Node No.6 99999 2.507 Threshold Discharge 2.507 Max. Outflow regd. Omax & Vol.Diverted = 1.874 c.m/s 1354.0 c.m No flow diverted 3.453 4.381 2.507 .000 c.m/s COMBINE 1 JUNCTION NOde No. 3.453 4.381 2.507 2.507 c.m/s FILE HYDROGRAPH 1 =READ: 2=WRITE 12 DIV00001.100 is Filename 2 I=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary 3.453 1.874 2.507 2.507 c.m/s COMMENT 1 line(s) of comment *** ROSEDALE - DRAINAGE AREA FUT *** CATCHMENT 12 17 22 35 *** KOSLL CATCHMENT ' 000 ID No.ó 99999 '> hectai 4 CATCHM 1.000 12.770 400.000 3.000 70.000 ID No.ô 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 0 Length (IMPERV)
0 % Imp, with Zero Dpth
1 Option 1=SCS (N/C; 2=Horton; 3=Green-Ampt; 4=Repeat
0 Manning "n"
0 SCS Curve No or C
0 Ia/S Coefficient
7 Initial Abstraction
1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
2.688 1.874 2.507 2.507 c.m/s
.425 .904 .760 C perv/imperv/total
RUNOFF 400.000 .000 1 .250 77.000 .100 7.587 1 .425 .904 .760 C perv/imperv ADD RINOFF 2.688 4.562 2.507 2.507 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .8693769E+04 c.m COMMENT = .8693769E+04 c.m 15 27 35 1 line(s) of comment
*** SITE - EX FLOWS OF 550 L/S DURING 100 YR *** **** SITE - EX FLOWS OF 555 _... POND 9 Depth - Discharge - Volume sets 174.850 .000 .0 175.350 .0310 1713.0 175.600 .0400 2746.0 175.760 .0829 3493.0 176.350 .0829 3493.0 176.650 .0831 8354.0 176.750 .233 8999.0 10 2746.0 3467.0 3893.0 6538.0 8354.0 8999.0 9663.0 175.600 175.760 175.850 176.350 176.650 176.750 176.850 176.750 .0831 8354.0 176.750 .233 8999.0 176.850 .473 9663.0 PeakOutlow = .083.cm/s Maximum Depth = 176.520 metres Maximum Storage = .7568.c.m 2.688 4.562 .083 COMENT 2.688 4.562 .083 COMENT 2.507 c.m/s 17 2.589 c.m/s Z.UCO COMMENT 1 line(s) of comment *** OVERALL - EX FLOWS OF 4585 L/S DURING 100 YR *** 35 1 CONFLUENCE 1 Junction Node No. 2.688 2.589 MANUAL 18 .083 .000 c.m/s 20