FUNCTIONAL SERVICING REPORT

HILLSBURGH HEIGHTS INC

PROPOSED RESIDENTIAL SUBDIVISION

5916 Trafalgar Road Hillsburgh Urban Area

Town of Erin

County of Wellington

February 15, 2023 (3rd submission)



FAX (905) 794-0611

TEL (905) 794-0600

PROJECT NO. W21081

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1. **INTRODUCTION**

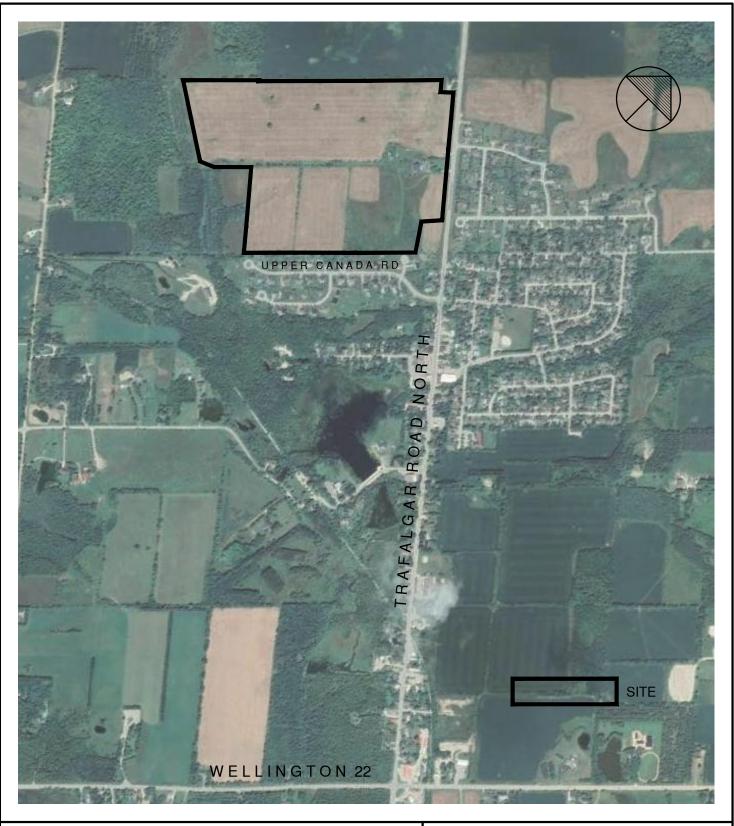
This Study has been prepared as a technical document in support of the Draft Plan application for Hillsburg Heights Inc and addresses sanitary, storm and water servicing and stormwater management.

The proposed subdivision is located at 5916 Trafalgar Road North in the former Village of Hillsburg, Town of Erin, as shown on Figure 1.

The subdivision, as illustrated on the Draft Plan (copy attached) comprises an area of 40.4 ha and includes:

- One Hundred Ninety Five (195) Single Detached Residential Units;
- One Hundred Seventy Four (174) Residential Townhouse Units;
- One (1) School Block;
- Two (2) SWM Pond Blocks;
- One (1) Park Block;
- One (1) Future Residential Block
- One (1) Future Commercial Block
- One (1) Vista Block
- One (1) Walkway Block
- One (1) Heritage House Block

The report describes the existing site conditions, and the proposed sanitary, storm and water systems, as well as the stormwater management infrastructure. The report includes preliminary grading information and outlines the required Erosion and Sediment Control Measures.



HILLSBURGH HEIGHTS INC. RESIDENTIAL SUBDIVISION 5616 TRAFALGAR ROAD NORTH PART 1 OF PLAN 61R-9590 PART OF LOT 26, CONCESSION 7 HILLSBURGH URBAN AREA TOWN OF ERIN LOCATION PLAN

CANDEVCON LIMITED					
	TEL. (905) 794-FAMOQ(905) 79	4-0611			
DATE	OCT. 1st, 2021	JOB No	W21081		
DRAWN	E.A.M	SKETCH No.	10		
SCALE	N.T.S		1.0		

2. BACKGROUND TECHNICAL STUDIES

The subject subdivision is located in the former Village of Hillsburgh in the Town of Erin. In the past seven years the Town has conducted a number of studies to review sanitary and water servicing within the Town, and the recommendations of the studies are outlined below.

2.1 Town of Erin Servicing and Settlement Master Plan¹

The Town of Erin commissioned a Servicing and Settlement Master Plan (SSMP) that was completed by B. M. Ross in 2014. The study reviewed both water and sanitary servicing requirements to meet future population forecasts to the year 2035. The key recommendations of the Master Plan were:

- The Town of Erin move forward with the remaining phases of the Class EA process to develop an undertaking to provide a sanitary sewage collection system for the settlement areas of Hillsburgh and Erin based on the servicing scenarios reviewed in the report.
- That the Town of Erin initiates the process of seeking out senior government funding assistance for this undertaking. The SSMP can be used as a supporting document to build a case that this undertaking would provide considerable economic, health, and environmental benefits to the Town. It is necessary to be ready to take advantage of any new funding programs that are introduced by the government.
- That the Town undertakes water servicing upgrades as defined in this report, so that appropriate facilities are in place when required to service future growth.
- That the Town review and amend its Official Plan as needed to implement the SSMP and allocate growth within its urban boundaries. Similarly, the County of Wellington should revise its Official Plan to reflect the Town's capacity to provide wastewater service, and adjust population forecasts accordingly.
 - That the Town should apply stormwater management policies, as discussed in this report, to manage new growth areas and to address deficiencies with

¹ Town of Erin Servicing and Settlement Master Plan Final Report, B. M. Ross, August 12, 2014,

existing stormwater management.

2.2 Town of Erin, Urban Centre Wastewater Servicing Class Environmental Assessment²

The town of Erin commissioned a Class Environmental Assessment to review sanitary sewer servicing options by Ainley and Associates which was approved by the MECP in August, 2019. The recommendations of the report were:

- construct a sanitary collection system within the Villages of Hillsburg and Erin
- construct a sanitary treatment plant with tertiary treatment to treat effluent from both Hillsburg and Erin.

The town has initiated the design of the sewage treatment plant and collection system with the goal of having the infrastructure in place by 2023.

2.3 Town of Erin Urban Centre Water Servicing Schedule B Class Environmental Assessment³

The Town of Erin commissioned a Class Environmental Assessment by Triton Engineering to review water supply options completed in 2020. The study was approved by the MECP on August 31, 2020. The Class EA study reviewed both current and future water needs and recommended the following:

- install two additional supply wells
- construct watermains to interconnect both Erin and Hillsburgh

² Town of Erin, Urban Centre Wastewater Servicing Class Environmental Assessment, Ainley, October 2019

³ Town of Erin Urban Centre Water Servicing Schedule B Class Environmental Assessment, triton Engineering Services Limited, February 28, 2020

2.4 5916 Trafalgar Road North, Environmental Impact Assessment⁴

A part of the planning process an Environmental Impact Assessment Study was conducted for the site. The Study did not identify any environmentally sensitive land uses on the site.

The recommendations can be summarized as follows

- all works shall be contained within the property boundaries
- · Sediment and erosion controls be in place prior to any earth works

⁴ 5916 Trafalgar Road North Environmental Impact Study, Birks Natural heritage Consultants, File 02-016-2021, November 1, 2021

3. EXISTING CONDITIONS

3.1 General

As part of the Planning process for the subject subdivision the following Studies were completed:

- Preliminary Geotechnical Investigation⁵
- Preliminary Hydrogeological Investigation⁶

3.2 Topography, Drainage and Natural Features

The terrain of the subject subdivision is rolling. The west half of the site drains to an existing low area to the west. The east half drains south to an existing storm sewer system and SWM pond located on McMurchy Lane. The west side drains to an existing wet land to the west.

Report to Cedar City Developments, Preliminary Geotechnical Investigation for Proposed Residential Development, 5916 Trafalgar Road North, Town of Erin (Hillsburgh), October 2020, Soil Engineers Limited, Reference Number 2009-S020

⁶ Hydrogeological Investigation, Proposed Briarwood Hillsburgh Development, 5916 Trafalgar Road North, town of Erin, Ontario, November 17 2021, 2021, HLV2K Engineering Limited, Project Number 2100428AH

3.3 Physiography and Geotechnical Conditions

The preliminary Geotechnical Investigation (copy of report including in Appendix "C") indicated that the surficial soils beneath the of 250-300mm thick topsoil layer consists of Sandy Silt/Silty Sand till ranging in depths of 2 to 6m over a sand layer to the extent of the borehole depths.

The Hydrogeological Investigation (copy of report included in Appendix "D") indicated groundwater levels are in excess of 7.8m below grade.

4. SANITARY AND WATER SERVICING

4.1 Sanitary

4.1.1 Existing Sanitary Sewers

The village of Hillsburgh is presently served with septic systems to treat sewage. There is no municipal sewage collection system

4.1.2 Proposed Sanitary Sewer System

As noted in section 2.2, the Town is proposing to install a sanitary collection system in the Village of Hillsburgh. The sanitary sewers will be designed in accordance with the Town of Erin 2022 Engineering Design Manual.

The town intends to extend a sanitary sewer on Trafalgar Road to the intersection of Upper Canada Drive. It is proposed to outlet the proposed sanitary sewers servicing the subdivision via a sanitary sewer to be constructed within McMurchy Lane and Upper Canada Drive to connect to the proposed sanitary sewer at the intersection of Trafalgar Road and Upper Canada Drive. The sewers within Upper Canada Drive shall be sized to accommodate the lands upstream on Upper Canada Drive .

The preliminary design of the sanitary sewer is shown on Drawing SA-1 and the Sanitary Sewer Design Sheets are included in Appendix "A".

4.2 Water

4.2.1 Existing and Planned Watermains

The existing watermain system in the vicinity of the subject subdivision is shown on Drawing PS-1 and comprises a 150mm watermain on Upper Canada Drive and a 150mm watermain located at the intersection of Upper Canada Drive and Trafalgar Road North

4.2.2 Proposed Watermain System

The proposed watermain system is shown on Drawing PS-1 and Drawing WM-1 and comprises of a 150and 200mm watermain throughout the subdivision and the extension of the existing 150mm watermain at Upper Canada Drive and Trafalgar North on Trafalgar Road north to Street A.

Connection points to the Town system will be at the intersection of Streets E and A with Trafalgar Road North and at the western limit of Upper Canada Drive.

5. STORM DRAINAGE AND STORMWATER MANAGEMENT

5.1 General

As shown on drawing PS-1 storm water will drain to two SWM ponds located within the proposed subdivision.

5.2 Storm Drainage System

5.2.1 Design Criteria

The proposed storm system design will comply with the Town of Erin Standards which is described as follows:

Minor system; 1/5 year local sewers 1/10 high-value commercial development, downtown and Trunk collectors

Based on the above storm sewers within the subdivision will be designed to the 1/5 year storm

5.2.2 Proposed Storm Sewer System

The proposed storm sewer system is shown on Drawing PS-1 and STM-1. as outlined in Section 5.1 the storm sewers will outlet to SWM Ponds 1 and 2. The overland flow will be conveyed within the road rights of way (subject to a maximum ponding depth of 0.3m).

5.3 Stormwater Management

The subject site is located within the watershed of Credit River. The stormwater management criteria for this development have been set based on requirements and discussion with the Town of Erin and Credit Valley Conservation. The requirements include:

- Stormwater quantity controls are required for the site to control postdevelopment flows from the site to the pre-development conditions from the 5-year to the 100-year storm.
- Stormwater quality control is to be provided for the developing area for an Enhanced Protection level.

As outlined in Section 5.2.2, storm drainage from the subject subdivision will drain to ponds 1 and 2. In accordance with the CVC SWM Criteria, MOE SWM Manual and the Town of Erin design standards, stormwater management within the subject lands must be practiced as follows;

Demonster		0
Parameter	Requirement	Source
Quality Control	Provide Enhanced Level (Level 1) water quality treatment in the SWM Pond, using the guidelines in the MOE SWM Design Manual	CVC SWM Criteria (Section 5.2: Quality Control Criteria, p. 24- 25) MOE SWM
	Provide at least 40m ³ of active storage in the SWM Pond for every hectare of the drainage area to the SWM Pond	Manual (Section 3.3.2: Water Quality Sizing Criteria, p. 3-10)
Erosion Control	Design the SWM Pond so that the 25 mm storm event discharges over a period of approximately 48 hours.	CVC SWM Criteria (Section 4.2: Erosion Control Criteria, p. 21- 22) MOE SWM Manual (Section 3.3.2: Water Quality Sizing Criteria, p. 3-10)
Quantity Control	2 to 100-year Storm Control Post-to Pre- Release Rates	CVC SWM Criteria Town of Erin

Table I

Stormwater Management Requirements

5.3.2 Minor System Design

As per the Town's engineering design criteria, the proposed development will be serviced with a minor storm sewer system designed to convey a 5-year storm event. The rainfall intensity values (I) are calculated per the Town of Erin IDF Equation Constants provided in the Town of Erin design standards (Table 13). Based on this data, the rainfall intensity for the 5 and 100-year rainfall events is provided as follows:

Return period	<u>2-Yr</u>	<u>5- Yr</u>	<u>10- Yr</u>	<u>25- Yr</u>	<u>50- Yr</u>	<u>100- Yr</u>		
Α	566	744	869	1011	1126	1248		
В	1.77	1.76	1.79	1.75	1.76	1.83		
С	0.730	0.729	0.730	0.728	0.729	0.732		

Table II Town of Erin IDF Equations Constants

The peak flows are calculated using the following formula:

Q = 2.778 ACI / 1000

WHERE:

Q = 5-Year Peak Flows (m³/s)

A= Area in hectares (ha)

C= Runoff Coefficient

I= Rainfall Intensity (mm/hr)

The IDF curve data and storm sewer design sheet is included in Appendix "E." A schematic design of a minor system is illustrated on Drawing PS,-1 and catchment areas are depicted on Drawing Storm Drainage Area Plan (SD-1).

5.3.3 Grading

Preliminary grading (roads) is also illustrated on Drawing PS-1, as well as overland flow routes. The proposed grading is based on providing cover to the sewer system according to Town of Erin Standards and providing an overland flow route to the SWM ponds. The lands to the north will be diverted to the east and west around the subject lands

5.3.4 Existing Drainage

Based on the topographic survey, the existing site land use is primarily agriculture with some grassed areas. The Pre-development area plan (EX-DR-1) provides an overview of the subject site's existing drainage conditions, catchment boundaries of the subject site and contributing external areas.

The existing storm sewers located on McMurchy Lane south were designed to capture external flows from the subject site during the construction of the Strittmatter Subdivision⁹. The excerpts from the stormwater management report¹⁰ for the Strittmatter subdivision are provided in Appendix "F."

The existing drainage area parameters are summarized in Table III below and are based on the CVC standard parameters.

⁹Stormwater Management Report and Design Drawings, Proposed Striimatter Subdivision, Village of Hillsbugh, Town of Erin, July 2000, Prepared by Burnside Development Services, R.J. Burnside & Associates Limited, RJB File : S-405.

Existing Drainage Parameters						
Catchment ID	Discharge Point	Catchment Area (Ha)	Land Type			
Area-1, 2, 3 & External Drainage from North	Existing low points west of the proposed development	30.14	Farm/Grassed			
Area-4 & External from Drainage North	Existing 450mm sewers on McMurchy Lane	22.96	Farm/Grassed			

TABLE III

Note: External Drainage from North is not included in Pre and Post Modelling. External drainage from the north will be conveyed to a low point via swales during the detailed design stage.

5.3.5 Requirements for Design of Stormwater Management Facilities

5.3.5.1 Stormwater Management Pond No. 1 (East)

The proposed stormwater management pond 1 is located on the southeast corner of the property. It will accommodate post-development drainage from an area of 19.44 Ha. The pond will outlet to an existing 450mm dia storm sewer located on McMurchy Lane. The flows from the pond will be controlled to the discharge targets established in Strittmatter SWM Report¹.

 TABLE IV

 Release Rate Targets for SWM Pond 1 (East)

Storm Event	Allowable Release Rate (m ³ /s)			
5-year	0.06			
100-Year	0.16			

Based on the drainage area and release rates identified in Table II, an iterative process was used to calculate the pond's effective stage-storage-discharge relationship, determining the control structure sizing. The ponds have been adequately sized for 5 and 100-year events. Table V below provides an overview of the stage-discharge-storage relationship of the stormwater management facility. Related outflow calculations are included in Appendix "E."

TABLE V SWM POND 1 RATING CURVE

_			Pond Stage-Storage-Discharge Relationship								
			E	Extended Detention for Erosion Control					Flood Control		rol
Bon	Pond	P.P.	25mm Erosion Control		5-Year Control		100-Year Control		ntrol		
Pon d No.	Pond Area (ha)	Volume Provide d (m³)	Releas e Rate (L/s)	Pond W.L (m)	Storag e Volum e (m ³)	Releas e Rate (L/s)	Pond W.L (m)	Storag e Volum e (m ³)	Releas e Rate (L/s)	Pond W.L (m)	Storag e Volum e (m ³)
1	19.44	12,362	40	454.45	3,970	60	455.3 4	13,086	160	456.0 0	21,269

VO model was used to determine storm flow calculations and required stormwater quantity control volumes based on required release rates. Table VI below provides an overview of the modelling results for the pond operation for 5 and 100-year storm events.

TABLE VI STORMWATER MANAGEMENT POND 1 (East) SUMMARY OF VO MODEL RESULTS

Pond 1					
Total Drainage Area to SWM Pond =		19.44 Ha			
Permanent Pool Storage Required for Protection Level (80% TSS Removal)	Enhanced	4,666 m ³			
Permanent Pool Storage Provided		12,362 m ³			
	Design	Storm*			
Description	5-Year	100-Year			
Peak Flow (m ³ /s)	Peak Flow (m³/s) 5.083				
Outflow (m ³ /s)	Outflow (m³/s) 0.060				
Pond W.L. (m)	456.00				
Max. Storage Used (m ³)	20,811				
Storage at Pond W.L (m ³)	21,269				

* Based on VO Results appended in Appendix "E."

* 24-Hour SCS Type II Design storm is used for Hydrologic Modeling for Town of Erin IDF Curve parameters;

IDF curve (5-Year):

A= 744 B = 1.76 C = 0.729 used in: INTENSITY = A / (t_d x B) ^C IDF curve (100-Year):

A = 1248 B = 1.83C = 0.732 used in: INTENSITY = A / (t_d x B) ^C

Stormwater Management Pond 2

The proposed stormwater management pond 2 is located at the western limit of the property and will outlet overland to an existing wetland located to the south. The SWM Pond will accommodate drainage from approximately 20.19 ha. The SWM pond design criteria are to control post-development peak flows to the pre-development levels. The outlet for pond 2 will outlet to proposed plunge pool before it outlets to the lands to the west. The purpose of the plunge pool is to help dissipate flows over a wider area to prevent erosion

The pre-development flows were modelled using Visual Otthymo for the Town of Erin IDF data. The values obtained were used to generate SCS Type II Distribution Hyetograph for 2 to 100-year storm events.

Drainage Area =	21.63 Ha		D	ESIGN STOR	М	
Storm Event	2-Year (L/s)	5-Year (L/s)	10-Year (L/s)	25-Year (L/s)	50-Year (L/s)	100-Year (L/s)
Target Flows*	925	1595	2089	2793	3309	3783

TABLE VII PRE-DEVELOPMENT FLOWS

*Refer to Pre-Development Release Rate in Appendix E

** External Drainage from North is not included in Pre and Post VO Modelling. External drainage from the north will be conveyed to a low point via swales along the north boundary of the subdivision during the detailed design stage.

Based on the drainage area and release rate targets identified in Table V, an iterative process was used to calculate the pond's effective stage-storagedischarge relationship, determining the control structure sizing. The ponds have been adequately sized for all storms up to and including 100-year events. Table VI below provides an overview of the stage-discharge-storage relationship of the stormwater management facility. Related outflow calculations are included in Appendix "E."

Total Drainage A	20.19 Ha		
Permanent Pool Level (80% TSS	4,642 m ³		
Permanent Pool	Storage Provided		7,704 m ³
25mm Erosion Co 18.32mm)	ontrol Volume Required (RV Depth =	3,698 m ³
Storm Event	Storage (m³)		
25mm	0.040	458.90	3,899
2-Year	0.356	459.22	6,274
5-Year	0.779	459.43	7,914
10-Year	1.273	459.56	8,963
25-Year	1.605	459.75	10,540
50-Year	1.782	459.87	11,564
100-Year	1.956	456.00	12,783

TABLE VIII SWM POND 2 (West) RATING CURVE

VO model was used to determine storm flow calculations and required stormwater quantity control volumes based on required release rates. Table VII below provides an overview of the modelling results for the pond operation for 2 to 100-year storm events (SCS Type II, 24Hour, 10mins).

					-	
Description			Design S	itorm*		
2-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Target Flow (m ³ /s)	0.925	1.595	2.089	2.793	3.309	3.783
VO Peak Flow (m ³ /s)	3.491	4.835	6.020	7.249	8.103	8.859
Outflow (m ³ /s)	0.342	0.746	1.188	1.549	1.744	1.896
Pond W.L. (m)	459.22	459.43	459.56	459.75	459.87	456.00
Max. Storage Used (m ³)	6,030	7,798	8,840	10,349	11,408	12,426
Storage at Pond W.L (m ³)	6,274	7,914	8,963	10,540	11,564	12,783

TABLE IX STORMWATER MANAGEMENT POND 2 (West) SUMMARY OF VO MODEL RESULTS

* Based on VO Results appended in Appendix "E."

Related control structure and outflow calculations are included in Appendix "E." For Pond 1 and 2, an orifice plate will be used to provide Erosion Control, and rectangular broad crested weir/orifice controls are proposed to achieve 2-year up to 100-year flow targets.

The following summarizes the outlet controls:

- SWM Pond No. 1 (East)
 - 25mm Erosion Control: 156mm diameter orifice plate.
 - 2 to 100 Year Release: a combination of 156mm diameter orifice plate and 0.25m wide x 0.13m high weir.

• SWM Pond No. 2 (West)

- 25mm Erosion Control: 160mm diameter orifice plate.
- 2 to 100 Year Release: a combination of 160mm diameter orifice plate and 1.30m wide x 0.60m high weir.
- A 30m wide emergency spillway is sized to safely convey the uncontrolled 100-year peak flow (8.859m3/s). The crest elevation of the emergency spillway is set at an elevation of 460.00m.

Preliminary design details of the proposed Stormwater Management Pond No. 1 and 2 are illustrated on Drawing SD-1 (Storm Drainage Area Plan), considering the proposed sewer inverts and preliminary grading. It is noted that the configurations of the ponds and related structures will be finalized as part of the final Engineering Design of the facilities.

5.4 Water Balance

Since the post-development condition will increase the imperviousness of the site the pre and post infiltration volumes were calculated to assess the infiltration deficit and the proposed mitigation measures were evaluated to demonstrate that the pre-development infiltration can be mated in the post-development condition.

The site climatic conditions were calculated using the Thornthwaite and Mather (1957) method utilizing meteorological data obtained from Environmental Canada's historical weather data for Fergus Shand Dam weather station. Monthly precipitation averages were obtained over the period of 1981 to 2010.

Based on the noted climate and soil conditions of the Subject Site it is expected that the increase in impervious areas will result in a groundwater infiltration deficit following development. The Water Balance calculations are provided in Water Balance Report prepared¹¹. As stated in the water balance report, the proposed development without mitigation would result in an infiltration deficit of 40,805m³/year.

Parameter	Value
Average Annual Rainfall (mm)	946
Pre- Development Infiltration (m ³ /year)	63,166
Post-Development Infiltration without Mitigation (m ³ /year)	22,361
Pre- and Post-Development Infiltration Deficit (m ³ /year)	-40,805

¹¹ Water Balance Assessment, Proposed Briarwood Hillsburgh Development, 5916 Trafalgar Road North, Town of Erin, Ontario, prepared by HLV2K Engineering Limited dated January 30th 2023.

To balance this infiltration deficit, infiltration/soakaway trenches are proposed at the rear of the lots as shown on Drawing IT-1 whereby the runoff from the roofs and rear yards will drain to the infiltration/soakaway trenches. A total length of 1000m (1.5m x 1.5m) is required to balance the infiltration deficit whereas a length of 1400m is provided. Refer to Appendix E for Infiltration Trench Sizing Calculations.

6 WELL HEAD PROTECTION

There is an existing well located on the east side of Trafalgar Road near the intersection of Trafalgar Road and Street A. The CTC Source Protection District has prepared an Approved Source Protection Plan and have identified a well head protection area for the well as shown on map 1.6 (copy attached as figure 3) from the above noted Plan.

The closest proposed Storm Water Management facility and sanitary sewers are show on the attached plan. Based on the plan the closest Storm Water Management facility is not located within the zone of influence for the well and no further protective measures are required. It is also noted that the proposed sanitary sewers are also outside the zone of influence.

Therefore no special construction methods will be required o construct the ponds or the sanitary sewers.

7. EROSION AND SEDIMENT CONTROL

Erosion and sedimentation are naturally occurring processes that involve particle detachment, sediment transport and deposition of soil particles. Construction activities commonly alter the landscapes where they are located, exacerbating these natural processes. One of the most significant alterations encountered during construction is the removal of the vegetation that stabilizes the subsoil. In the absence of the vegetation, the underlying soils are fully or partially exposed to various natural forces such as rain, flowing water, wind, and gravity^{δ}.

The discharge of high sediment loads to natural watercourses has significant impacts on receiving waters and aquatic habitat. Some specific examples include:

- Degradation of water quality;
- Damage or destruction of fish habitat;
- Increased flooding.

In consideration of the above, it is necessary as part of the Final Design and implementation of infrastructure and development servicing to incorporate a comprehensive Erosion and Sediment Control Plan. The objectives are:

- (i) Minimize wherever possible the extent of vegetation removal;
- Provide appropriate sediment control measures to minimize the off-site transport of sediment;
- (iii) Minimize the extent of time that sites are devoid of stabilizing vegetation;
- (iv) Provide interim erosion control measures where permanent restoration is not feasible.
- (v) Provide permanent restoration to eliminate future erosion.

⁶ *Erosion and Sediment Control Guidelines for Urban Construction*, December 2006, Greater Horseshoe Conservation Authorities.

The Erosion and Sediment Control Plan should consider the specific characteristics of each development site and address the requirements relating to the following typical construction stages:

- Topsoil Stripping and Site Pre-Grading
- Infrastructure Servicing
- Building Construction

A "treatment train" approach is recommended in the development of an appropriate Erosion and Sediment Control Plan in compliance with the *Erosion and Sediment Control Guidelines for Urban Construction.* Typical sediment control measures include:

- Installation of double silt fencing along the boundary of work areas adjacent to the NHS;
- Construction of vegetated cut off swales including sediment traps and rock check dams;
- Stabilization of temporary sediment traps and provision of vegetated filter strips adjacent to the NHS;
- • Provision of catch basin sediment controls.

Inherent in the Erosion and Sediment Control Plan is a monitoring program with an Action Plan to implement remedial measures in a timely manner where required.

As part of the final engineering design, the Sediment and Erosion Control Plan will be prepared including sizing of temporary sedimentation ponds and sediment traps.

APPENDIX "A"

Sanitary Sewer Design Sheets

	~ * * *			18/1				Subdivision		-	Hillshu	gh Heights				Town of	Hillsburgh				Project No.:	W21081	
		DEVC						File No.:				<u></u>					/ DRAINAGE					2023-02-15	
		TING ENGI						Consultant:				con Limited									Prepared By:		·
	9358 GOREW BRAMPTON (/AY DRIVE ON. L6P-0M7		TEL (905) 794 FAX (905) 794				Drainage Ar	rea Plan:			SA-1									Checked By:	JSL	
							equivalent pop Single Family (Townhouse (pe school (per ha)	per unit) er unit)	3	oopulation 3 2.8 50		f Erin DESIGN CR Average Day Flow: Peaking Factor: Infiltration:	290 1+14/(4+(P)^0.5)	Lpcd P = Pop. in 1000's I/s/ha									
							commercial (pe			00		Manning's Co-eff.: max flow (m/s) min flow (m/s).	0.013 3 0.6										
	LOCATIO	N														POP	ULATION					FLOWS	
STREET	AREA		NCE HOLES		RESIDENTI/	AL	commercial (ha)	school (ha)	TOTAL POP	ACCUM. POP.	PEAK FACTOR	AREA	ACCUM. AREA	PK. DAY FLOW	INFILT.	TOTAL FLOW	SIZE	SLOPE	CAPACITY	VELC FULL FLOW		DESIGN FLOW / FULL FLOW %	
		upstream	downstream	area	units	units			1.01	101.	TACTOR	(ha)	(ha)	(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(m/s)		
1	2	3	4			5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
	1	MH1A	MH2A	0.39	5			1	15	15	3.40	0.39	0.39	0.171	0.113	0.284	200	2.50%	51.9	1.65	0.09	1	
	2	MH2A	MH3A	0.39	2			1	6	21	3.38	0.39	0.59	0.171	0.113	0.204	200	4.50%	69.7	2.22	0.09	1	
	3	МНЗА	MH6A	0.94	14				42	63	3.29	0.94	1.55	0.696	0.450	1.146	200	4.50%	69.7	2.22	0.25	2	
	4	MH5A	MH6A	0.46		10			28	28	3.36	0.46	0.46	0.316	0.133	0.449	200	2.00%	46.5	1.48	0.08	1	
	5	MH6A	MH8A	0.46	6				18	109	3.23	0.46	2.47	1.183	0.716	1.899	200	4.50%	69.7	2.22	0.37	3	
	6	MH7A	MH8A	0.78		20			56	56	3.30	0.78	0.78	0.621	0.226	0.847	200	4.50%	69.7	2.22	0.25	2	
	7	MH8A	MH9A	0.36	4			<u> </u>	12	177	3.17	0.36	3.61	1.881	1.047	2.928	200	1.30%	37.5	1.19	0.43	8	
	8	MH9A	MH10A	0.09	1				3	180	3.16	0.09	3.70	1.912	1.073	2.985	200	0.50%	23.2	0.74	0.35	13	
	9	MH10A	MH19A	0.67	-	15			42	222	3.13	0.67	4.37	2.333	1.267	3.600	200	0.50%	23.2	0.74	0.39	16	
	10	MH1A	MH4A	0.25	2	+		+	6 39	6	3.43 3.32	0.25	0.25 1.17	0.069 0.502	0.073	0.142	200	2.00%	46.5	1.48	0.08	1	
	11 EXT1	MH4A EXT1	MH5A MH11A	0.92 2.05	13				39 82	45 82	3.32	0.92	1.17 0.00	0.502	0.339	0.841	200	2.20%	48.7	1.55	0.17	2	
	12	MH5A	MH11A MH11A	2.05 0.57	2	10		1	34	82 79	3.27	0.57	1.74	0.867	0.505	1.372	200	0.50%	23.2	0.74	0.23	6	
	12	MH11A	MH11A MH12A	0.08	2	10			0	161	3.18	0.08	6.19	1.719	1.795	3.514	200		-	1.87	0.23	6	
	10	MH12A	MH12A	5.00	1			1	0	161	3.18	0.00	6.19	1.719	1.795	3.514	200			1.87	0.57	6	
	15	MH13A	MH14A	0.35		7			20	20	3.38	0.35	0.35	0.222	0.102	0.324	200			1.81	0.10	1	
	16	MH14A	MH15A	0.32		6			17	36	3.34	0.32	0.67	0.408	0.194	0.602		3.00%		1.81	0.20	2	
	17	MH7A	MH15A	0.79		20			56	56	3.30	0.79	0.79	0.621	0.229	0.850	200	4.50%	69.7	2.22	0.25	2	
	18	MH15A	MH18A	0.15					0	253	3.11	0.15	7.80	2.644	2.262	4.906	200	3.00%	56.9	1.81	0.70	9	
	19	MH16A	MH17A	0.45		9			25	25	3.37	0.45	0.45	0.285	0.131	0.415		1.00%		1.05	0.12	2	
	20	MH17A	MH18A	0.17		3			8	34	3.35	0.17	0.62	0.377	0.180	0.557		3.20%		1.87	0.10	1	
	21	MH18A	MH19A	0.24		5			14	301	3.08	0.24	8.66	3.110	2.511	5.621	200			1.87	0.77	10	
	22	MH19A	MH20A	0.29		6			17	540	2.96	0.29	8.95	5.357	2.596	7.953	200			0.74	0.64	35	
	23	MH20A MH29A	MH21A MH21A	0.29 0.41	5	6			17 15	557 15	2.95 3.40	0.29 0.41	9.24 0.41	5.511 0.171	2.680 0.119	8.191 0.290	200 200			0.74	0.64 0.15	36 1	
	24 25	MH29A MH21A	MH21A MH22A	0.41	5				15	587	3.40 2.94	0.41	10.02	5.784	2.906	8.690	200	1.80%		1.40	0.15	20	
	25	MH21A MH22A	MH23A	0.37	4				15	599	2.94	0.37	10.02	5.784	3.002	8.894	200	0.50%		0.74	0.67	39	
	20	MH23A	MH24A	0.12	1				3	602	2.93	0.33	10.33	5.920	3.036	8.956	200			0.74	0.67	39	
	28	MH24A	MH25A	0.35	3			1	9	611	2.93	0.35	10.82	6.001	3.138	9.139	200			0.74	0.67	40	
	29	MH25A	MH26A	0.38	2			1	6	617	2.93	0.38	11.20	6.055	3.248	9.303	200			0.74	0.68	41	
	30	MH26A	MH27	0.97	11				33	650	2.91	0.97	12.17	6.352	3.529	9.881	200			0.74	0.70	43	
	32	MH27	MH30	0.90	10				30	680	2.90	0.90	13.07	6.619	3.790	10.410	200	0.50%	23.2	0.74	0.71	45	
	34	MH17A	MH28A	0.50	4	6			29	29	3.36	0.50	0.50	0.325	0.145	0.470	200	1.80%	44.1	1.40	0.16	2	
	33	MH28A	MH29A	0.49	4	6			29	58	3.30	0.49	0.99	0.638	0.287	0.925	200	1.80%	44.1	1.40	0.24	3	
	34	MH29A	MH30A	0.43	5				15	73	3.28	0.43	1.42	0.799	0.412	1.211	200	1.80%	44.1	1.40	0.24	3	

Project No.: W21081
Date: 2023-02-15
Prepared By: SDL
Checked By: JSL

	LOCATIO	N														PO	PULATION					FLOWS
STREET	AREA	MAINTANA	NCE HOLES		RESIDENTIA		commercial (ha)	school (ha)	TOTAL	ACCUM.	PEAK		ACCUM.	PK. DAY	INFILT.	TOTAL	SIZE	SLOPE	CAPACITY	VELO	СІТҮ	DESIGN FLOW / FULL FLOW %
	ID				single family	Townhouse			POP	POP.	FACTOR	AREA	AREA	FLOW		FLOW				FULL FLOW	ACT. FLOW	
		upstream	downstream	area	units	units						(ha)	(ha)	(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(m/s)	
1	2	3	4			5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	35	MH30A	MH32A	0.47	4				12	764	2.87	0.47	14.96	7.367	4.338	11.706	200	0.50%	23.2	0.74	0.75	51
	36	MH16A	MH31A	0.87	13				39	39	3.34	0.87	0.87	0.437	0.252	0.689	200	2.90%	55.9	1.78	0.20	2
	37	MH31A	MH32A	0.91	13				39	78	3.27	0.91	1.78	0.857	0.516	1.373	200	2.90%	55.9	1.78	0.30	3
	39	MH32A	MH56A	0.48	4				12	854	2.84	0.48	17.22	8.151	4.994	13.145	200	0.50%	23.2	0.74	0.79	57

	OCATIO	N														POI	PULATION			1		FLOWS
Ľ																F0	FULATION					FLOWS
																						DESIGN FLOW /
							commercial															FULL FLOW
STREET	AREA ID	MAINTANA	NCE HOLES		RESIDENTIA single family		(ha)	school (ha)	TOTAL POP	ACCUM. POP.	PEAK FACTOR	AREA	ACCUM. AREA	PK. DAY FLOW	INFILT.	TOTAL FLOW	SIZE	SLOPE	CAPACITY	FULL FLOW	ACT. FLOW	
1	2	upstream 3	downstream 4	area	units	units 5	6	7	8	9	10	(ha) 11	(ha) 12	(L/s) 13	(L/s) 14	(L/s) 15	(mm) 16	(%) 17	(L/s) 18	(m/s) 19	(m/s) 20	21
		0				0					10		12	10		10	10		10	10	20	
	40	MH36A	MH37A	0.18					0	0	3.50	0.18	0.19	0.000	0.052	0.052	200	1 90%	44.1	1.40	0.08	1
	40	MH37A	MH38A	0.18					0	0	3.50	0.18	0.18	0.000	0.052	0.052	200		<u>44.1</u> 44.1	1.40	0.08	1
	42	MH38A	MH41A	0.09					0	0	3.50	0.09	0.38	0.000	0.110	0.110	200		44.1	1.40	0.08	1
	43	MH39	MH40	0.49	4				12	12	3.41	0.49	0.49	0.137	0.142	0.279	200	1.00%	32.8	1.05	0.06	1
	EXT2 44	EXT2 MH40	MH40 MH41A	4.20 0.29	2				168 6	168 186	3.17 3.16	4.20 0.29	4.20 4.98	1.790 1.972	1.218	3.008 3.417	200	0.80%	29.4	0.94	0.42	12
	45	MH13A	MH34A	0.23	5				15	15	3.40	0.23	0.47	0.171	0.136	0.307	200		46.5	1.48	0.08	1
	46	MH34A	MH35A	2.63	3			2.33	149	164	3.18	4.96	5.43	1.747	1.575	3.322	200	2.00%	46.5	1.48	0.53	8
	47	MH35A	MH41A	0.07					0	164	3.18	0.07	5.50	1.747	1.595	3.342	200		46.5	1.48	0.53	8
3	48 49	MH41A MH43A	MH44A MH44A	0.66	8				24 3	374 3	3.04 3.45	0.66 0.49	11.52 0.49	3.809 0.035	3.341 0.142	7.150 0.177	200 200		56.9 57.8	1.81 1.84	0.85	13
	50	MH42A	MH44A	0.07	•				0	0			0.07	0.000	0.020	0.020	200		38.9	1.24	0.07	1
	51	MH44A	MH45A	0.44		11			31	408		0.44	12.52	4.129	3.631	7.760	200		51.9	1.65	0.84	15
	52	MH45A	MH50A	0.49	1	12			34	441	3.00	0.49	13.01	4.445	3.773	8.218	200		51.9	1.65	0.88	16
	53 54	MH43A MH46A	MH46A MH47A	0.12	4	7			3 32	3 35		0.12	0.12	0.035	0.035	0.070 0.594	200 200		63.2 67.3	2.01 2.14	0.11	1
	55	MH47A	MH49A	0.47	3	5			23	58		0.47	1.18	0.638	0.342	0.981	200		67.3	2.14	0.24	2
	56	MH48A	MH49A	0.28	3				9	9	3.42	0.28	0.28	0.103	0.081	0.184	200		67.3	2.14	0.12	1
	57 58	MH49A MH50A	MH50A MH54A	0.27 0.17	2				<u>6</u> 0	73 514	3.28 2.97	0.27	1.73 14.91	0.799 5.119	0.502	1.301 9.443	200 200		73.4 34.5	2.34 1.10	0.26	2 28
	59	MH42A	MH54A MH52A	0.17	4				12	12	3.41	0.17	0.29	0.137	0.084	9.443 0.221	200		38.9	1.10	0.04	1
	60	MH16A	MH51A	0.14	1				3	3	3.45	0.14	0.14	0.035	0.041	0.075	200	1.00%	32.8	1.05	0.06	1
	61	MH51A	MH52A	0.29	4				12	15			0.43	0.171	0.125	0.296	200		56.9	1.81	0.10	1
	62 63	MH52A MH53A	MH53A MH54A	0.31 0.55	1 5	4			15 33	42 75		0.31 0.55	1.03 1.58	0.469	0.299	0.768 1.283	200 200		91.7 91.7	2.92 2.92	0.16	1 2
	64	MH54	MH56A	0.64	7				21	610	2.93	0.64	17.13	5.994	4.968	10.961	200		34.5	1.10	0.90	32
	65	MH56A	MH58A	0.04					0	1464	2.69	0.04	34.39	13.204	9.973	23.178	200		46.5	1.48	1.48	50
	66 67	MH58A MH59A	MH59A MH60A	0.08					0		2.69 2.69		34.47 34.48	13.204 13.204	9.996 9.999	23.201 23.204		2.00% 2.00%	46.5 46.5	1.48 1.48	1.48 1.48	
	07	WII 100A	WINDOA	0.01					1464	1404	2.03	34.48	04.40	13.204	3.333	23.204	200	2.0070	40.5	1.40	1.40	
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	LOCATIO	N										1	1	1		PO	PULATION					FLOW
TREET	AREA	MAINTAN	NCE HOLES		I RESIDENTIA		commercial (ha)	school (ha)	TOTAL	ACCUM.	PEAK		ACCUM.	PK. DAY	INFILT.	TOTAL	SIZE	SLOPE	CAPACITY	VELO	OCITY	DESI FLO\ FULL F %
	ID	upstream	downstream	area	single family units	Townhouse units			POP	POP.	FACTOR	AREA (ha)	AREA (ha)	FLOW (L/s)	(L/s)	FLOW (L/s)	(mm)	(%)	(L/s)	FULL FLOW (m/s)	ACT. FLOW (m/s)	
1	2	3	4	urou	Grinto	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	2
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174.00

2.33

176.33

APPENDIX "B"

Storm Sewer Design Sheets

		935	58 GOREW AMPTON (AY DRIVE			ID PLA TEL (905 FAX (905	5) 794-06	00																				
ubdivisi ile No.: consulta prainage		an:			BURGH evcon L								-	-		SBURGH INAGE						DATE	IUMBEF ARED B			W21081 February ⁻ SDL	15, 2023		
ORE ROAL) TRIBUTA	RY						Park Single/ Multip Industi Roads	le/inst		0.25 0.50 0.75 0.90 0.90												For 1	5-yr storm L0-yr storm D0-yr storm	I ₁₀ =	744/((tc*1.76)^ 869/((tc*1.79)^ 1248/((tc*1.83)	^.730)		
Core System	Area No.	Up- stream	Down- stream	Contri	buting Are	ea (ha)	Bre	eakdow	n of Are	eas	Ar	ea x St	orm Co	ef.	с	Total	Cummulative	Time (m	nin)	l ₅	I ₁₀	FLOW Q= 2.78AC I/1000				PIPE			
		Node	Node	In Area	Control	Total	0.25	0.50	0.75	0.90	0.25	0.50	0.75	0.90		AxC	AxC	In Area	Total			Q _{Design}	Length (m)	Size (mm)	Grade (%)	Capacity (m ³ /sec)	Velocity (m/s)	Time (min)	% Fu
OND 1	EXT2	EXT2	MH37	2.45	0.00	2.45	0.00		2.45		0	0.00	1.84	0.00	0.75	1.84	1.838	10.00	10.00	92.0		0.470							[
	SP1-1	MH37	MH38	0.18	2.45		3			0.18	0	0.00	0.00	0.16	0.90	0.16	2.000		10.16	90.9		0.505	26.8	600	1.6	0.776	2.75	0.16	1
	SP1-2	MH38	MH39	0.11	2.63		-			0.11	0	0.00				0.10	2.099	10.16		88.7		0.518	55.7	600	1.6	0.776	2.75	0.34	I
	SP1-3	MH39	MH42	0.09	2.74	2.83	-	0.40		0.09	0	0.00				0.08	2.180		10.83	86.8		0.526	57.2	600	1.8	0.823	2.91	0.33	
	SP1-4 SP1-5	MH40 MH41	MH41 MH42	0.49 2.10	0.00	0.49 2.59	-	0.49			0	0.25				0.25 1.55	0.245	10.00	10.51 10.97	88.7 86.0		0.060 0.428	56.6 72.5	300 525	1.8 1.8	0.130 0.577	1.84 2.67	0.51 0.45	<u> </u>
			MH35	0.47			-	0.11			0	0.00				0.24	0.235		10.97			0.420	84.5	300	1.0	0.137	1.93	0.43	
	SP1-7	MH35	MH42	2.71	0.00			0.18			0	0.09		0.00		1.99	2.223		11.11	85.2		0.526	70.9	600	2	0.868	3.07	0.38	
	SP1-8	MH42	MH45	0.64				0.64			0	0.32				0.32	6.515		11.37	83.7		1.517	67.6	750	3	1.927	4.36	0.26	
	SP1-9	MH44	MH45	0.49	0.00	0.49)	0.49			0	0.25	0.00	0.00	0.50	0.25	0.245	10.00	10.48	88.9		0.061	80	375	3.1	0.309	2.80	0.48	
		MH43	MH45	0.07						0.07	0	0.00		0.06		0.06	0.063		10.43			0.016	41.4	300	1.4	0.114	1.62	0.43	L
	SP1-11	MH45	MH46	0.44	9.80				0.44		0	0.00				0.33	7.153		11.61	82.5		1.640	61.6	825	2.5	2.269	4.25	0.24	
		-	MH51	0.49	10.24			0.42	0.49		0	0.00	0.37			0.37	7.520		11.85			1.698	61.6	825	2.5	2.269	4.25	0.24	
		1	MH47 MH48	0.12 0.59	0.00	0.12		0.12			0	0.06	-			0.06 0.37	0.060 0.428		10.12 10.46	91.2 89.0		0.015 0.106	18.3 57.1	300 300	3.7 4.2	0.186 0.198	2.63 2.80	0.12 0.34	
	-		MH50	0.39			_	0.32			0	0.15	0.22			0.37	0.428		5 10.40	87.3		0.100	55.3	375	4.2	0.359	3.25	0.34	
		MH49	MH50	0.26	0.00	0.26		0.26			0	0.13		0.00		0.13	0.130		10.20	90.6		0.033	34.8	300	4.3	0.200	2.84	0.20	
			MH51	0.27	-	1.71	-	0.27			0	0.14	0.00			0.14	0.965		11.13			0.228	93	450	5	0.637	4.01	0.39	Ĺ
		MH51	MH56	0.16	12.44	12.60)			0.16	0	0.00	0.00	0.14		0.14	8.629		11.54	82.8		1.987	82.3	1050	1.1	2.863	3.31	0.41	
			MH54	0.28	0.00		-	0.28			0	0.14				0.14	0.140		10.21	90.6		0.035	47.3	300	7.8		3.82	0.21	ļ
		MH16	MH53	0.14	0.00			0.14			0	0.07	0.00	0.00		0.07	0.070	10.00		90.8		0.018	40.2	300	7.8	0.270	3.82	0.18	
			MH54	0.29	0.14		-	0.29			0	0.15	0.00	0.00		0.15	0.215		10.50	88.7		0.053	52.3	300	3.8		2.67	0.33	
	SP1-22			0.31	0.71			0.15			0	0.08	-			0.20	0.550	10.50		86.9		0.133	48	300	3.8		2.67	0.30	
	SP1-23 SP1-24		MH56 MH57	0.55 0.31	1.02 14.17		-	0.36			0	0.18				0.32 0.16	0.873 9.657		11.18 11.79			0.206 2.189	70.8 49.9	375 1050	3.8 1.1	0.342 2.863	3.09 3.31	0.38 0.25	
	SP1-24 SP1-25		MH62	0.31	14.17			0.31			0	0.16	0.00	0.00		0.16	9.657		12.05	81.6		2.189	49.9 51.7	1050	1.1	2.863	3.31	0.25	<u> </u>
	SP1-26		MH58	0.50	0.00			0.5			0	0.15		0.00	0.00	0.15	3.007	11.13	12.00	00.0		2.100	51.7	300	1.1	0.118	1.68	0.20	

For 5-yr storm I_5 =	744/((tc*1.76)^.729)
For 10-yr storm I_{10} =	869/((tc*1.79)^.730)
For 100-yr storm I_{100} =	1248/((tc*1.83)^.732)

		C(935	CANE ONSULT 58 GOREW, RAMPTON C	ING EN	IGINEE	RS ANE		INERS	5 0																				
l Subdivisi File No.: Consulta Drainage	nt:	an:			evcon Li	I HEIGH	ITS						-	-		SBURGH INAGE						DATE	IUMBEI ARED B			W21081 February SDL	15, 2023		
GORE ROAL	O TRIBUTAI	RY					S N Ir	Park Aingle/se Aultiple Industria Roads	e/inst		0.25 0.50 0.75 0.90 0.90												For 1	⁻ 5-yr storm 10-yr storm 00-yr storm	I ₁₀ =	744/((tc*1.76)′ 869/((tc*1.79)′ 1248/((tc*1.83	.730)		
Core System	Area No.	Up- stream	Down- stream	Contril	buting Are	ea (ha)	Brea	akdown	of Area	as	Ar	ea x St	orm Co	ef.	С	Total	Cummulative	Time (m	nin)	l ₅	I ₁₀	FLOW Q= 2.78AC I/1000				PIPE			
		Node	Node	In Area	Control	Total	0.25	0.50	0.75	0.90	0.25	0.50	0.75	0.90		AxC	AxC	In Area	Total			Q _{Design}	Length (m)	Size (mm)	Grade (%)	Capacity (m ³ /sec)	Velocity (m/s)	Time (min) %	Full
		MH58	MH59	0.81	0.50	1.31		0.81			0	0.41	0.00				0.655		8 11.40			0.152	90	375	1.5	0.215	1.94	0.77	71
	-	MH59	MH60	0.47				0.47			0	0.24					0.890		11.88			0.201	63		1.5	0.349	2.20	0.48	58
L			MH60	0.23	0.00	0.23		0.23			0	0.12					0.115		10.20	90.6		0.029	43.7	300	7	0.256	3.62	0.20	11
			MH62	0.50	2.01	2.51		0.5			0	0.25					1.255		12.27			0.276	104.3	450	6	0.698	4.39	0.40	40
	SP1-31	MH62	POND	0.00	17.29	17.29	0.00	7.99	8.69	0.61	0 17.29	0.00	0.00	0.00	0.64	0.00	11.062	12.27	12.27	79.2		2.436	23.9	1050	2	3.860	4.46	0.09	63

For 5-yr storm I_5 =	744/((tc*1.76)^.729)
For 10-yr storm I_{10} =	869/((tc*1.79)^.730)
For 100-yr storm I_{100} =	1248/((tc*1.83)^.732)

			9358 GOREWAY DRIVE TEL (905) 794-0600 BRAMPTON ON. L6P-0M7 FAX (905) 794-0611																										
Subdivision: Tile No.: Consultant: Drainage Area Plan:			HILLSBURGH HEIGHTS Candevcon Limited STM 1							TOWN OF HILLSBURGH STORM DRAINAGE										FILE NUMBER DATE PREPARED BY				W21081 February 15, 2023 SDL					
DRE ROAL	O TRIBUTAF	RY						Park Single/semi Multiple/inst Industrial Roads			0.25 0.50 0.75 0.90 0.90												For 5-yr storm I_5 = For 10-yr storm I_{10} = For 100-yr storm I_{100} =			744/((tc*1.76)^.729) 869/((tc*1.79)^.730) 1248/((tc*1.83)^.732)			
Core System	Area No.	o. Up- Down stream strear		Contributing Area		ea (ha)	В	Breakdown of Areas		Area x Storm Coef.		oef.	С	Total	Cummulative	Time (min)		I ₅	l.a.	FLOW Q= 2.78AC I/1000				PIPE					
		.		line A sec		-	0.07																Length	Size	Grade	Capacity	Velocity	Time	o/ E
	SP2-1	Node MH1	Node MH2	In Area	Control			0.50	0.75	0.90	0.25	0.50		0.90	0.50	A x C 0.20	AxC 0.20	In Area 10.00	Total 10.51	88.7		Q _{Design} 0.048	(m) 66.1	(mm) 300	(%) 2.5	(m ³ /sec) 0.153	(m/s) 2.16	(min) 0.51	% Fu
		MH2	MH3	0.3				0.39			0	0.20			1 1	0.20	0.20	10.00		88.2		0.048	14.8	300	4.5	0.155	2.10	0.08	
		MH3	MH6	0.86				0.86			0	0.43	-	-		0.13	0.78		11.11	85.2		0.184	103.6	375		0.372	3.37	0.00	
		MH1	MH4	0.25		_		0.25			0	0.13				0.13	0.13		11.23	84.5		0.029	14.8	300	2	0.137	1.93	0.13	_
	-	MH4	MH5	0.93				0.93			0	0.47	-	-		0.47	0.59		12.00	80.5		0.132	102.7	375	2	0.248	2.25	0.76	-
		MH5	MH6	0.45	_				0.45		0	0.00	-	0.00		0.34	0.93					0.195	87.3	525	0.5	0.304	1.40	1.04	
	SP2-7	MH6	MH8	0.47	7 3.18	3.6	5	0.47			0	0.24	4 0.00	0.00	0.50	0.24	1.94	13.03	13.44	74.1		0.399	91.9	450	4.5	0.605	3.80	0.40	
	SP2-8	MH7	MH8	0.81	0.00	0.8	1		0.81		0	0.00	0 0.61	0.00	0.75	0.61	0.61	13.44	13.96	72.1		0.122	92.9	300	4.7	0.210	2.97	0.52	
	SP2-9	MH8	MH9	0.36	6 4.46	6 4.8	2	0.36			0	0.18	8 0.00	0.00	0.50	0.18	2.73	13.96	5 14.47	70.2		0.532	76.9	600	1.3	0.700	2.48	0.52	
		MH9	MH10	0.09	_			0.09			0	0.05				0.05	2.77		14.58	69.8		0.538	16.2	600	1.3	0.700	2.48	0.11	
		MH10	MH19	0.64		-			0.64		0	0.00	-			0.48	3.25					0.598	118	750	0.5	0.787	1.78	1.10	<u> </u>
	SP2-12		MH11	0.57				_	0.57		0				0.75	0.43			17.05	62.3		0.074	91.6	375	0.5	0.124	1.12	1.36	_
	-	EXT1	MH11	2.05		_			2.05		0	0.00	_	-	0.75	1.54	1.54		10.00			0.544				. ===			<u> </u>
	SP2-13		MH12	0.09						0.09		0.00	-		0.90	0.08	2.05		10.23			0.514	36.7		1.5	0.752	2.66	0.23	1
	SP2-14 SP2-15		MH15 MH14	0.09				1	0.35		0.453	0.00	-	-		0.08	2.13 0.72		10.57 10.88	88.3 86.5		0.522 0.172	55 63.7	600 375	1.5 4.7	0.752	2.66 3.44	0.34	-
	SP2-15 SP2-16		MH14 MH15	0.33		-		<u> </u>	0.33		0.455	0.00	-	-	1 1	0.72	0.72		11.19			0.172	63.7	375		0.380	3.44	0.31	
	SP2-17		MH15	0.75	_		-		0.75		0	0.00			0.75	0.56	0.56		12.12			0.125	88.9	375		0.175	1.59	0.93	1
	SP2-18		MH18	0.15						0.15	0	0.00	_			0.14	3.79		12.56			0.820	88.9	750	1.8	1.493	3.38	0.44	-
	SP2-19		MH17	0.44		-	-		0.44		0	0.00				0.33	0.33		13.63		1	0.067	87.5	300	1	0.097	1.37	1.07	-
	SP2-20		MH18	0.18					0.18		0	0.00	-		0.75	0.14	0.47		13.83			0.094	42.4	300	6.4	0.245	3.46	0.20	
	SP2-21	MH18	MH19	0.26	6.8	7.0	7		0.26		0	0.00	0 0.20	0.00	0.75	0.20	4.45	13.83	8 14.03	71.9		0.888	51	750	3	1.927	4.36	0.19	
	SP2-22		MH34	0.24	12.62	2 12.8	6	0.24			0	0.12	2 0.00	0.00	0.50	0.12	7.82	14.03	14.42	70.4		1.530	52.8	1050	0.5	1.930	2.23	0.39	
	SP2-23		MH22	0.23	_			0.23			0	0.12	-			0.12	0.12		14.73			0.022	43.7	300	2.9	0.165	2.33	0.31	-
	_	MH22	MH23	0.54				0.54			0	0.27				0.27	0.39		15.17	67.9	ļ	0.073	61.4	300	2.9	0.165	2.33	0.44	
	SP2-25		MH24	0.88				0.88			0	0.44				0.44	0.83		15.94			0.150	90		1.2	0.312	1.96	0.76	-
	SP2-26		MH25	0.27				0.27			0	0.14	_			0.14	0.96		16.46			0.171	61.4	450	1.2	0.312	1.96	0.52	
	SP2-27		MH26	0.38				0.38			0	0.19	-		0.50	0.19	1.15		16.60			0.203	16.2	450	1.2	0.312	1.96	0.14	┣──
	SP2-28		MH27	0.36	_	-		0.36			0	0.18	-			0.18	1.33		17.20	61.9		0.229	71.4	450	1.2	0.312	1.96	0.61	
	SP2-29 SP2-30		MH28 MH29	0.12				0.12			0	0.06	-			0.06	1.39 1.56		17.33 18.08			0.238 0.258	14.8 62.2	450 600	1.2 0.4	0.312	1.96 1.37	0.13 0.75	-

For 5-yr storm I_5 =	744/((tc*1.76)^.729)
For 10-yr storm I_{10} =	869/((tc*1.79)^.730)
For 100-yr storm I_{100} =	1248/((tc*1.83)^.732)

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Subdivision:HILLSBURGH HEIGHTSFile No.:Candevcon LimitedDrainage Area Plan:STM 1				TOWN OF HILLSBURGH STORM DRAINAGE						FILE NUMBER DATE PREPARED BY				W21081 February 15, 2023 SDL															
GORE ROAL	O TRIBUTAI	RY						Park Single/ Multip Industr Roads	le/inst		0.25 0.50 0.75 0.90 0.90												For 1	5-yr storm L0-yr storm D0-yr storm	I ₁₀ =	744/((tc*1.76)/ 869/((tc*1.79)/ 1248/((tc*1.83	.730)		
Core System	Area No.	Up- stream	Down- stream	Contril	outing Are	ea (ha)	Bre	eakdow	n of Are	eas	Ar	ea x St	orm Co	ef.	С	Total	Cummulative	Time (n	nin)	I_5	I ₁₀	FLOW Q= 2.78AC I/1000				PIPE			
		Node	Node	In Area	Control	Total	0.25	0.50	0.75	0.90	0.25	0.50	0.75	0.90		AxC	AxC	In Area	Total			Q _{Design}	Length (m)	Size (mm)	Grade (%)	Capacity (m ³ /sec)	Velocity (m/s)	Time (min)	% Full
	SP2-31	MH29	MH32	0.36	3.11	3.47		0.36			0	0.18	0.00	0.00	0.50	0.18	1.74	18.08	8 18.80	58.0		0.280	59.2		0.4	0.388	1.37	0.72	72
		MH17	MH30	0.51	0.00	0.51		0.34			0	0.17				0.30	0.30		19.25	57.1		0.047	63.4		3	0.167	2.37	0.45	28
L		MH30	MH31	0.49	0.51	1.00		0.32	0.17		0	0.16				0.29	0.59		5 19.65	56.2		0.091	58		3	0.167	2.37	0.41	55
L		MH22	MH31	0.44	0.00	0.44		0.44			0	0.22				0.22	0.22		20.69	54.1		0.033	93.4		1.2		1.50	1.04	31
	SP2-35 SP2-36	MH31 MH32	MH32 MH34	0.41	1.44 5.32	1.85 5.67		0.41	0.35		0	0.21	0.00			0.21 0.26	1.01 3.01		21.20	53.2 51.7		0.149	93.4 76.7		5 0.4	0.216 0.704	3.06 1.59	0.51 0.80	69 61
	5-2-30	MH32 MH34	OUT	0.35	18.53				0.35		0	0.00	0.20			0.20	10.82		22.00	51.7		1.551	22.2		0.4		2.82	0.80	64

For 5-yr storm I_5 =	744/((tc*1.76)^.729)
For 10-yr storm I_{10} =	869/((tc*1.79)^.730)
For 100-yr storm I_{100} =	1248/((tc*1.83)^.732)

APPENDIX "C"

Preliminary Geotechnical Investigation Report



Soil Engineers Ltd.

CONSULTING ENGINEERS

GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	N
TEL: (705) 721-7863	TEL
FAX: (705) 721-7864	FAX

MISSISSAUGA L: (905) 542-7605 FAX: (905) 542-2769

OSHAWA TEL: (905) 440-2040 FAX: (905) 725-1315 FAX: (905) 881-8335

NEWMARKET TEL: (905) 853-0647

GRAVENHURST TEL: (705) 684-4242 FAX: (705) 684-8522

HAMILTON TEL: (905) 777-7956 FAX: (905) 542-2769

A REPORT TO CEDAR CITY DEVELOPMENTS

PRELIMINARY GEOTECHNICAL INVESTIGATION FOR

PROPOSED DEVELOPMENT

5916 TRAFALGAR ROAD NORTH

TOWN OF ERIN (HILLSBURGH)

REFERENCE NO. 2009-S020

OCTOBER 2020

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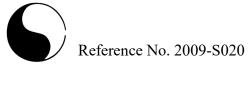


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1.0 **INTRODUCTION**

In accordance with an email authorization dated September 2, 2020, from Mr. Steven Silverberg, President of Cedar City Developments, a geotechnical investigation was carried out at 5916 Trafalgar Road North in the Town of Erin (Hillsburgh).

The purpose of the investigation was to reveal the subsurface conditions and determine the engineering properties of the disclosed soils for a future development. Detailed design of the development is not available; the geotechnical findings and preliminary recommendations for development are presented in this report.

2.0 SITE AND PROJECT DESCRIPTION

The Town of Erin is located in a physiographical region known as Hillsburgh Sandhills where the topography is rough with flat-bottomed swampy valleys running through sandy knolls. Lacustrine sands, silts and clays, reworked till, and glaciolacustrine sediments were deposited on drift and ground moraines which had been partly eroded by the past glaciation.

The subject property at 5916 Trafalgar Road North in the Town of Erin (Hillsburgh) is approximately 47 hectares in area. It is located on the west side of Trafalgar Road North, approximately 650 m south of Sideroad 27. At the time of the investigation, the property was mostly a farm field, with farm buildings fronting Trafalgar Road North. The existing site gradient is undulating, having a difference in elevation of more than 20 m across the property.

Detailed design of the proposed development is not available at the time or report preparation. It is understood that it will likely be a mixed use residential subdivision development with municipal services and roadways.

3.0 FIELD WORK

The field work, consisting of twelve (12) sampled boreholes extending to depths ranging from 6.2 to 6.6 m from the prevailing ground surface, was performed on September 22 and 23, 2020, at the locations shown on the Borehole Location Plan, Drawing No. 1.

The boreholes were advanced at intervals to the sampling depths by a track-mounted, continuous-flight power-auger machine equipped for soil sampling. Standard Penetration Tests, using the procedures described on the enclosed "List of Abbreviations and Terms", were performed at the sampling depths. The test results are recorded as the Standard Penetration



Resistance (or 'N' values) of the subsoil. The relative density of the non-cohesive strata and the consistency of the cohesive strata are inferred from the 'N' values. Split-spoon samples were recovered for soil classification and laboratory testing.

The ground elevation at each borehole location was obtained using a hand-held Global Navigation Satellite System (GNSS) equipment.

4.0 SUBSURFACE CONDITIONS

The investigation has disclosed that beneath a topsoil veneer, with a layer of earth fill and topsoil fill at one location, the site is generally underlain by strata of sandy silt till, silty sand till and sand. In place, a localized deposit of silt was also encountered.

Detailed descriptions of the subsurface conditions are presented on the Borehole Logs, comprising Figures 1 to 12, inclusive. The revealed stratigraphy is plotted in the Subsurface Profiles, Drawing Nos. 2 and 3. The engineering properties of the disclosed soils are discussed herein.

4.1 **Topsoil** (All Boreholes)

Boreholes were drilled in the farm field or open areas. The revealed topsoil ranges from 25 to 33 cm in thickness. Due to active farming activities, thicker topsoil layers can be anticipated in places, especially in low-lying areas. Diligent control of the stripping operation will be required to prevent overstripping for the development.

The topsoil is dark brown in colour, with appreciable amounts of roots and humus. It is considered to be void of engineering value and must be removed for development.

Due to its humus content, the topsoil will produce volatile gases and may generate an offensive odour under anaerobic conditions. It must not be buried within the building envelope or deeper than 1.2 m below the finished grade so it will not have an adverse impact on the environmental well-being of the developed area.

4.2 Earth Fill and Topsoil Fill (Borehole 6)

A layer of earth fill and topsoil fill was contacted in Borehole 6, extending to a depth of 3.0 m from grade. The earth fill consists of silty sand with organic inclusions while the topsoil fill is sandy in texture, with appreciable topsoil content.



The water content values of the earth fill samples are 9% and 12%; while the water content values for the topsoil fill are 11%, 13% and 19%, indicating damp to very moist conditions. The high water content value of 19% indicates the presence of topsoil in the fill.

The obtained 'N' values range from 4 to 11 blows per 30 cm of penetration. This indicates that the fill was non uniform in compaction.

The existing earth fill is not suitable for supporting structures. It must be subexcavated, sorted free of organics and deleterious material, inspected, and properly compacted. If it is impractical to sort the fill, then it must be wasted. The topsoil fill encountered on site should be further assessed to determine its suitability for reuse.

One must be aware that the samples retrieved from boreholes may not be truly representative of the geotechnical and environmental quality of the fill, and do not indicate whether the topsoil beneath the earth fill was completely stripped. This should be further assessed by laboratory testing and/or test pits.

4.3 Sandy Silt Till and Silty Sand Till (All Boreholes, except Boreholes 6 and 7)

The sandy silt till and silty sand till predominate the soil stratigraphy at the site. They consist of a random mixture of particle sizes ranging from clay to gravel, with either sand or silt being the dominant fractions. Hard resistance to augering was encountered occasionally, inferring the occurrence of cobbles and boulders in the till mantle. Grain size analyses were performed on 4 representative samples and the results are plotted on Figures 13 and 14.

The natural water content values of the till samples were determined; the results are plotted on the Borehole Logs. The obtained values range from 3% to 15%, with a median of 7%. This indicates that the tills are in a dry to very moist condition.

The obtained 'N' values range from 3 to more than 100, with a median of 39 blows per 30 cm of penetration. These values show that the relative density is very loose to very dense, being generally dense. The loose tills generally occur in the weathered zone near the ground surface, extending to a depth of 0.8 to 1.8 m from grade. The engineering properties of the till deposit are listed below:

- High frost susceptibility and moderately low water erodibility.
- Relatively low to low permeability, with an estimated coefficient of permeability of 10⁻⁵ to 10⁻⁶ cm/sec, an estimated percolation rate of 30 to 50 min/cm and runoff coefficients of:

Slope

0% - 2%	0.11 to 0.15
2% - 6%	0.16 to 0.20
6%+	0.23 to 0.28

- The shear strength is primarily derived from internal friction and is augmented by cementation.
- The till deposit will generally be stable in relatively steep cuts; however, under prolonged exposure, localized sheet collapse may occur.
- Fair pavement-supportive material, with an estimated California Bearing Ratio (CBR) value of 8%.
- Moderately low corrosivity to buried metal, with an estimated electrical resistivity of 5000 ohm cm.
- 4.4 **<u>Sand</u>** (All Boreholes, except Borehole 1)

The sand deposit was interstratified with the till deposit in 11 of the 12 boreholes. It is fine to medium grained, with a variable amount of silt. The sand is laminated with silt seams, showing a lacustrine deposit. Grain size analyses were performed on 3 representative samples and the results are plotted on Figure 15.

The obtained 'N' values range from 2 to over 100, with a median of 35 blows per 30 cm of penetration, indicating the sand is very loose to very dense, being generally dense in relative density. The natural water content of the sand samples was determined to range from 1% to 17%, with a median of 4%., indicating a dry to wet, generally damp condition.

The deduced engineering properties of the sand deposit are given below:

- Moderate to low frost susceptibility.
- High water erodibility.
- Pervious, with an estimated coefficient of permeability of 10⁻² to 10⁻³ cm/sec, a percolation rate of 5 to 10 min/cm, and runoff coefficients of:

Slope	
0% - 2%	0.04
2% - 6%	0.09
2% - 6%	0.13

- The shear strength is derived from internal friction and is directly dependent on soil density.
- In excavation, the sand will slough in a relatively steep slope. It will run with water seepage and boil under a piezometric head of 0.3 m.



- A fair pavement-supportive structure, with an estimated CBR value of 10%.
- Low corrosivity to buried metal, with an estimated electrical resistivity of 6500 ohm cm.

4.5 <u>Silt</u> (Boreholes 1 and 2)

The silt stratum was contacted beneath the topsoil in the southwest sector of the property. It is very fine grained, with sand and clay seams and layers.

The natural water content of the soil samples was determined; the values range from 8% to 16%, with a median of 13%, indicating moist to very moist conditions.

The obtained 'N' values range from 6 to 27, with a median of 8 blows per 30 cm of penetration, indicating the deposit is loose to compact, being generally loose in relative density. The loose silt is the result of weathering near the ground surface, which extends up to a depth of 1.8 m from grade.

The engineering properties relating to the project are given below:

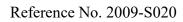
- High frost susceptibility, with high soil-adfreezing potential.
- High water erodibility; it is susceptible to migration through small openings under seepage pressure.
- Relatively low permeability, with an estimated coefficient of permeability of 10⁻⁵ cm/sec, a percolation rate of 30 to 40 min/cm and the runoff coefficients of:

Slope	
0% - 2%	0.11
2% - 6%	0.16
6% +	0.23

- The shear strength is derived from internal friction, which is density dependent.
- In excavation, the silt will slough and run slowly with seepage bleeding from the cut face. It will boil with a piezometric head of 0.4 m.
- Poor pavement-supportive material, with an estimated CBR value of 3%.
- Moderate corrosivity to buried metal, with an estimated electrical resistivity of 4500 ohm cm.

4.6 Compaction Characteristics of the Revealed Soils

The obtainable degree of compaction is primarily dependent on the soil moisture and, to a lesser extent, on the type of compactor used and the effort applied. As a general guide, the



typical water content values of the revealed soils for Standard Proctor compaction are presented in Table 1.

	Determined Natural	Water Content (%) for Standard Proctor Compaction					
Soil Type	Water Content (%)	100% (optimum)	Range for 95% or +				
Existing Earth Fill	9 and 12	12 to 15	8 to 18				
Silt/Sand	1 to 17 (median 4 and 13)	11 and 12	6 to 15				
Silt Till/Sand Till	3 to 15 (median 7)	12	8 to 15				

Table 1 - Estimated Water Content for Compaction of On-Site Material

The above values show that part of the in situ soils are either too dry or too wet and will require aeration or wetting for a 95% or + Standard Proctor compaction. The wet materials must be aerated by spreading them thinly on the ground in dry and warm weather, prior to structural compaction. Alternatively, the wet sand and silt can be mixed with the drier tills.

Weathered soils and earth fill should be screened, segregated the organics and deleterious material before reuse as structural backfill. The earth fill must be sorted free of topsoil and deleterious materials prior to reuse as structural fill. If it is impractical to sort the fill, then it must be wasted. The topsoil fill must be further assessed to determine its suitability for reuse.

When compacting the very dense till on the dry side of the optimum, the compactive energy will frequently bridge over the chunks in the soils and be transmitted laterally into the soil mantle. Therefore, the lifts of these soils must be limited to 20 cm or less (before compaction). The presence of boulders will prevent transmission of the compactive energy into the underlying material to be compacted. If an appreciable amount of boulders is mixed with the material, it must either be sorted or must not be used for structural backfill.

If the compaction of the soils is carried out with the water content within the range for 95% Standard Proctor dry density but on the wet side of the optimum, the surface of the compacted soil mantle will roll under the dynamic compactive load. This is unsuitable for road construction since each component of the pavement structure is to be placed under dynamic conditions which will induce the rolling action of the subgrade surface and cause structural failure of the new pavement. The foundations or bedding of the sewer and slab-on-grade, on the other hand, will be placed on a subgrade which will not be subjected to impact loads. Therefore, the structurally compacted soil mantle with the water content on

the wet side or dry side of the optimum will provide an adequate subgrade for the construction.

One should be aware that $90\%\pm$ Standard Proctor compaction of the wet organic sand and silt is achievable. Further densification is prevented by the pore pressure induced by the compactive effort; however, large random voids will have been expelled, and with time the pore pressure will dissipate and the percentage of compaction will increase. There are many cases on record where after a few weeks to months of rest, the density of the compacted mantle has increased to over 95% of its maximum Standard Proctor dry density.

5.0 GROUNDWATER CONDITIONS

All boreholes remained dry and open upon completion of drilling. Minor seepage was encountered in the sand deposit in Borehole 9 at a depth of 6.0 m from grade. The groundwater level will fluctuate with seasons.

In excavation, where groundwater seepage is encountered, the yield is expected to be small to some in the till and appreciable and maybe persistent in the sand and silt.

6.0 DISCUSSION AND RECOMMENDATIONS

This investigation has disclosed that beneath a topsoil veneer, with a layer of earth fill and topsoil fill at Borehole 6, the site is underlain by strata of sandy silt till, silty sand till and sand, very loose to very dense, generally dense in relative density. A localized deposit of loose to compact silt was contacted near the ground surface. The very loose to loose condition in the revealed soil stratigraphy is the result of weathering near the ground surface, which extends up to a depth of 0.8 to 1.8 m from grade.

All boreholes remained dry and open upon completion of the borehole drilling. Minor seepage was contacted in Borehole 9 at a depth of 6.0 m from grade. The groundwater level will fluctuate with the seasons.

The future development at the property will likely be a mixed use residential subdivision development with municipal services and roadways. The geotechnical findings warranting special consideration for the proposed project are presented below:

1. The existing site gradient is undulating. The site will have to be regraded for the proposed development. Prior to site grading with cut and fill, the topsoil veneer



should be completely removed. The earth fill and topsoil fill should be excavated, examined, sorted free of topsoil and deleterious material before reuse for filling. If it is impractical to sort the fill, then it must be wasted.

- 2. After demolition of the existing structures and foundations, the debris must be removed and disposed off-site.
- 3. In areas where earth fill is required to raise the site, it is generally more economical to place an engineered fill for normal footing, underground services and pavement construction.
- 4. The proposed structures can be constructed on conventional footings founded in the engineered fill or sound natural soils.
- 5. The footing subgrade must be inspected by either a geotechnical engineer, or a geotechnical technician under the supervision of a geotechnical engineer to assess its suitability for bearing the foundations.
- 6. Additional boreholes may be required to elaborate the subsoil and groundwater conditions once the design for the proposed development is finalized.

The recommendations appropriate for the design of the development are presented herein. One must be aware that the subsurface conditions may vary between boreholes. Should subsurface variances become apparent during construction, a geotechnical engineer must be consulted.

6.1 Site Preparation

The existing site gradient is undulating. The site will have to be regraded for the proposed development.

Prior to site grading with cut and fill, the existing topsoil should be completely removed. The earth fill and topsoil fill should be excavated, examined, sorted free of topsoil and deleterious material before reuse for filling, otherwise they have to be removed.

The existing structures and foundations must be demolished and the debris must be removed and disposed off-site. The backfill must be free of topsoil or deleterious material, placed and compacted to engineered fill specifications.

The existing earth fill, topsoil fill, disturbed soils and weathered soils must be subexcavated, sorted free of topsoil and organics or further assessed for suitability of engineered fill uses.

The requirements for the engineered fill are presented below:

- 1. After removal of topsoil, earth fill, topsoil fill and unsuitable material, the native soil subgrade must be inspected and proof-rolled prior to any fill placement.
- 2. Inorganic soils must be used for the fill, and they must be uniformly compacted in lifts 20 cm thick to 98% or + of the maximum Standard Proctor dry density up to the proposed finished grade. The soil moisture must be properly controlled near the optimum. If the foundations are to be built soon after the fill placement, the densification process for the engineered fill must be increased to 100% of the maximum Standard Proctor compaction.
- 3. If the engineered fill is compacted with the moisture content on the wet side of the optimum, the underground services and pavement construction should not begin until the pore pressure within the fill mantle has completely dissipated. This must be further assessed at the time of the engineered fill construction.
- 4. If imported fill is to be used, it should be inorganic soils, free of any deleterious material with environmental issue (contamination). Any potential imported earth fill from off-site must be reviewed for geotechnical and environmental quality by the appropriate personnel as authorized by the developer or agency, before it is hauled to the site.
- 5. The engineered fill must not be placed during the period from late November to early April when freezing ambient temperatures occur either persistently or intermittently. This is to ensure that the fill is free of frozen soils, ice and snow.
- 6. The fill operation must be fully supervised and monitored by a technician under the direction of a geotechnical engineer.
- 7. If the engineered fill is to be left over the winter months, adequate earth cover, or equivalent, must be provided for protection against frost action.
- 8. The engineered fill envelope and finished elevations must be clearly and accurately defined in the field, and they must be precisely documented.
- 9. Foundations founded on engineered fill must be reinforced by at least two 15-mm steel reinforcing bars in the footings and in the upper section of the foundation walls, or be designed by a structural engineer, to properly distribute the stress induced by the abrupt differential settlement (about 15 mm) between the natural soil and engineered fill.
- 10. Any excavation carried out in certified engineered fill must be reported to the geotechnical consultant who supervised the fill placement in order to document the locations of excavation and/or to supervise reinstatement of the excavated areas to engineered fill status. If construction on the engineered fill does not commence within a period of 2 years from the date of certification, the condition of the engineered fill must be assessed for re-certification.
- 11. The footing and underground services subgrade must be inspected by the geotechnical consulting firm that supervised the engineered fill placement. This is to ensure that the



foundations and service pipes are placed within the engineered fill envelope, and the integrity of the fill has not been compromised by interim construction, environmental degradation and/or disturbance by the footing excavation.

6.2 **Foundation**

The proposed structures can be supported on conventional spread and strip footings, founded on the undisturbed native soil or engineered fill. The recommended soil bearing pressures for the design of conventional footings are provided below:

- Maximum Soil Bearing Pressure at Serviceability Limit State (SLS) = 150 kPa
- Factored Ultimate Bearing Pressure at Ultimate Limit State (ULS) = 240 kPa

The total and differential settlements of structures designing for the bearing pressure at SLS are estimated within 25 mm and 20 mm, respectively.

Foundations exposed to weathering or in unheated areas should have at least 1.5 m of earth cover for protection against frost action. In heated areas, the earth cover can be reduced to 1.2 m.

During construction, the subgrade soils of foundations should be inspected by the geotechnical engineer to ensure that the conditions are compatible with the design of the foundations.

If water seepage is encountered in excavation, the foundation must be poured immediately after subgrade inspection or the subgrade should be protected by a concrete mud-slab immediately after exposure. This will prevent construction disturbance and costly rectification of the bearing subsoil.

The building foundation should meet the requirements specified in the latest Ontario Building Code and the structures should be designed to resist an earthquake force using Site Classification 'D' (stiff soil).

6.3 Basement Structures

All boreholes remained dry upon completion of the fieldwork. In conventional basement construction, the basement structures should be provided with perimeter drainage system (Drawing No. 4), connecting into a positive outlet or sewer system. The subdrains should be encased in a fabric filter to protect them against blockage by silting. If the basement



structure is within 1.0 m above the high groundwater regime, underfloor subdrain should be placed in the slab bedding, with a 6 mil vapour barrier above the obvert of the subdrain to prevent upfiltrating moisture from dampening the floor slab.

Both the perimeter and underfloor subdrain systems should be drained into the municipal storm sewer system by gravity or into a sump pit where the water can be removed by pumping. In addition, the external grading should be designed to drain the surface runoff away from the building structures.

The soil parameters stated in Section 6.8 can be used to evaluate the earth pressure on the foundation walls. The exterior must be graded to direct runoff away from the structures.

The basement floor slab should be constructed on a granular base, 20 cm thick, consisting of 20-mm clear limestone, or equivalent. The subgrade for the slab-on-grade floor should consist of sound natural soils or properly compacted inorganic earth fill, compacted to 98% of the maximum Standard Proctor dry density.

A Modulus of Subgrade Reaction of 35 MPa/m can be used for the design of the floor slab.

6.4 Underground Services

The underground services should be founded on sound natural soil or properly compacted inorganic earth fill. Where incompetent or weathered soil is encountered, it should be subexcavated and replaced with the bedding material, compacted to at least 95% Standard Proctor dry density.

A Class 'B' bedding is recommended for the underground services construction. It should consist of compacted 20-mm Crusher-Run Limestone, or equivalent, as approved by a geotechnical engineer. Where the subgrade consists of saturated soil, with continuous seepage of groundwater, a Class 'A' concrete bedding is recommended.

The sewer joints into the manholes and catch basins must be leak-proof to prevent the migration of fines through the joints. Openings to subdrains and catch basins should be shielded with a fabric filter to prevent blockage by silting.

In order to prevent pipe floatation when the sewer trench is deluged with water derived from infiltrated precipitation, a soil cover of at least two times the diameter of the pipe should be in place at all times after completion of the pipe installation.



The subgrade of the underground services may consist of soils which are considered to have moderately high electrical corrosivity to ductile iron pipes and metal fittings; therefore, the underground services should be protected against soil corrosion. For estimation for the anode weight requirements, the electrical resistivities of the disclosed soils can be used. The proposed anode weight must meet the minimum requirements as specified by the Town of Erin and/or Wellington County Standard.

6.5 Backfilling in Trenches and Excavated Areas

The backfill in service trenches should be compacted to at least 95% of its maximum Standard Proctor Dry Density (SPDD). Below concrete floor subgrade and in the zone within 1.0 m below the pavement, the material should be compacted with the water content 2% to 3% drier than the optimum; compacted to 98% of the respective SPDD.

Selected on site inorganic soils are suitable for use as trench backfill. The till should be sorted free of large cobbles and boulders (over 15 cm in size). In addition, some of the in situ soils are either too wet or too dry for 95% or + Standard Proctor compaction and will require aeration, wetting or proper mixing prior to its use as structural backfill.

In normal construction practice, the problem areas of pavement settlement largely occur adjacent to manholes, catch basins, services crossings, foundation walls and columns, it is recommended that a sand backfill should be used.

The narrow trenches for services crossings should be cut at 1 vertical:2 horizontal so that the backfill in the trenches can be effectively compacted. Otherwise, soil arching in the trenches will prevent achievement of the proper compaction. In confined areas where the desired slope cannot be achieved or the operation of a proper kneading-type roller cannot be facilitated, imported sand fill, which can be appropriately compacted by using a smaller vibratory compactor, must be used. The interface of the native soils and the sand backfill will have to be flooded for a period of several days.

One must be aware of the possible consequences during trench backfilling and exercise caution as described below:

• To backfill a deep trench, one must be aware that future settlement is to be expected, unless the sides is flattened to 1 vertical:2 horizontal, and the lifts of the fill and its moisture content are stringently controlled; i.e., lifts should be no more than 20 cm (or less if the backfilling conditions dictate) and uniformly compacted to achieve at least 95% SPDD, with the moisture content on the wet side of the optimum.

- It is often difficult to achieve uniform compaction of the backfill in the lower vertical section of a trench which is an open cut or is stabilized by a trench box, particularly in the sector close to the trench walls or the sides of the box. These sectors must be backfilled with sand and the compaction must be carried out diligently prior to the placement of the backfill above this sector, i.e., in the upper sloped trench section. This measure is necessary in order to prevent consolidation of inadvertent voids and loose backfill which will compromise the compaction of the backfill in the upper section.
- In areas where groundwater movement is expected in the pipe bedding or trench backfill mantle, anti-seepage collars (OPSS 802.095) should be provided.
- When construction is carried out in freezing weather, frozen soil layers may inadvertently be mixed with the structural trench backfill. Should the in situ soils have a water content on the dry side of the optimum, it would be impossible to wet the soils due to the freezing condition, rendering difficulties in obtaining uniform and proper compaction. Furthermore, the freezing condition will prevent wetting of the backfill or when it is required, such as when the trench box is removed. The above will invariably cause backfill settlement in the next few years.
- In areas where the underground services construction is carried out during winter months, prolonged exposure of the trench walls will result in frost heave within the soil mantle of the walls. This may result in some settlement as the frost recedes, and repair costs will be incurred prior to final surfacing of the new pavement.

6.6 Slab-On-Grade, Garages and Driveways

The on-site soils are mostly frost susceptible and the ground will be subject to frost heaving during cold weather. The pavement and sidewalk in open areas, thus, should be designed to tolerate the ground movement.

In areas where ground movement due to frost heave cannot be tolerated, the slab-on-grade, pavement, barrier free ramps and/or sidewalk can be constructed on a free-draining granular base of 0.3 to 1.2 m thick, depending on the degree of tolerance for settlement. These measures, with proper drainage, will prevent water from accumulating in the granular base.

Alternatively, they can be insulated with 50-mm Styrofoam, or its thermal equivalent.

The slab-on-grade in open areas should be designed to tolerate frost heave, and the grading around the slab-on-grade must be such that it directs runoff away from the surface.

6.7 Pavement Design

The pavement design for local and collector roads is presented in Table 2.

Course	Thickness (mm)	OPS Specifications
Asphalt Surface	40	HL-3
Asphalt Binder Local Road Collector Road	50 65	HL-8
Granular Base	150	OPSS Granular 'A' or equivalent
Granular Sub-base Local Road Collector Road	300 400	OPSS Granular 'B' or equivalent

 Table 2 - Pavement Design

In preparation of pavement subgrade, all topsoil and compressible material should be removed. The final subgrade must be proof-rolled using a heavy roller or loaded dump truck. Any soft spot as identified must be rectified by subexcavation and replacing with selected dry inorganic material. The subgrade within 1.0 m below the underside of the granular sub-base must be compacted to at least 98% SPDD, with the water content at 2% to 3% drier than its optimum.

All the granular bases should be compacted in 150 to 200 mm lifts to 100% SPDD.

The pavement subgrade will suffer a strength regression if water is allowed to saturate the mantle. The following measures should, therefore, be incorporated in the construction procedures and road design:

- The subgrade should be properly crowned and smooth-rolled to allow interim precipitation to be properly drained.
- Lot areas adjacent to the roads should be properly graded to prevent ponding of large amounts of water. Otherwise, the water will seep into the subgrade mantle and induce a regression of the subgrade strength, with costly consequences for the pavement construction.
- Fabric filter-encased curb subdrains connecting to a positive outlet of catch basin, will be required on both sides of the roadway.

6.8 Soil Parameters



The recommended soil parameters for the project design are given in Table 3.

Unit Weight and Bulk Factor		it Weight (kN/m³)		timated k Factor
	Bulk	Submerged	Loose	Compacted
Sandy Silt Till and Silty Sand Till	22.5	12.5	1.30	1.05
Earth Fill, Weathered Soil, Silt and Sand	20.5	11.5	1.25	0.98
Lateral Earth Pressure Coefficients		Active Ka	At Rest Ko	Passive Kp
Compacted Earth Fill		0.40	0.55	2.50
Native Till, Sand or Silt		0.30	0.45	3.30
Coefficients of Friction				
Between Concrete and Granular Base				0.50
Between Concrete and Sound Natural Soil	S			0.35
Maximum Allowable Soil Pressure (SLS)	For Th	ust Block Des	ign	
Engineered Fill and Sound Natural Soils				75 kPa

Table 3 - Soil Parameters

6.9 Excavation

Excavation should be carried out in accordance with Ontario Regulation 213/91. The types of soils are classified in Table 4.

 Table 4 - Classification of Soils for Excavation

Material	Туре
Sound Till	1 to 2
Earth Fill, Weathered Soils, Sand or Silt in drained condition	3
Saturated Soils	4

Groundwater derived from infiltrated surface water or precipitation may be encountered in excavation. Any groundwater seepage in shallow excavation can be controlled by normal pumping from sumps. In excavation extending into the saturated silt or sand, if encountered, the possibility of flowing sides and bottom boiling dictates that the ground be pre-drained or depressurized by pumping from closely spaced sump-wells or well points.



7.0 LIMITATIONS OF REPORT

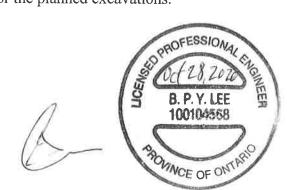
This report was prepared by Soil Engineers Ltd. for the account of Cedar City Developments and for review by the designated consultants, contractors, financial institutions, and government agencies. The material in the report reflects the judgment of Kelvin Hung, P.Eng., and Bernard Lee, P.Eng., in light of the information available to it at the time of preparation.

Prospective contractors may be asked to assess the subsurface conditions for soil cuts and dewatering by digging test pits to the intended depth of trench excavation. These test pits should be allowed to remain open for a period of at least 4 hours to assess the trenching conditions and to assess the proper dewatering scheme for the planned excavations.

SOIL ENGINEERS LTD.

Kelvin Hung, P.Eng. KH/BL:dd





Bernard Lee, P.Eng.

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

- AS Auger sample
- CS Chunk sample
- DO Drive open (split spoon)
- DS Denison type sample
- FS Foil sample
- RC Rock core (with size and percentage recovery)
- ST Slotted tube
- TO Thin-walled, open
- TP Thin-walled, piston
- WS Wash sample

PENETRATION RESISTANCE

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows for each foot of penetration of a 2-inch diameter, 90° point cone driven by a 140-pound hammer falling 30 inches. Plotted as '—•—'

Standard Penetration Resistance or 'N' Value:

The number of blows of a 140-pound hammer falling 30 inches required to advance a 2-inch O.D. drive open sampler one foot into undisturbed soil. Plotted as ' Ω '

- WH Sampler advanced by static weight
- PH Sampler advanced by hydraulic pressure
- PM Sampler advanced by manual pressure
- NP No penetration

SOIL DESCRIPTION

Cohesionless Soils:

<u>'N' (</u>	blov	vs/ft)	Relative Density
0	to	4	very loose
4	to	10	loose
10	to	30	compact
30	to	50	dense
0	ver	50	very dense

Cohesive Soils:

Undrained	l Shear				
Strength (<u>ksf)</u>	<u>'N' (</u>	blov	vs/ft)	<u>Consistency</u>
less than	0.25	0	to	2	very soft
0.25 to	0.50	2	to	4	soft
0.50 to	1.0	4	to	8	firm
1.0 to	2.0	8	to	16	stiff
2.0 to	4.0	16	to	32	very stiff
over	4.0	0	ver	32	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

- x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding
- \triangle Laboratory vane test
- □ Compression test in laboratory

For a saturated cohesive soil, the undrained shear strength is taken as one half of the undrained compressive strength

METRIC CONVERSION FACTORS

1 ft = 0.3048 metres11b = 0.454 kg 1 inch = 25.4 mm1 ksf = 47.88 kPa



Soil Engineers Ltd.

GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

LOG OF BOREHOLE NO.: 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)

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LOG OF BOREHOLE NO.: 10

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)

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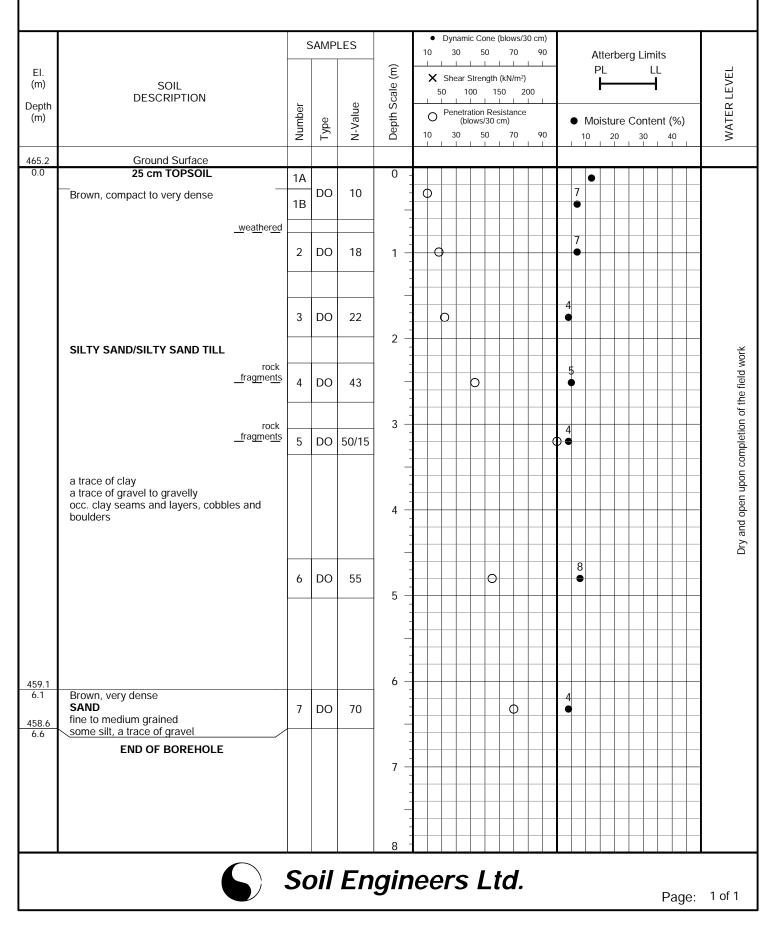
LOG OF BOREHOLE NO.: 11

FIGURE NO.: 11

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)



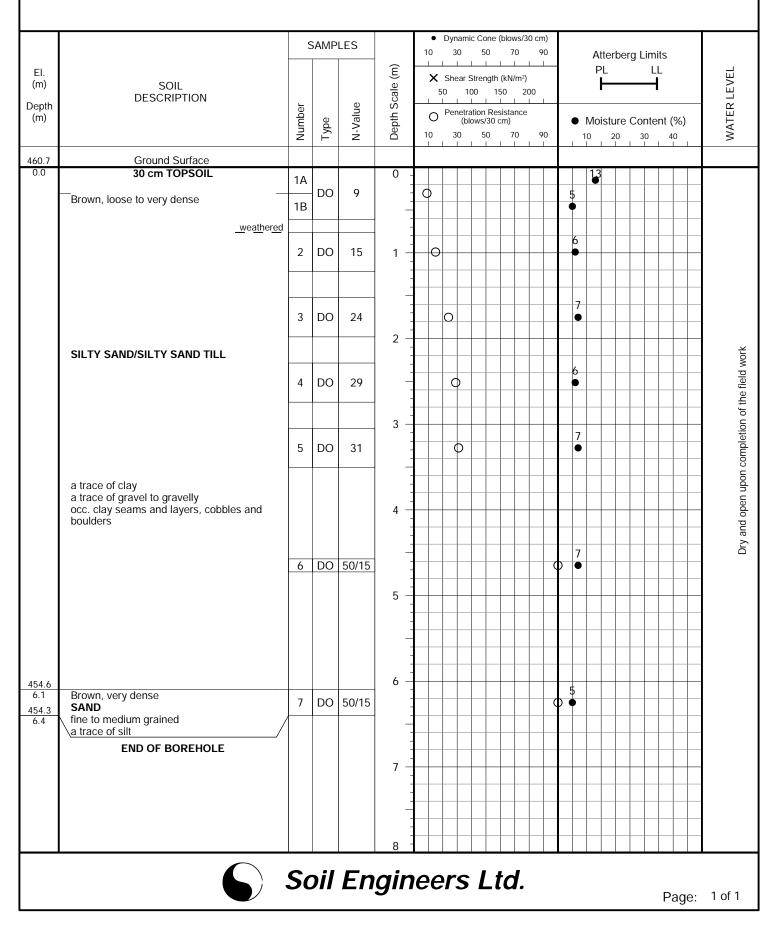
LOG OF BOREHOLE NO.: 12

2 FIGURE NO.: 12

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)



LOG OF BOREHOLE NO.: 2

2 FIGURE NO.:

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)

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LOG OF BOREHOLE NO.: 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)

DRILLING DATE: September 22, 2020

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LOG OF BOREHOLE NO.: 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)

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LOG OF BOREHOLE NO.: 5

FIGURE NO.: 5

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)

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LOG OF BOREHOLE NO.: 6

FIGURE NO.: 6

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)

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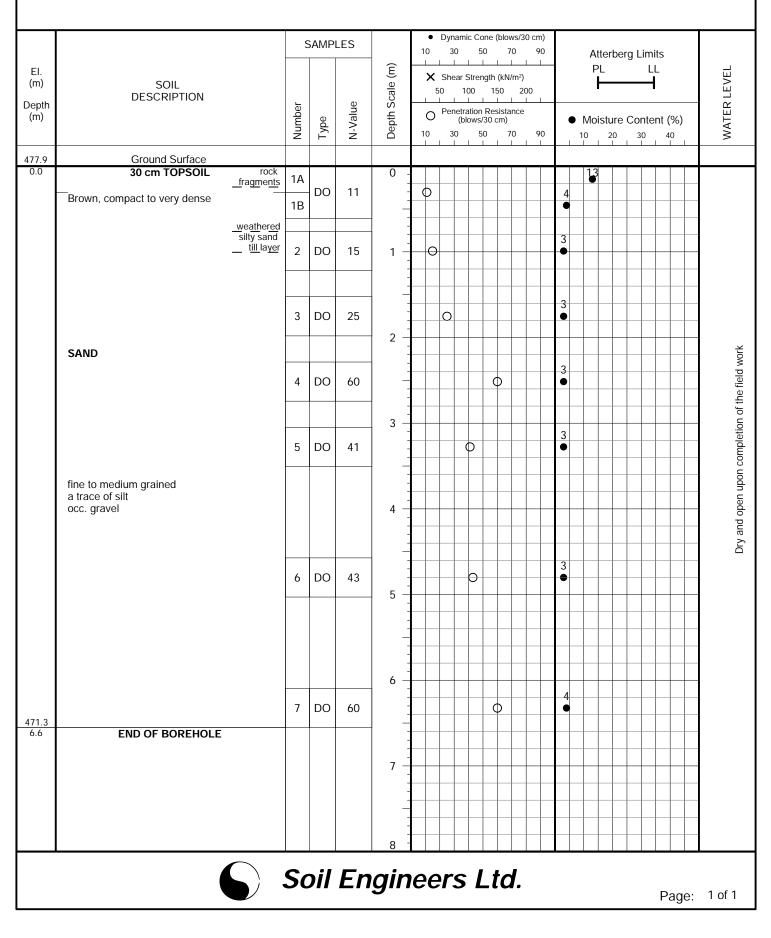
LOG OF BOREHOLE NO.: 7

FIGURE NO.: 7

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)



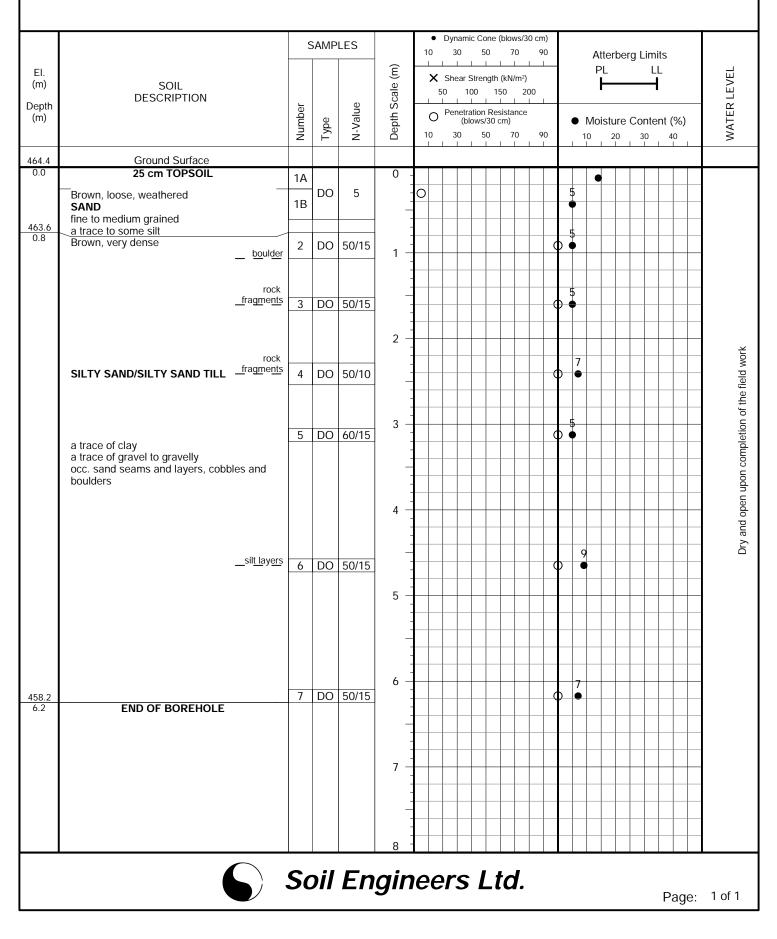
LOG OF BOREHOLE NO.: 8

FIGURE NO.: 8

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)



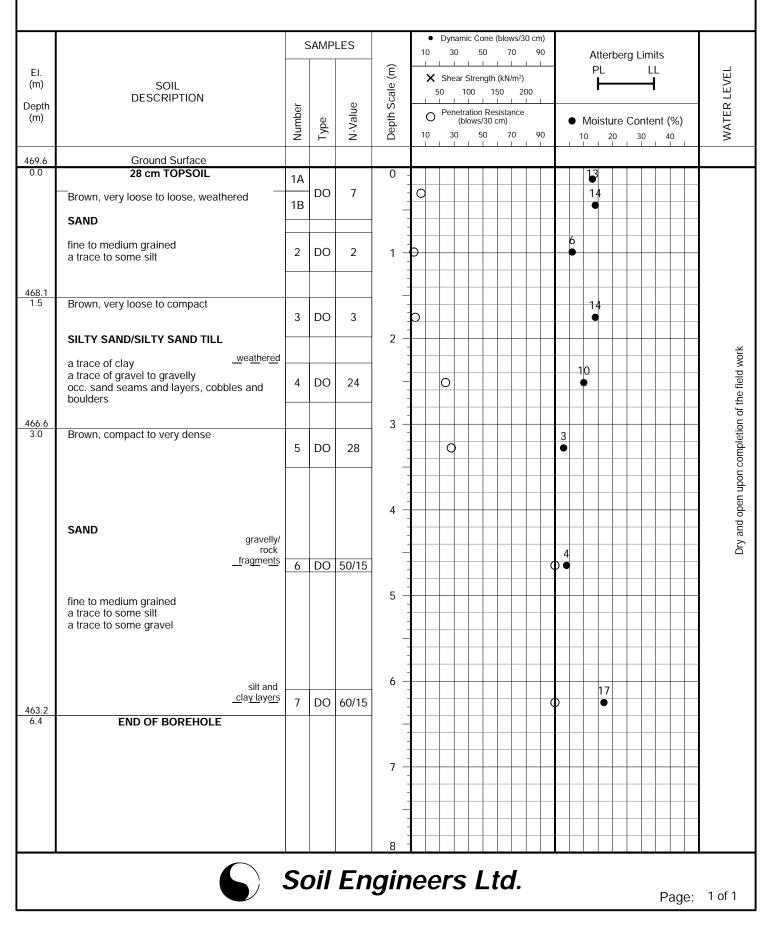
LOG OF BOREHOLE NO.: 9

FIGURE NO.: 9

PROJECT DESCRIPTION: Proposed Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin (Hillsburgh)

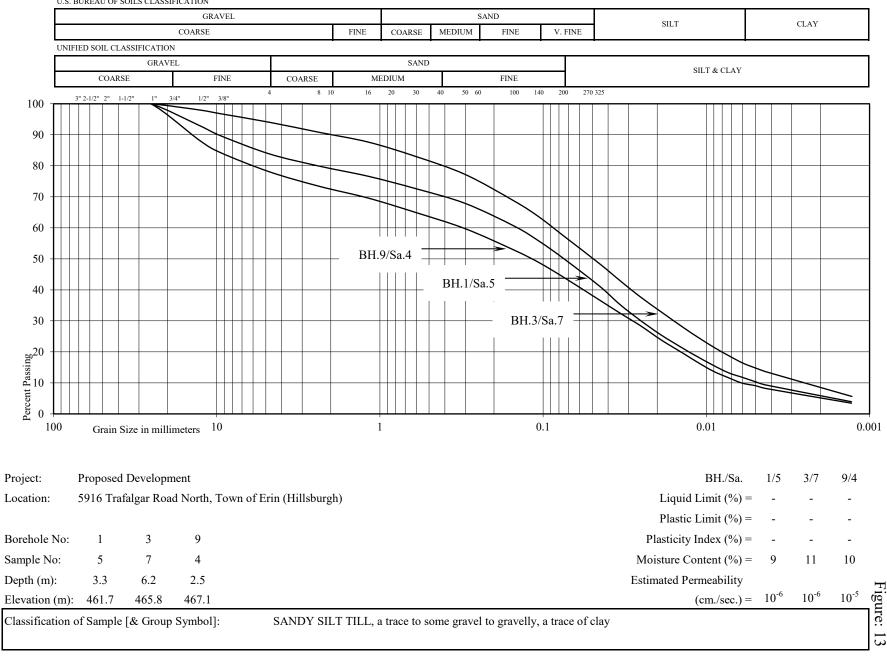




GRAIN SIZE DISTRIBUTION

Reference No: 2009-S020

U.S. BUREAU OF SOILS CLASSIFICATION

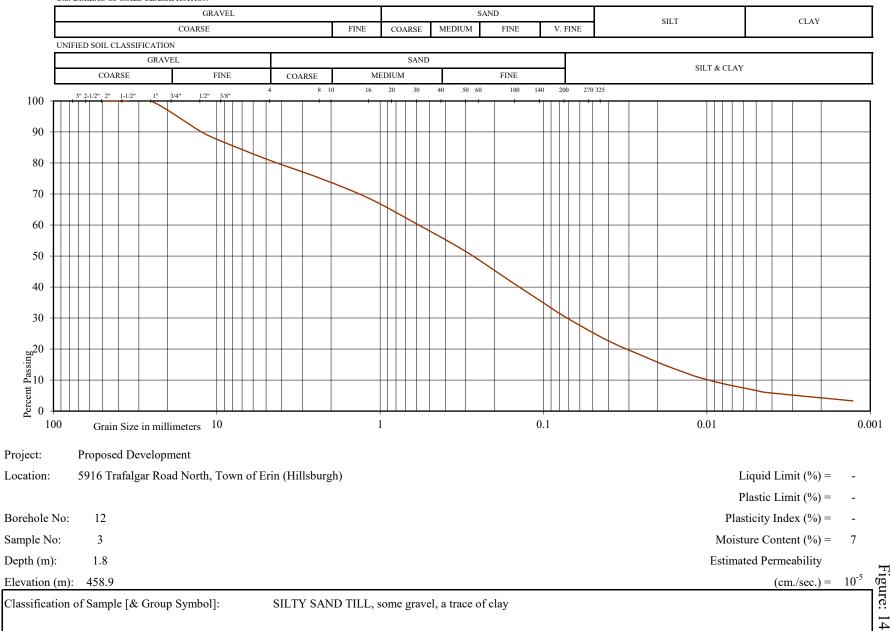




GRAIN SIZE DISTRIBUTION

Reference No: 2009-S020

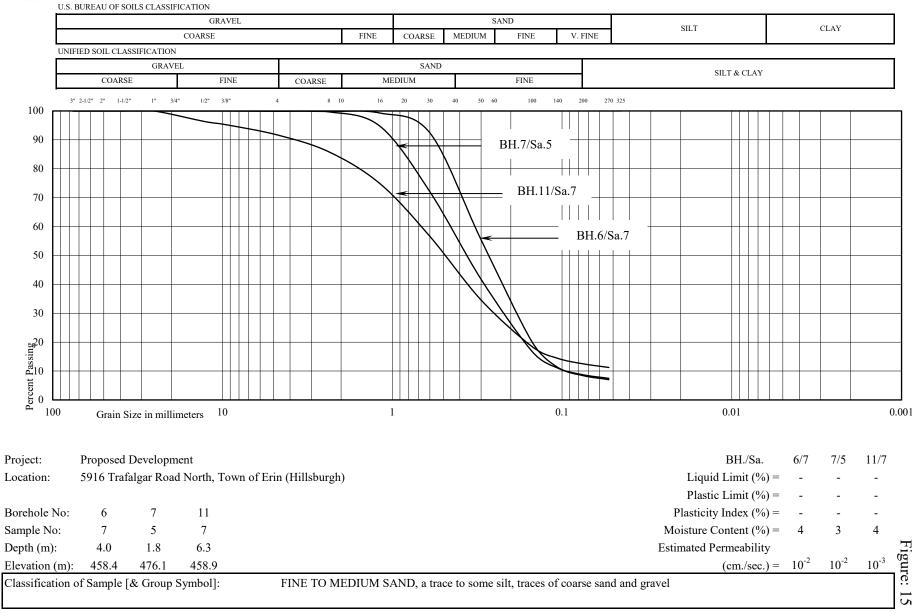
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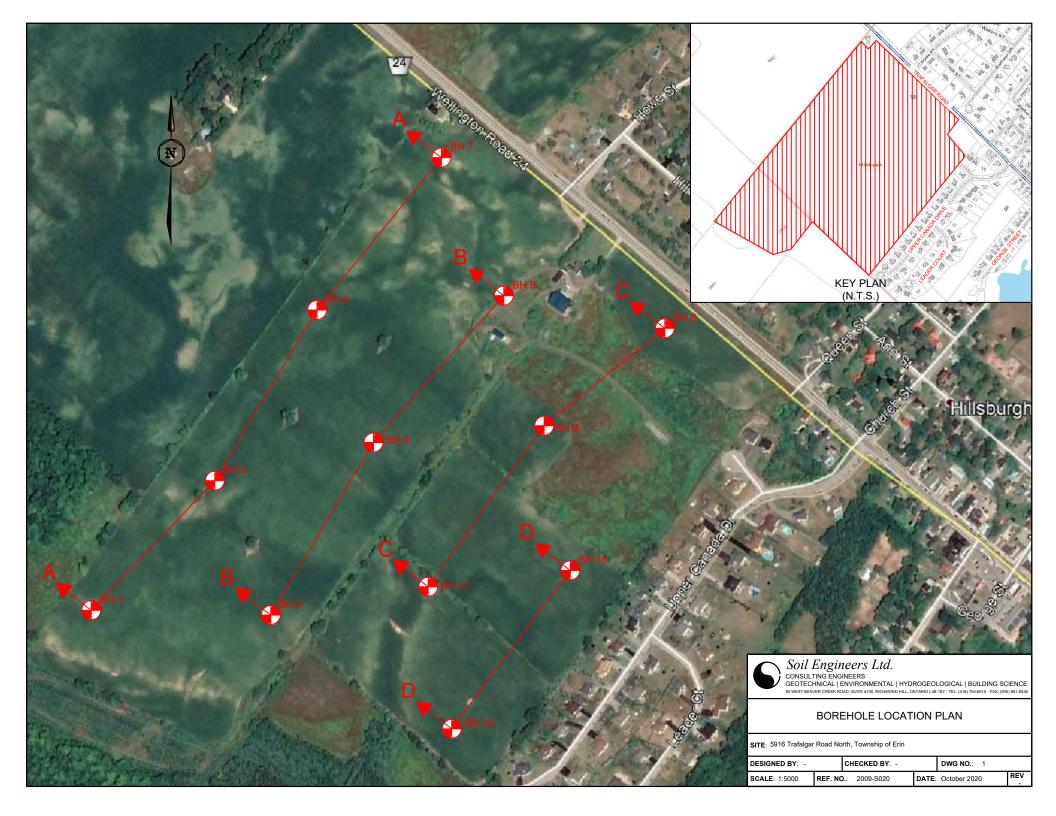


Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

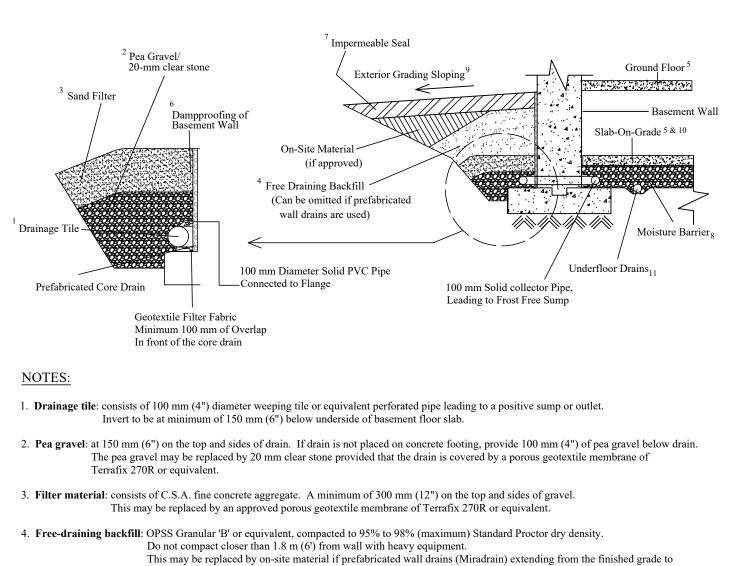
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Soil Engin CONSULTING ENG GEOTECHNICAL	eers Ltd. gineers environmen	TAL HYDROG	EOLOGICAL BL	JILDING SCIENCE				DR	ACE PROFILE AWING NO. 2 E: AS SHOWN
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CONSULTING	ineers Ltd. Engineers AL ENVIRONMENTAL HYDROGEOLOGICAL BUILDING SCIENCE	SUBSURFACE PROFILE DRAWING NO. 3 SCALE: AS SHOWN
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PROJECT LOCATION:	5916 Trafalgar Road North, Town of Erin (Hillsburgh)	
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the bottom of the basement wall are used.

- 5. Do not backfill until the wall is supported by the basement floor slab and ground floor framing, or adquate bracing.
- 6. Dampproofing of the basement wall is required before backfilling

7. Impermeable backfill seal of compacted clay, clayey silt or equivalent. If the original soil in the vicinity is a free-draining sand, the seal may be omitted.

- 8. Moisture barrier: 20-mm clear stone or compacted OPSS Granular 'A', or equivalent. The thickness of this layer should be 150 mm (6") minimum.
- 9. Exterior Grade: slope away from basement wall on all the sides of the building.
- 10. Slab-On-Grade should not be structurally connected to walls or foundations.
- 11. Underfloor drains* should be placed in parallel rows at 6 to 8 m (20'-25') centre, on 100 mm (4") of pea gravel with 150 mm (6") of pea gravel on top and sides. The invert should be at least 300 mm (12") below the underside of the floor slab. The drains should be connected to positive sumps or outlets. Do not connect the underfloor drains to the perimeter drains.

^{*}Underfloor drains can be deleted where not required.



CONSULTING ENGINEERS GEOTECHNICAL | ENVIRONMENTAL | HYDROGEOLOGICAL | BUILDING SCIENCE 90 WEST BEAVER CREEX, SUITE ION, RICHMOND HILL, ONTARIO - TEL. (416) 754-8515 - FAX: (416) 754-8516

Details of Perimeter Drainage System

SITE 5916 Trafalgar Road North, Township of Erin

 DESIGNED BY
 K.L.
 CHECKED BY
 B.S.
 DWG NO.
 4

 SCALE
 N.T.S.
 REF. NO.
 2009-S020
 DATE
 October 2020
 REV

APPENDIX "D"

Hydrogeological Investigation and Water Balance Report

HYDROGEOLOGICAL INVESTIGATION PROPOSED BRIARWOOD HILLSBURGH DEVELOPMENT 5916 Trafalgar Road North, Town of Erin, Ontario

Prepared for:

Hillsburgh Heights Inc.

636 Edward Avenue, Suite 14 Richmond Hill, Ontario L4C 0V4



2179 Dunwin Drive, Unit 4 Mississauga, ON L5L 1X2

Project No. 2100428AH

August 3, 2022



August 3, 202

Project No. 2100428AH

Hillsburgh Heights Inc. 636 Edward Avenue, Suite 14 Richmond Hill, Ontario L4C 0V4

Email: Fausto@briarwoodhomes.ca

Attention: Mr. Fausto Saponara

Dear Mr. Saponara

RE: Hydrogeological Investigation for Proposed Briarwood Hillsburgh Development 5916 Trafalgar Road North, Town of Erin, Ontario

HLV2K Engineering Limited (HLV2K) is pleased to provide the hydrogeological investigation report for the above mentioned project. The report presents HLV2K's understanding of the hydrogeological setting of the study area based on exploratory drilling, data collection, analyses, and review.

We trust that this information meets your present requirements. If we can be of additional assistance in this regard, please contact this office.

For and on behalf of HLV2K Engineering Limited,

k. Mohamadi

Kourosh Mohammadi, Ph.D., P.Eng. President & Principal Engineer

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Appendix B	Infiltration Tests Field Measurements and Calculations
Appendix C	Information on Water Well Records Received from MECP
Appendix D	Drawings Provided by the Client

LIST OF ACRONYMS AND DEFINITIONS

ВН	Borehole
EASR	Environmental Activity and Sector Registry
К	Hydraulic Conductivity
GPM	Gallon per Minute
mbgs	Metres Below Ground Surface
MECP	Ontario Ministry of the Environment, Conservation and Parks
O.Reg.903	Ontario's Wells Regulation
PTTW	Permit To Take Water

1 INTRODUCTION

1.1 General

HLV2K Engineering Limited (HLV2K) was retained by Hillsburgh Heights Inc. (the Client) with a proposal to conduct the hydrogeological investigations for the proposed Briarwood Hillsburgh Development located at 5916 Trafalgar Road North, Town of Erin, Ontario (the Site). The Site is situated in a mixed rural, residential, and agricultural area. It is on the west side of Trafalgar Road, between Sideroad 27 to the north and Upper Canada Drive to the south. The Site is surrounded by residential housing, agricultural fields, and forested area.

At the time of investigation, the Site was vacant and covered by grass. There are two residential houses within the property. The total area of the Site is approximately 46.9 hectares (ha).

Based on the information provided by the client, the proposed development will consist of 195 single family residential lots, 174 townhouse units, one (1) school block, one (1) heritage house, two (2) storm water management (SWM) facilities, one (1) park block, and new private roads with total area of 40.4 ha. The subdivision will be fully connected to municipal services (municipal water and sanitary sewers). The location of the Site is shown on **Figure 1**.

1.2 Purpose

The purpose of the hydrogeological investigation was to characterize the existing hydrogeological conditions at and in the vicinity of the Site, assess the need for, and options for, groundwater control in association with the proposed construction, evaluate potential impacts to the local groundwater regime resulting from the proposed construction, and identify appropriate mitigative measures, as warranted.

This hydrogeological study may be utilized in support for an application for a Permit to Take Water (PTTW) for dewatering purposes during construction or registering in Environmental Activity and Sector Registry (EASR), if necessary. The purpose of completing the PTTW / EASR application is to conduct the work in compliance with Ontario Regulation 387/04 (as amended) and the Ontario Water Resources Act (OWRA). The water taking EASR is for construction projects that require more than 50,000 liters per day (L/day) of water and less than 400,000 L/day under normal conditions. A PTTW is required for any surface water or groundwater taking during construction in excess of 400 cubic metres per day (m³/day).

2 METHOD OF INVESTIGATION

2.1 General

This hydrogeological study began with a review of previously completed geotechnical and environmental reports and published information for the study area, including previously published regional physiographic and geologic mapping and watershed planning reports. Many of these documents are referred to throughout various sections of this report and the relevant details can be found in the References section following the text of the report.

In particular, the work completed in association with this hydrogeological study consisted of the following tasks:

- Reviewing and interpreting available reports and published data;
- Developing Health & Safety and Sampling and Analysis Plans for work at the Site;
- Assessing the current Site conditions, and areas of interest;
- Installing five (5) monitoring wells;
- Reviewing water well records available from the Ministry of the Environment, Conservation and Parks (MECP);
- Developing the groundwater monitoring wells installed on the Site by removing at least three well volumes of groundwater or two times to dry;
- Performing in-situ hydraulic conductivity testing (slug tests) to assess the aquifer permeability;
- Measuring groundwater levels in each of the monitoring wells located at the Site;
- Evaluating proposed construction dewatering requirements; and
- Prepare a final report on the findings of this investigation.

2.2 Boreholes and Monitoring Wells

HLV2K drilled five (5) boreholes on September 1 and 7, 2021 and installed five (5) monitoring wells (MW1 to MW5) for groundwater monitoring and sampling. One monitoring well (MW1) was installed at approximate depth of 10 m below ground surface (mbgs) and others were installed at approximately 6.2 mbgs. Borehole logs for all boreholes are provided in **Appendix A**. One piezometer to approximate depth of 1 mbgs was installed close to the wetland to monitor the shallow water level close to the wetland. In addition, HLV2K drilled 4 test holes to approximate depth of 2.4 mbgs for percolation tests.

The well survey was conducted using a GPS unit (Sokkia GCX3 with SHC500 controller). The monitoring well, test holes, and piezometer locations are shown in **Figure 2**. The details of construction of the monitoring wells are summarized in **Table 1**.

It should be noted that the ground surface elevations noted on the appended borehole logs are approximate and were used for the purpose of relating borehole soil stratigraphy and should not be used or relied on for other purposes.

MW ID	Estimated Ground	Boreho	le Bottom		en Interval (mbgs)	Well Screen Interval Elevation (m)		
MWW ID	Surface Elevation (m)	Depth (mbgs)			to	from	to	
MW1	473.50	9.8	463.70	6.65	9.7	466.85	463.80	
MW2	469.37	6.2	463.17	3.05	6.1	466.32	463.27	
MW3	471.00	6.3	464.70	3.15	6.2	467.85	464.80	
MW4	458.48	6.7	451.78	3.55	6.6	454.93	451.88	
MW5	454.05	6.5	447.55	3.35	6.4	450.70	447.65	
Piezometer	448.19	0.9	447.29	0.3	0.9	447.89	447.29	

 Table 1: Information on Boreholes and Groundwater Monitoring Wells

2.3 Groundwater Monitoring

As part of this investigation, HLV2K visited the site on September 17th and 30th to measure the groundwater levels in the monitoring wells. Groundwater was encountered only in MW5 and the rest of the wells were found dry.

2.4 In-Situ Hydraulic Conductivity Testing

Monitoring wells were dry except MW5. The depth of the water in MW5 was not enough to conduct hydraulic conductivity test. Wells will be revisited in spring when the high groundwater level is expected. If enough water is encountered in any of the wells, the hydraulic conductivity test will be conducted.

2.5 In-Situ Percolation Test

HLV2K's staff visited the Site on September 1st and 7th, 2021. After receiving utility locates, four (4) 150mm borehole was drilled to approximate depth of 2.4 m below ground surface (mbgs). All loose material was removed from the sides and bottom of the hole. **Figure 2** shows the location of the test holes. Groundwater level was measured in the monitoring well in vicinity of the test hole.

The installed monitoring wells were used to measure the groundwater levels at the time of percolation tests. The borehole logs are provided in **Appendix A**.

The bottom of the hole was covered with 10 cm of sand and then the hole was filled with the water to a depth close to the surface (15 cm to 30 cm below ground surface). The water levels versus time were recorded. Field test measurements are provided in **Appendix B**.

3 SITE CONDITIONS

3.1 Physical Setting

The Site is situated in a mixed rural, residential, and agricultural area. It is on the west side of Trafalgar Road, between Sideroad 27 to the north and Upper Canada Drive to the south. The Site is surrounded by residential housing, agricultural fields, and forested area. According to the Oak Ridges Moraine Atlas which is available online at (http://www.mah.gov.on.ca/page334.aspx) and the Niagara Escarpment Plan (NEP) Maps available online at (http://www.escarpment.org/landplanning), the Site is not located within an area where either the Oak Ridges Moraine Conservation Plan or the Niagara Escarpment Plan would be applicable.

3.2 Climatic Conditions

Average monthly climate data from an Environment Canada climate station located at the Fergus Shand Dam (Station ID 6142400), approximately 14 km west of the Site, for the period between 1981 and 2010 is provided in **Table 2**, below (Environment Canada, 2021). The data indicates that the climate in the study area is typical continental with cold winters and warm summers and precipitation records showing local seasonal variation. As shown in **Table 2**, below, the mean annual precipitation is 945.7 mm/year, with annual mean rainfall of 797.8 mm/year (84% of total precipitation). Average monthly precipitation ranged from 55.9 mm in February to 96.6 mm in August. The mean annual daily temperature is 6.7 degrees Celsius (°C), ranging from -7.4 °C in January to 20.0 °C in July.

MONTH	Daily Average Temperature (°C)	Average Rainfall (mm)	Average Snow (cm)	Average Precipitation (mm)
January	-7.4	27.8	40.1	67.9
February	-6.3	25.3	30.6	55.9
March	-1.9	36.7	22.9	59.6
April	5.7	67.9	6.2	74.1
Мау	12.2	86.8	0.1	86.9
June	17.5	83.8	0.0	83.8
July	20.0	89.2	0.0	89.2
August	19.0	96.6	0.0	96.6
September	14.9	93.1	0.0	93.1
October	8.3	75.6	1.6	77.2
November	2.1	80.5	12.5	93.0
December	-3.9	34.7	33.9	68.6
Year	6.7	797.8	147.8	945.7

Table 2: Climate Data Summary (1981 – 2010) – Fergus Shand Dam Station (ID 6142400)

NOTE: Data was obtained from Environment Canada website (Environment Canada 2021).

3.3 Physiography and Drainage

A review of the topographic map provided online by Natural Resources Canada (Toporama) depicts the Site as located within an area that is generally high relief at an approximate elevation of 450 m to 470 m. The project is located in the Little Credit River Watershed within the Credit Valley River Conservation

Authority (CVCA) jurisdiction. The watershed is approximately 1,000 square kilometers (km²). The main branch of the Credit River originates north of Orangeville and flows southerly to Lake Ontario at Port Credit, Mississauga, ON (CVC, 2011).

According to the physiographic regions of Ontario identified by Chapman and Putnam (2007), the Site is located in Hillsburgh Sandhills (**Figure 3**). The Hillsburgh Sandhills physiographic region is found in the northwestern portion of the watershed and consists of coarse-grained sediments. It is an area of high relief with thick deposits of glacial outwash (sandy materials) overlying glacial tills and bedrock (CVC, 2011)

3.4 Geological Mapping

The geology of the Credit River watershed generally consists of ice-contact stratified drift (CVC, 2011). A regional description of the Quaternary geology for the area of the Site can be found on the Ontario Geological Survey Digital Map - Surficial geology of southern Ontario (OGS, 2010). A section of this map showing the surficial geology in the vicinity of the Site is presented on **Figure 4**.

As shown on **Figure 4**, the surficial deposits in the immediate vicinity of the Site are mapped as Orangeville Moraine with materials consisted of sand and gravel including some till or silt. The western side of the Site is modern alluvial deposits.

Bedrock is comprised of upper Silurian to lower Devonian of Guelph Formation. The bedrock surface is expected to be approximately 60 mbgs. None of the boreholes drilled for this investigation reached the bedrock. **Figure 5** shows the bedrock at the Site and its vicinity.

3.5 Subsurface Soil Conditions

The subsurface soil conditions encountered during boreholes advanced at the Site are shown on the borehole logs in **Appendix A**. A summary of the soil conditions is provided below.

Topsoil with approximate thickness of 200 to 300 mm was encountered in all boreholes. Below the topsoil, a layer of sandy silt to silty sand was encountered at all borehole locations and extended in general to approximately from 1.5 to 3.1 m below the existing ground surface. Organic matter, rootlets, gravel and cobbles were found in this layer. Below this layer, a layer of sand and gravel was encountered in all boreholes and extended to maximum explored depth of 9.8 m.

4 GROUNDWATER CONDITIONS

4.1 Regional Groundwater Recharge

Recharge is the process by which groundwater is replenished and involves the vertical infiltration of water through the subsoil deposits and geologic materials to the saturated zone. The major sources of recharge in the study area are a result of precipitation and freshet. The amount of groundwater recharge in a particular area depends on surficial geology, topography, and the extent of land development in that area. Generally, regional groundwater recharge is irregularly distributed temporally and spatially as interpreted from specific climatic conditions, local geology, and land development status.

The Site is a vacant land and is used for agriculture. Therefore, the groundwater recharge occurs under natural condition. A water balance analysis was completed for the site to estimate the change in water recharge pre and post development and will be presented in the following sections.

4.2 Groundwater Level Fluctuations

The groundwater level data collected from the monitoring wells are provided in **Table 3**, below. The screen elevations of these monitoring wells are shown in **Table 1** above and on the borehole logs provided in **Appendix A**.

Groundwater level monitoring rounds were completed from September 2021 to July 2022. As shown in **Table 3** below, the groundwater has found only in MW5 at approximate elevation of 449.5 m. The rest of the monitoring wells were dry.

Regional groundwater flow in the area typically reflects the local topography and generally occurs from topographic highs to topographic lows. The dominant regional groundwater flow direction is southerly, toward Lake Ontario.

It should be noted that groundwater conditions vary depending on factors such as temperature, season, precipitation, construction activity and other situations, which may be different from those encountered at the time of the monitoring. The possibility of groundwater level fluctuations at the Site should be considered when designing and developing the construction plans for the project.

BH ID	М	W1	М	W2	N	IW3	Ν	IW4	Μ	W5		P1
Ground Elevation (m)	47	3.50	46	9.37	47	1.00	45	8.48	45	4.05	448.19	
Borehole Depth (m)	9	.80	6	.20	6	.30	6	5.70	6.50		0.90	
	Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)
1&7-Sep-21 (at completion)	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
17-Sep-21	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.64	449.41	Dry	Dry
30-Sep-21	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.70	449.35	Dry	Dry
05-Oct-21	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.64	449.41	Dry	Dry
15-Oct-21	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.65	449.40	Dry	Dry
30-Oct-21	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.69	449.36	Dry	Dry
16-Nov-21	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.67	449.38	Dry	Dry
30-Nov-21	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.65	449.40	Dry	Dry
15-Dec-21	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.66	449.39	Dry	Dry
04-Jan-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.67	449.38	Dry	Dry
17-Jan-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.68	449.37	Dry	Dry
31-Jan-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.68	449.37	Dry	Dry
14-Feb-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.65	449.40	Dry	Dry

Table 3: Summary of Groundwater Level Observations in Monitoring Wells

BH ID	Ν	IW1	M	W2	N	IW3	M	W4	M	W5		P1
Ground Elevation (m)	47	3.50	469.37		471.00		458.48		454.05		448.19	
Borehole Depth (m)	9.80		6.20		6.30		6.70		6.50		0.90	
28-Feb-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.63	449.42	Dry	Dry
15-Mar-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.55	449.50	Dry	Dry
31-Mar-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.51	449.54	Dry	Dry
12-Apr-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.42	449.63	Dry	Dry
27-Apr-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.35	449.70	Dry	Dry
18-May-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.30	449.75	Dry	Dry
01-Jun-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.28	449.77	Dry	Dry
16-Jun-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.28	449.77	Dry	Dry
30-Jun-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.30	449.75	Dry	Dry
15-Jul-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.34	449.71	Dry	Dry
27-Jul-22	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.36	449.69	Dry	Dry

4.3 Percolation Test Results

Table 4 below is the summary of the percolation test results. The selected value for the test presented in the table is the average of final three percolation rates during each test which is closer to the steady-state infiltration rate. Detailed calculations are provided in **Appendix B**.

Test ID	Hole Depth (mbgs)	Hole Bottom Elevation (m)	Groundwater Depth (mbgs)	Infiltration Rate (mm/hr)	Percolation Time (min/cm)
TP1	2.4	466.3	<9.8 (MW1)	600	1
TP2	2.4	466.7	<6.2 (MW2)	120	5
TP3	1.85	460.5	<6.7 (MW4)	1200	0.5
TP4	2.2	452.8	4.8 (MW5)	300	2

Table 4: Summary of Infiltration Test Results

4.4 Groundwater Use in the Study Area

A search of the MECP Water Well Information System (WWIS) database to identify active wells near the Site were conducted. The database search was requested for the area located within 500 m from the Site. The database search identified records for 90 wells.

Figure 5 presents the locations of the identified wells as well as the associated water use categories within 500 m around the Site. A detailed table showing water well record (WRR) information for these wells is provided in **Appendix C**. The classification of these wells is as follows:

- 4 monitoring/observation wells and test hole;
- 16 wells identified as abandoned; and
- 2 wells were not stated;
- 68 wells as water supply wells.

The monitoring wells/test holes identified in the database search are typically interpreted as geotechnical/geological boreholes and normally no water would be obtained or used from these boreholes. The search revealed the presence of 68 domestic water wells or other water supply wells potentially in use in the area of the Site. If groundwater use or dewatering is required for the Site, a door-to-door well survey is recommended.

5 GROUNDWATER DEWATERING ESTIMATES

Details of construction was not provided to HLV2K at the time of this investigation; however, it is our understanding that one level of basement is considered for the houses in this development. **Appendix D** shows the layout of the proposed development. The water level monitored during the investigation shows that dewatering would not be required during the construction to control the groundwater. The monitoring well depths are 6.5 to 9.8 mbgs and no groundwater encountered within this depth except in MW5 at 4.8 mbgs or elevation of 449.3 m. Perch water may be present during the construction and the contractor should be ready to control that water, if encountered.

During the excavation for foundation or underground utilities, rainwater may need to be pumped from the trenches. According to MTO IDF Curve Lookup website¹, 24-hour rainfall with a 2-year return period in Erin area is 56.5 mm. The volume of the water depends on the area of excavation at the time.

6 WELLHEAD PROTECTION AREA

A small portion of the Site (approximately 0.6 ha) in the northeast is located within the Well Head Protection Area A (WHPA-A) which represents a 100 m circle around a municipality water supply well as shown in **Figure 7**. It is also located within the Significant Groundwater Recharge Area (SGRA). A water balance analysis was conducted to estimate the recharge rate in pre and post construction. The results are provided in the following section.

7 PREDICTED EFFECTS

Based on the hydrogeological information and data analysis in this report, the potential impacts to surface water and groundwater resources in the vicinity of the Site due to excavation dewatering for construction of the proposed houses at the Site are described below.

7.1 Groundwater Use

As indicated in Section 4.3, the search of the MECP water well records indicated 68 water supply wells within approximately 500 m of the Site. The area of the Site is currently serviced with a municipal water supply. The groundwater depth at the site is expected to be below basement floor and foundation. However, if groundwater dewatering and/or use is considered for this development, a door-to-door survey is recommended.

7.2 Surface Water Resources

The only surface water feature in the vicinity of the Site is the wetland at the southwest side of the Site (**Figure 8**). Since no groundwater use/dewatering is expected for this development, the impact on surface water is not anticipated. The change in the infiltration rate or runoff due to the development is considered in the water balance analysis.

¹ http://www.mto.gov.on.ca/IDF_Curves

7.3 Potential for Dewatering-Related Consolidation Settlement

Based on the investigation completed, temporary dewatering (i.e. during construction) is not expected. No settlement due to dewatering is expected for this Site.

8 SUMMARY AND CONCLUSION

Based on the results of the subsurface investigation, hydrogeological assessment, and analysis of hydraulic conductivity testing and groundwater level monitoring data, the following summary of conclusions and recommendations is provided:

- The groundwater was not encountered in any of the monitoring wells within the depth of expected excavation and PTTW/EASR is not required for dewatering during construction. Perched water and rainfall might be present during excavation and the contractor should be ready to deal with the water, if encountered.
- The Site is located within the Significant Groundwater Recharge Area (SGRA). Based on water balance analysis, implementing mitigation measures to reduce the infiltration deficit will assist in maintaining the current level of groundwater contribution to the surface water features. As such, no negative impact is expected if LID measures are implemented to maintain the groundwater recharge similar to the existing conditions.
- A small portion of Site (approximately 0.6 ha) is within the Wellhead Protection Area A (WHPA-A), which represent a 100 m distance from one municipal supply well. The sanitary sewer and stormwater management facility should be designed as per policy SWG-13 and SWG-14 to protect the groundwater quality.
- HLV2K recommends the decommissioning of existing groundwater monitoring wells after completion of the construction of the project. In conformance with Ontario's Wells Regulation (O.Reg.903) of the Ontario Water Resources Act, the installation and eventual decommissioning of groundwater wells must be carried out by a licensed well contractor. If a well is damaged/destroyed during the construction activities, then the well should be properly decommissioned in advance of that work.

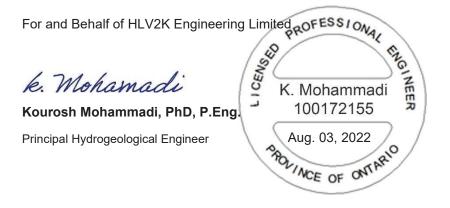
9 STATEMENT OF LIMITATIONS

The contents of this report are subject to the attached 'Statement of Limitation' sheet. The reader's attention is specifically drawn to these conditions as it is considered essential that they be followed for proper use and interpretation of this report. The Statement of Limitations is not intended to reduce the level of responsibility accepted by HLV2K, but rather to ensure that all parties who have been given reliance for this report are aware of the responsibilities each assumes in so doing.

This report was prepared by HLV2K exclusively for the account of Hillsburgh Heights Inc. (the CLIENT). Other than by the CLIENT, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of HLV2K. Any use, reliance on or decision made by any person other than CLIENT based on this report is the sole responsibility of such other person. The CLIENT and HLV2K make no representation or warranty to any other person with regard to this report and the work referred to in this report and the CLIENT and HLV2K accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

10 CLOSURE

We trust that this information is satisfactory for your present requirements. Should you have any questions or require additional information, please do not hesitate to contact this office.



REFERENCES

- Chapman, L.J., and Putnam, D.F. (2007). The Physiography of Southern Ontario, Ontario Geological Survey, Miscellaneous Release—Data 228.
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HLV2K Engineering Limited

STATEMENT OF LIMITATIONS

Your report has been developed based on your unique project specific requirements as understood by HLV2K Engineering Limited (HLV2K) and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking HLV2K to assess how factors that changed subsequent to the date of the report affect the report's recommendations. HLV2K cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions, which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult HLV2K to be advised how time may have impacted on the project.

The findings derived from this investigation were based on information collected and/or provided by the Client. It may become apparent that soil and groundwater conditions differ between and beyond the testing locations examined during future investigations or other work that could not be detected or anticipated at the time of this study. As such, HLV2K cannot be held liable for environmental conditions that were not apparent from the available information. The conclusions presented represent the best judgment of the assessors based on limited investigations.

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature, external data source review, sampling, and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions, which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of HLV2K through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report is based on the assumption that he site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only HLV2K, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and HLV2K cannot be held responsible for such misinterpretation.

To avoid misuse of the information contained in your report it is recommended that you confer with HLV2K before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

HLV2K Engineering Limited

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain HLV2K to work with other project design professionals who are affected by the report. Have HLV2K explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment.

Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact HLV2K for information relating to geoenvironmental issues.

HLV2K is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with HLV2K to develop alternative approaches to problems that may be of genuine benefit both in time and in cost.

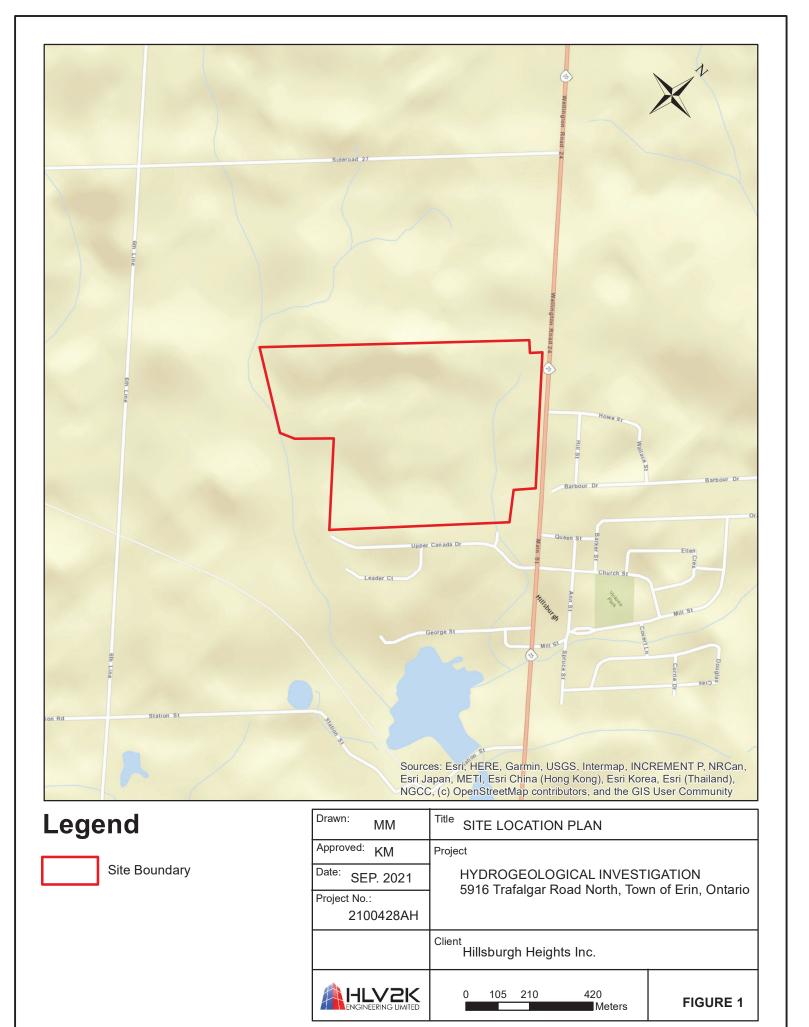
Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from HLV2K to other parties but are included to identify where HLV2K's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from HLV2K closely and do not hesitate to ask any questions you may have.

Third party information reviewed and used to formulate this report is assumed to be complete and correct. HLV2K used this information in good faith and will not accept any responsibility for deficiencies, misinterpretation or incompleteness of the information contained in documents prepared by third parties.

Nothing in this report is intended to constitute or provide a legal opinion.

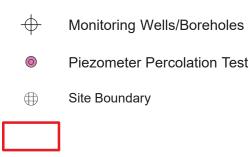
Should additional information become available, HLV2K requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

FIGURES

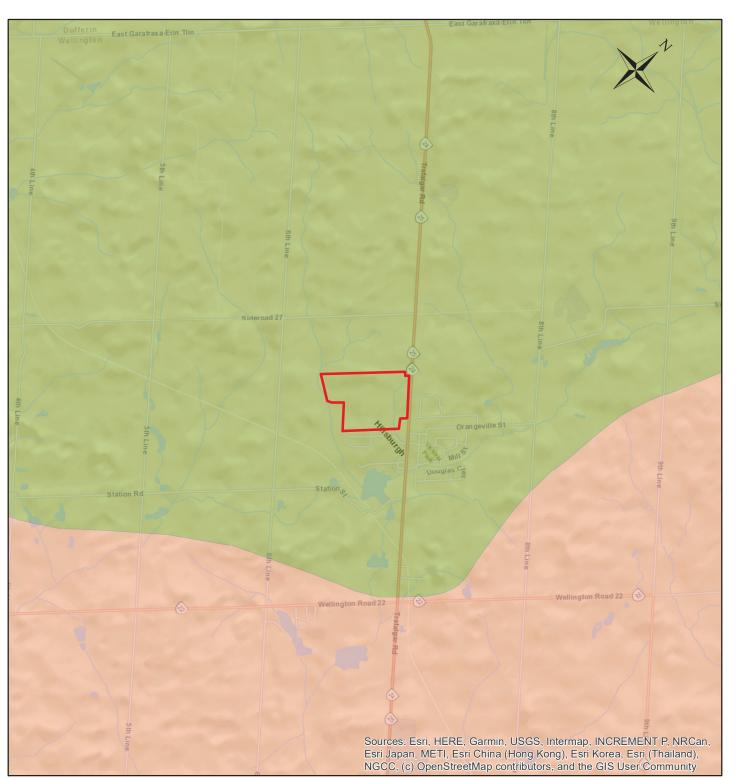




Legend



Drawn: MM	Title BOREHOLES LOCATION PLAN								
Approved: KM	Project								
Date: SEP. 2021	HYDROGEOLOGICAL INVESTIGATION								
Project No.: 2100428AH	5916 Trafalgar Road North, Town of Erin, Ontario								
	^{Client} Hillsburgh Heights Inc.								
	0 40 80 160 FIGURE 2								

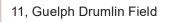


Legend

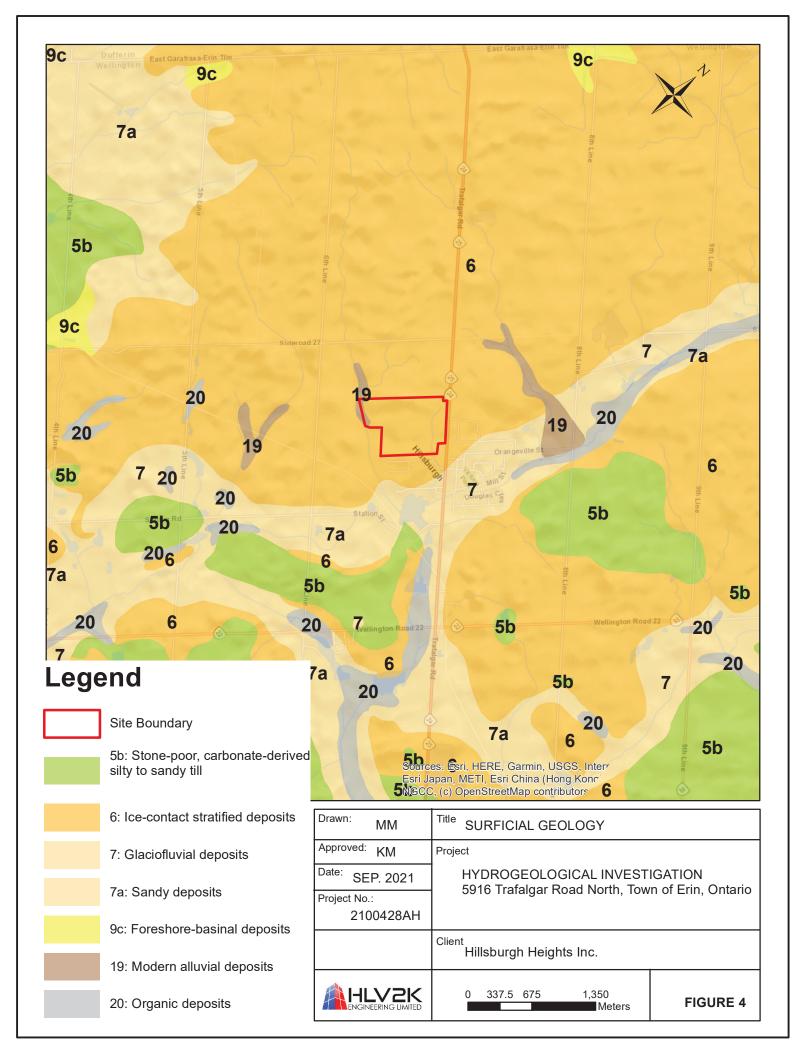


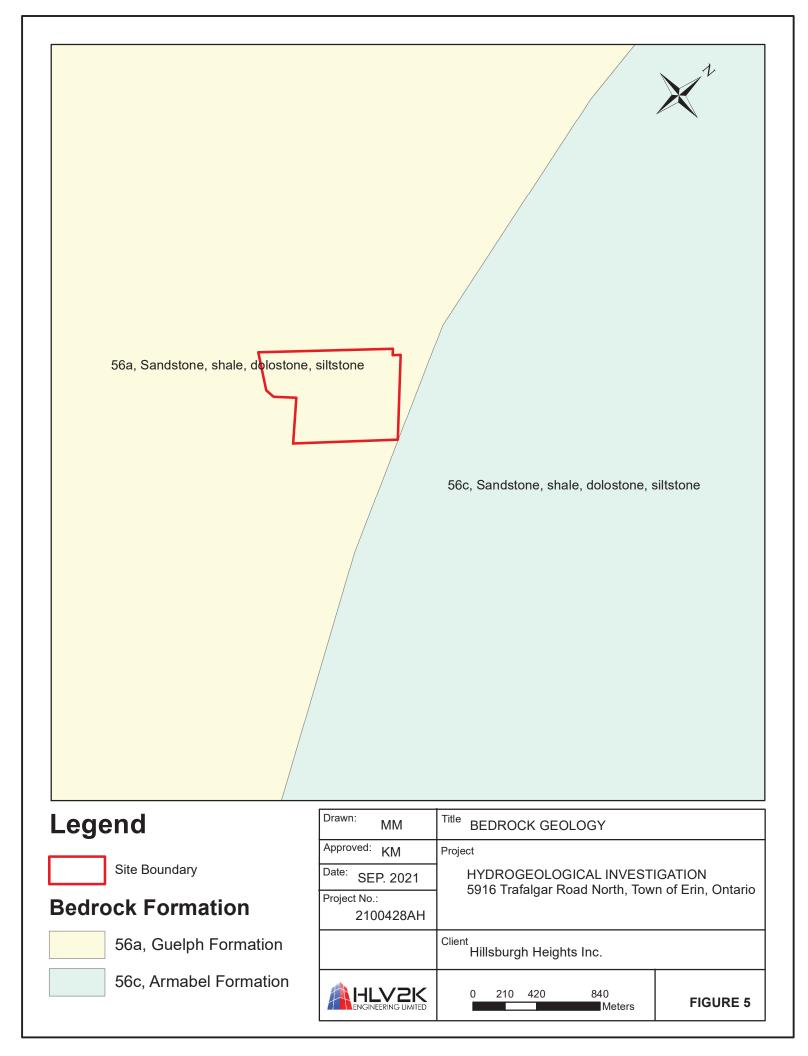
Site Boundary

9, Hillsburgh Sandhills



Drawn: MM	Title PHYSIOGRAPHIC MAP							
Approved: KM	Project							
Date: SEP. 2021	HYDROGEOLOGICAL INVESTIGATION							
Project No.: 2100428AH	– 5916 Trafalgar Road North, Town of Erin, Ontario							
	^{Client} Hillsburgh Heights Inc.							
	0 337.5 675 1,350 FIGURE 3							





Legend

Final Status

- Abandoned
- Monitoring and Test Hole
- Not Stated

Water Supply

500m Buffer

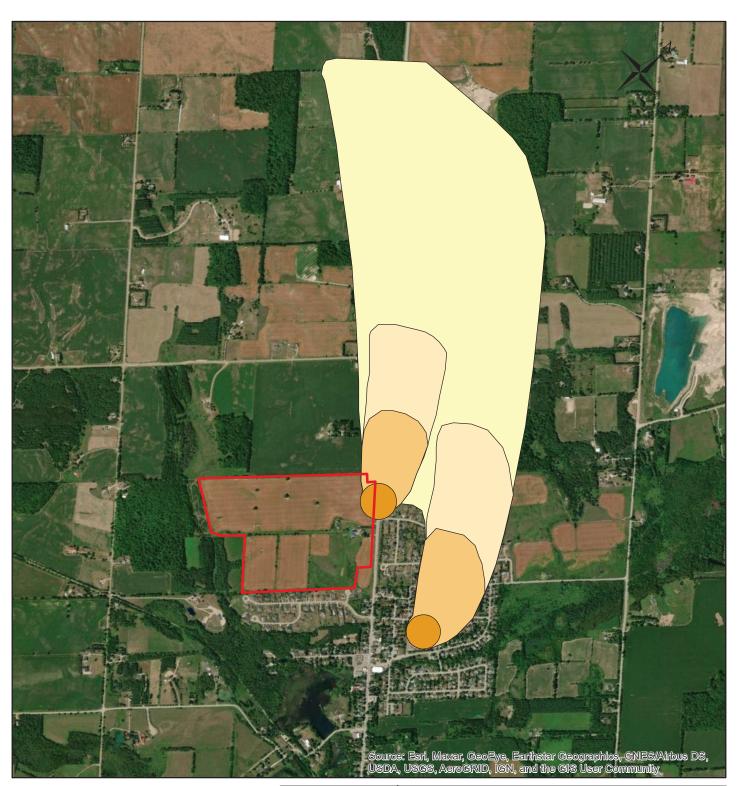
Site Boundary

h	Source: Esri, Maxar, GeoEye, Earthst	ar (?
	USDA, USGS, AeroGRID, IGN, and 1	

5737485

Drawn: MM	Title WATER WELL USE MAP									
Approved: KM	Project									
Date: SEP. 2021	HYDROGEOLOGICAL INVESTIGATION									
Project No.:	5916 Trafalgar Road North, Town of Erin, Ontario									
2100428AH										
	^{Client} Hillsburgh Heights Inc.									
	0 105 210 420 FIGURE 6									

6704469



Legend								
	Site Boundary							
	WHPA-A							
	WHPA-B							
	WHPA-C							
	WHPA-D							

Drawn: MM	Title WELLHEAD PROTECTION AREA CLOSE TO SITE								
Approved: KM	Project								
Date: NOV. 2021	HYDROGEOLOGICAL INVESTIGATION								
Project No.: 2100428AH	5916 Trafalgar Road North, Town of Erin, Ontario								
	^{Client} Hillsburgh Heights Inc.								
	0 170 340 680 FIGURE 7								

APPENDIX A

BOREHOLE LOGS AND GRAIN SIZE ANALYSIS



LOG OF BOREHOLE BH1

PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4849474.973 E 568214.5891

SOIL PROFILE			SAMPLES					DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL MOISTURE L LIMIT CONTENT					F	REMARKS	
(m) ELEV		PLOT			MS E	GROUND WATER CONDITIONS	NO		1	10 60 RENG	TH (kl	Pa)	00	LIMIT W _P	C MOIS	TURE TENT N		POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	AND GRAIN SIZE DISTRIBUTION
DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	ТҮРЕ	"N" <u>BLOWS</u> 0.3 m		ELEVATION	0 U • Q	NCONF UICK TI	'INED RIAXIAL	+ ×	FIELD V. & Sensiti LAB VA	ANE					DOC Cu	NATUR (k	
473.5 0.0 473.3	Topsoil: 200mm	0 <u>11/</u>	ž	F	Ę	00	Ξ	-	20 4	0 60	5 0	30 10	00		0 2	20 3	30			GR SA SI CL
	Sandy Silt: trace gravel/cobblees, trace clay, trace rootlets, oxidized, greyish brown, moist, loose to compact		1	SS	4		473	-							¢			-		
- - - - -			2	SS	12			-							0					
- - - - - -			3	SS	23		-Bento	rite - - - -						0						
-			4	SS	23		471	- - - - - -							o			-		
<u>3470.4</u> - 3.1 - - -	Sand and gravel: trace silt, trace clay, brown, moist, loose to very dense	* 0 • 0 • 0	5	SS	39		470	-						0						
		• • • • •					469	-												
- - - - -		p 	6	SS	50/150			-						c						
- - - - -							468	-												
-			7	SS	67		-Sand 467							0				-		
- - - - -	Continued Next Page							-												

Method: Hollow Stem Auger

Diameter: 150mm Date: Sep-07-2021

DRILLING DATA

REF. NO.: 2100428AH DRAWING NO.: 2

DR



LOG OF BOREHOLE BH1

PROJECT: Briarwood Hillsburgh Development

SOIL PROFILE

DESCRIPTION

Sand and gravel: trace silt, trace

clay, brown, moist, loose to very

End of Borehole: borehole

1) 50 mm diameter monitoring well installed upon completion.

terminated at 9.8m

Upon completion: open & dry

dense(Continued)

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario

DATUM: Geodetic

(m)

ELEV DEPTH

463.7

9.8

BH LOCATION: See Borehole Location Plan N 4849474.973 E 568214.5891

STRATA PLOT

•

. |0|-

6 þ

•

10 .p 9 SS 6

01.

•

NUMBER

8 SS 13

SAMPLES

TYPE z GROUND WATER CONDITIONS

ELEVATION

-Screen

465

464

BLOWS 0.3 m

DRILLING DATA

Method: Hollow Stem Auger

DYNAMIC CONE PENETRATION RESISTANCE PLOT

SHEAR STRENGTH (kPa) O UNCONFINED + FIELD VANE QUICK TRIAXIAL × LAB VANE

Diameter: 150mm

REF. NO.: 2100428AH DRAWING NO.: 2

5

NATURAL UNIT ((kN/m³)

POCKET PEN. (Cu) (kPa)

LIQUID

LIMIT

WL

-1

PLASTIC LIMIT NATURAL MOISTURE CONTENT

10 20 30

C

0

WP

н

w

-0-

WATER CONTENT (%)

Date: Sep-07-2021

20 40 60 80 100

20 40 60 80 100 REMARKS

AND

GRAIN SIZE

DISTRIBUTION

(%)

GR SA SI CL

GROUNDWAT	ER EL	EVAT	IONS	5
Measurement	$\underline{\nabla}^{1st}$	2nd	3rd	$\underline{\underline{V}}^{4th}$



LOG OF BOREHOLE BH2

PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4849079.566 E 567864.1193

DYNAMIC CONE PENETRATION RESISTANCE PLOT SOIL PROFILE SAMPLES PLASTIC NATURAL MOISTURE LIMIT CONTENT REMARKS GROUND WATER CONDITIONS LIQUID POCKET PEN. (Cu) (kPa) AND LIMIT NATURAL UNIT ((kN/m³) 20 40 60 100 80 (m) STRATA PLOT GRAIN SIZE WL BLOWS 0.3 m Wp w SHEAR STRENGTH (kPa) O UNCONFINED + FIELD VANE QUICK TRIAXIAL × LAB VANE ELEVATION ELEV DEPTH -0 DISTRIBUTION -1 DESCRIPTION NUMBER (%) WATER CONTENT (%) TYPE ż 20 40 60 80 100 10 20 30 GR SA SI CL 469.4 Topsoil:300mm 11 0.0 11 469.1 SS 6 0 1 0.3 Silty sand to sandy silt till: trace ŀ 469 clay, trace gravel/cobble, trace rootlets, brown, moist, loose to compact Bentonite 1 2 SS 23 С 468 467.9 1.5 Sandy silt till: trace gravel, brown, moist, dense to very dense 3 SS 52 о 467 4 SS 44 SS 5 39 466 0 -Sand 465 -Screen 6 SS50/125mm 464 Η 463.2 22 /75 6.2 End of Borehole:borehole terminated at 6.2m 1) 50 mm diameter monitoring well installed upon completion. Upon completion: open & dry



Diameter: 150mm Date: Sep-07-2021

Method: Hollow Stem Auger

DRILLING DATA

REF. NO.: 2100428AH DRAWING NO.: 3



LOG OF BOREHOLE BH3

PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario DATUM: Geodetic

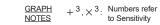
BH LOCATION: See Borehole Location Plan N 4849170.944 E 568075.1217

DRILLING DATA

Method: Hollow Stem Auger

Diameter: 150mm Date: Sep-07-2021 REF. NO.: 2100428AH DRAWING NO.: 4

	SOIL PROFILE		S	AMPL	ES			DYNAI RESIS	VIC CO TANCE	NE PEN PLOT		TION			- NATI	JRAL			⊢	REMARKS	
(m)		ЪТ				GROUND WATER CONDITIONS		2	0 4	06	0 8	30 1	00	PLASTI LIMIT			LIQUID LIMIT	PEN.	NATURAL UNIT WT (kN/m ³)	AND	
ELEV	DESCRIPTION	STRATA PLOT	~		BLOWS 0.3 m	D W	NOL			RENG	TH (kl	Pa)	ANE	W _P	\ (м Э	WL	POCKET PEN. (Cu) (kPa)	(kN/m ³	GRAIN SIZE	1
DEPTH		RAT/	NUMBER	ТҮРЕ	OBLO	NUO	ELEVATION		VCONF	INED RIAXIAL	+ ×	FIELD V & Sensit LAB V	ivity	WAT	TER CC	NTENT	Г (%)	9 Q Q	NATU	(%)	
471.0			R	Ł	Ž	50	Ē	2	0 4	06	s 0	30 1	00	1	0 2	20 3	80			GR SA SI C	L
0.0	Topsoil:300mm	<u>x¹ 1₁</u>																			
470.7 0.3	Silty sand: trace gravel, trace	<u>2</u> 2 111	1	SS	8									0							
	rootlets, greyish brown, moist, loose	計						-													
								-													
		臣					-Bento														
1			2	SS	9		470)						
								-													
469.5								-													
1.5	Sand and gravel: trace silt, some	i i						-													
	cobbles, brown, moist, dense to very dense	0	3	SS	36			-						0							
2		0.	3	33	30		469	_													
		0						-													
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		0																			
		0																			
		° 0						-													
		0						-													
		0						-													
<u>6</u>		0			0/75mi	目	465	-													
464.7		0	7	SS5	0/75mi	n 🗄 🗄		-							0						
6.3	End of Borehole:borehole terminated at 6.3m																				
	1) 50 mm diameter monitoring well installed upon completion.																				
	Upon completion: open & dry																				
	-																				





LOG OF BOREHOLE BH4

PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4848881.638 E 568028.4108

DRILLING DATA

Method: Hollow Stem Auger

Diameter: 150mm Date: Sep-07-2021 REF. NO.: 2100428AH DRAWING NO.: 5

	SOIL PROFILE		S	AMPL	ES			DYNAI RESIS	MIC CO TANCE	NE PEN PLOT	ETRAT	FION			ΝΔΤΙ	IRAI			_	REMARKS
(m) ELEV		PLOT			SM E	GROUND WATER CONDITIONS		2	0 4	•) 8 FH (kF	0 10 Pa)	00	PLAST LIMIT W _P				POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	AND GRAIN SIZE DISTRIBUTION
458.5	DESCRIPTION	STRATA PLOT	NUMBER	ТҮРЕ	"N" <u>BLOWS</u> 0.3 m	GROUND	ELEVATION	0 UN • QI	NCONF		+ ×	FIELD V. & Sensiti LAB VA	ANE .		TER CC		T (%) 30	DOC)	NATUR. (K	(%) GR SA SI CL
. 0.0	Topsoil:250mm	<u>×1/</u>	_					-												
458.2		1/ 2						-												
0.3	Sand and gravel: trace silt, trace clay, trace rootlets, some cobbles,	0	1	SS	4			-							0					
-	brown, moist, loose to compact	0					458													
-		0						-												
-		0						-												
1		0.	2	SS	17		-Bento	nite												
-		0	2	33	17		Dento	-						0						
-		0						-												
457.0		.0					457													
. 1.5	Silty clay: trace sand, trace gravel, brown, moist, hard							-												
-			3	SS5	0/75m			-							0					
			Ũ					_												
-								-												
456.2		XX						-												
2.3	Sand and gravel: trace silt, trace clay, some cobbles, brown, moist,	° 0					456	-												
-	compact to very dense	0	4	SS50)/130m	m .		-						0						
-		0					1	-												
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451.8	Find of Developing 1 - 1					ŀ.⊨.		-												
6.7	End of Borehole:borehole terminated at 6.7m																			
	1) 50 mm diameter monitoring																			
	well installed upon completion.																			
	Upon completion: open & dry																			







PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario DATUM: Geodetic

(m) ELEV DEPTH

454.0 0.0 453.8 0.3

1

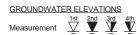
451.7

BH LOCATION: S

M: Geodetic							Da	ale:	Sep-u	07-202	. 1					Dł	RAWIN	IG NO	0.:6			
OCATION: See Borehole Location Plan	N 48	<u>4913</u>	6.503	E 5684	118.30)89																
SOIL PROFILE		s	AMPL	ES			D) RF	YNAM ESIST	IC CO ANCE	NE PEI PLOT		TION			NAT					DE	MARK	_
					GROUND WATER CONDITIONS			20					00	PLAST LIMIT	C NATI MOIS CON		LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	ΓΜΙ		AND	
	STRATA PLOT			S L	NS NS	z	-						1	W _P	١	N	WL	ET Pf (kPa)	L UN /m ³)		AIN SIZ	
DESCRIPTION	A P	К		BLOWS 0.3 m	DA DE	0E			CONFI		TH (kl +	FIELD V & Sensi	ANE			э <u> </u>		OCKE	URAI (KN	DISTR		ON
	RAT	NUMBER	TYPE			ELEVATION					. ×	LAB V	ANE	WA	TER CO	ONTEN	T (%)	e.	¥1 N		(%)	
		R	≽	"N	5 0			20	4	06	i0 8	30 1	00	1	0 2	20 3	30			GR S/	A SI	CL
Topsoil:250mm	<u>×1/</u>					454	4															
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Silty sand: trace clay, trace gravel. trace rootlets, brown, moist, loose	. .	1	SS	5			ŀ															
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Sand: some gravel, some silt, trace	μμ						Ē															
clay, brown, moist, compact to very							ŀ															
dense		4	SS	12			F							0						15 64	4 17	4
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End of Borehole:borehole	· · ·				ŀ., ⊢Į.	·	+						-									_
terminated at 6.5m																						
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Method: Hollow Stem Auger

Diameter: 150mm Date: Sep-07-2021 REF. NO.: 2100428AH DRAWING NO.: 6



Date:

Sept 07, 2021

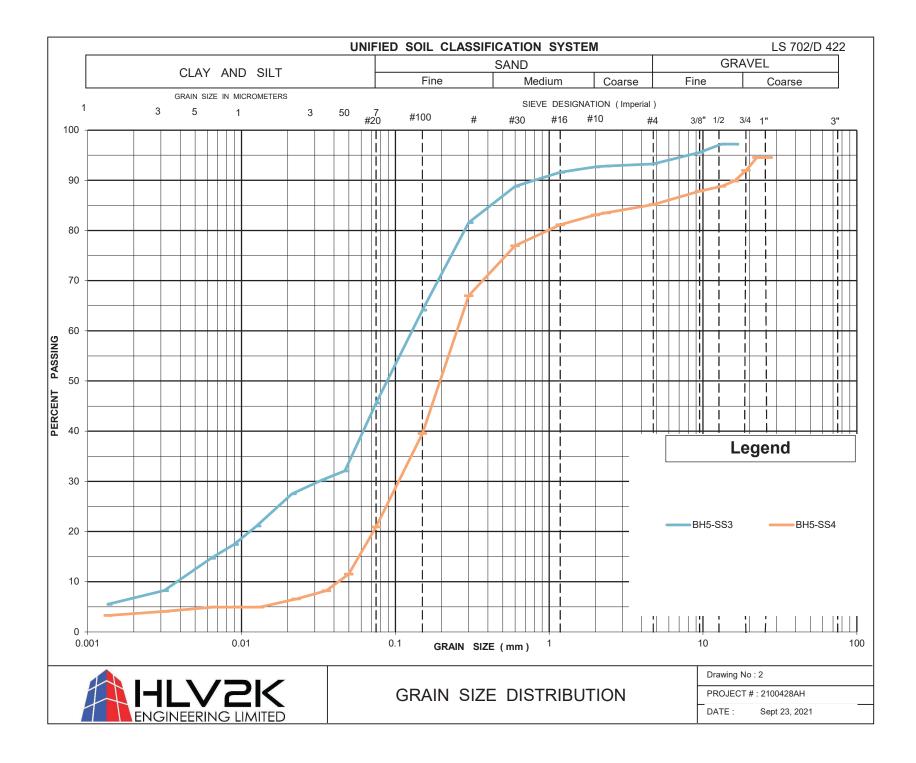
6

447.6 6.5

Water Level(mbgl):

4.8

1) 50 mm diameter monitoring well installed upon completion.
 2) Water Level Readings:



APPENDIX B

INFILTRATION TESTS FIELD MEASUREMENTS AND CALCULATIONS



Test Hole:	TP4	Date:	07-Sep-21	Project No.:	2100428AH
Tested By:	Bruce Kashani	Weather:	Cloud & windy		
		Depth to Water (m):	>6.5	Depth to bedroo	:k (m): N/A
		Diameter (cm):	15	Depth (cm):	220

Horizon (m)	Soil Texture	Soil color	Comments
0.0 - 0.25	Topsoil	Brown, black	
0.25 - 2.20	Sandy silt	Brown	

Time (min)	Water Depth (cm)	∆t (min)	Δh (cm)	Inf. Rate (cm/min)	Inf. Rate (mm/hr)	Percolation time (min/cm)	Average (min/cm)
0	15.00						
2	30.00	2	15.00	7.5	4500.0		
5	38.00	3	8.00	2.7	1600.0	0.38	
12	42.00	7	4.00	0.6	342.9	1.75	
20	53.00	8	11.00	1.4	825.0	0.73	
30	58.00	10	5.00	0.5	300.0	2.00	
40	63.00	10	5.00	0.5	300.0	2.00	
50	68.00	10	5.00	0.5	300.0	2.00	2.0



Test Hole:	TP1	Date:	01-Sep-21	Project No.:	2100428AH
Tested By:	Bruce Kashani	Weather:	Sunny		
		Depth to Water (m):	>6.5	Depth to bedroc	k (m): N/A
		Diameter (cm):	15	Depth (cm):	240

Horizon (m)	Soil Texture	Soil color	Comments
0.0 - 0.20	Topsoil	Brown, black	
0.20 - 2.40	Sandy silt to silty sand with gravel and cobbles	Brown	

Time (min)	Water Depth (cm)	Δt (min)	∆h (cm)	Inf. Rate (cm/min)	Inf. Rate (mm/hr)	Percolation time (min/cm)	Average (min/cm)
0	30.00						
2	60.00	2	30.00	15.0	9000.0		
5	75.00	3	15.00	5.0	3000.0	0.20	
10	83.00	5	8.00	1.6	960.0	0.63	
20	105.00	10	22.00	2.2	1320.0	0.45	
30	115.00	10	10.00	1.0	600.0	1.00	
40	125.00	10	10.00	1.0	600.0	1.00	
50	135.00	10	10.00	1.0	600.0	1.00	1.0



Test Hole:	TP2	Date:	07-Sep-21	Project No.:	2100428AH
Tested By:	Bruce Kashani	Weather:	Cloud & windy		
		Depth to Water (m):	>6.5	Depth to bedro	ck (m): N/A
		Diameter (cm):	15	Depth (cm):	240

Horizon (m)	Soil Texture	Soil color	Comments
0.0 - 0.30	Topsoil	Brown, black	
0.30 - 1.50	Silty sand to sandy silt with gravel and cobbles	Brown	
1.50 - 2.40	Sandy silt till	Brown	

Time (min)	Water Depth (cm)	∆t (min)	∆h (cm)	Inf. Rate (cm/min)	Inf. Rate (mm/hr)	Percolation time (min/cm)	Average (min/cm)
0	30						
2	33	2	3.00	1.5	900.0		
6	39	4	6.00	1.5	900.0	0.67	
11	45	5	6.00	1.2	720.0	0.83	
16	48	5	3.00	0.6	360.0	1.67	
21	49	5	1.00	0.2	120.0	5.00	
26	50	5	1.00	0.2	120.0	5.00	
31	51	5	1.00	0.2	120.0	5.00	
36	52	5	1.00	0.2	120.0	5.00	5.0



Test Hole:	TP3	Date:	07-Sep-21	Project No.:	2100428AH
Tested By:	Bruce Kashani	Weather:	Cloud & windy		
		Depth to Water (m):	>6.5	Depth to bedro	ck (m): N/A
		Diameter (cm):	15	Depth (cm):	185

Horizon (m)	Soil Texture	Soil color	Comments
0.0 - 0.25	Topsoil	Brown, black	
0.25 - 1.50	Sand and gravel	Brown	
1.50 - 2.30	Silty caly	Brown	
1.50 - 1.85	Sand and gravel	Brown	

Time (min)	Water Depth (cm)	∆t (min)	Δ h (cm)	Inf. Rate (cm/min)	Inf. Rate (mm/hr)	Percolation time (min/cm)	Average (min/cm)
0	18						
2	36	2	18.00	9.0	5400.0		
6	55	4	19.00	4.8	2850.0	0.21	
9	62	3	7.00	2.3	1400.0	0.43	
12	68	3	6.00	2.0	1200.0	0.50	
15	74	3	6.00	2.0	1200.0	0.50	
18	80	3	6.00	2.0	1200.0	0.50	
21	86	3	6.00	2.0	1200.0	0.50	0.5

APPENDIX C

INFORMATION ON WATER WELL RECORDS RECEIVED FROM MECP

Water Well Record

WELL_ID	BOREHOLE ID	Easting	Northing	Well Depth (m)	Water Table Depth (m)	Date Completed	Final Status
5737485	10541210	568049	4848857	47.2	31.4	10-Dec-02	Water Supply
6700714	10464860	568613	4849152	33.5	19.8	19-Oct-57	Water Supply
6700738	10464884	568722	4849243	45.7	10.4	16-Feb-65	Water Supply
6700740	10464886	568722	4849233	42.7	12.2	04-Aug-58	Water Supply
6700741	10464887	568764	4849146	25.9	4.3	20-May-60	Water Supply
6700742	10464888	568801	4849079	29.9	6.1	21-Mar-61	Water Supply
6703364	10467506	568294	4849423	68.6	25.9	05-Feb-69	Water Supply
6703528	10467665	568634	4848703	54.9	7.6	05-Aug-69	Water Supply
6703896	10468025	568514	4848713	50.3	8.5	01-Apr-71	Water Supply
6703961	10468086	567144	4849103	41.8	15.2	14-Jun-71	Water Supply
6704469	10468577	568174	4849553	88.4	42.1	22-Sep-72	Water Supply
6704716	10468823	568914	4849033	45.7	2.4	11-May-73	Water Supply
6704913	10469017	568918	4849017	74.7	4.6	25-Oct-73	Water Supply
6704915	10469019	568749	4849470	47.2	13.7	20-Sep-73	Water Supply
6704918	10469022	568725	4849314	27.7	9.8	18-Sep-73	Water Supply
6705909	10469993	568614	4849343	46.6	9.8	08-Jul-75	Water Supply
6705915	10469999	567864	4849643	68.0	35.1	05-Jun-75	Water Supply
6705933	10470017	568514	4849213	35.1	12.5	30-May-75	Water Supply
6706282	10470362	568764	4849423	27.4	12.8	16-Oct-76	Water Supply
6706584	10470660	568814	4849373	53.0	0.9	20-May-77	Water Supply
6706900	10470970	568564	4848773	60.0	7.6	29-Apr-78	Water Supply
6707164	10471227	568564	4848823	29.0	6.4	09-Jan-79	Water Supply
6707358	10471410	568714	4848823	32.9	3.7	18-Apr-80	Water Supply
6707813	10471818	568814	4849473	32.0	12.2	29-Apr-83	Water Supply
6707821	10471826	568814	4849473	20.4	12.8	08-Jun-83	Water Supply
6707858	10471859	568614	4849323	36.6	14.9	06-Jul-83	Water Supply
6707861 6708154	10471862 10472069	568664 568752	4848923 4849492	36.6 19.2	2.4 12.2	12-May-83 29-Jun-84	Water Supply Water Supply
6708134	10472089	568803	4849492	22.9	2.1		
6708346	10472255	568642	4848787	35.4	4.3	18-Apr-84 24-Jul-85	Water Supply Water Supply
6708340	10472256	568847	4849569	33.5	4.5	04-Dec-85	Water Supply Water Supply
6708360	10472268	568714	4849447	33.5	14.3	18-Dec-85	Water Supply Water Supply
6708365	10472273	568793	4848858	34.1	3.0	24-Dec-85	Water Supply Water Supply
6708389	10472295	567929	4848635	41.1	6.4	09-May-85	Water Supply Water Supply
6708413	10472319	568828	4849519	33.5	10.7	07-Apr-86	Water Supply Water Supply
6708616	10472508	568719	4849027	29.6	8.8	01-Dec-86	Water Supply
6708625	10472517	568732	4849358	23.5	10.7	11-Aug-86	Water Supply
6708826	10472716	568676	4849428	15.2	6.7	13-Apr-87	Water Supply
6709042	10472915	568731	4849270	48.2	12.2	10-Dec-87	Water Supply
6709050	10472923	568646	4848767	57.0	5.5	30-Nov-87	Water Supply
6709156	10473026	568808	4849283	51.8	7.6	12-Jan-88	Water Supply
6709157	10473027	568786	4849305	30.2	7.6	09-Dec-87	Water Supply
6709502	10473351	568399	4849055	15.2	5.5	20-Dec-88	Water Supply
6709578	10473427	568859	4848859	49.7	7.0	15-Dec-88	Water Supply
6710235	10474082	568896	4848874	32.0	2.7	27-Jul-89	Water Supply
6710806	10474647	568559	4848525	25.6	3.0	24-Jul-91	Water Supply
6710809	10474650	568682	4848850	34.1	6.7	24-May-91	Water Supply
6711075	10474916	568765	4848930	57.0	4.3	30-Oct-92	Water Supply
6711348	10475182	568741	4849173	48.8	12.2	19-Oct-93	Water Supply
6711628	10475461	568665	4849244	44.2	16.8	27-Oct-94	Water Supply
6712031	10475864	568983	4849133	57.9	1.8	01-May-96	Water Supply
6712436	10476269	568623	4849076	39.6	9.8	30-Jul-97	Water Supply
6713318	10477151	568660	4849130	49.4	8.5	26-Jan-00	Water Supply
6713603	10477436	568730	4848645	29.6	3.0	22-Nov-00	Water Supply
6713631	10477464	568677	4849256	51.8	15.2	09-Jan-01	Water Supply
6713887	10523019	568753	4849068	29.0	8.5	04-Oct-01	Water Supply
6713900	10523032	568707	4848838	38.1	4.3	25-Oct-01	Water Supply
6714075	10528610	568602	4849240	38.4	17.4	18-Jun-02	Water Supply
6714666	10548217	567286	4848578	72.5	34.1	09-Oct-03	Water Supply
6715166	11179802	568963	4848990	4.2		10-Dec-04	Abandoned
6715250	11327036	568800	4848921	4.3	F 2	10-Feb-05	Abandoned Water Supply
6715394	11327180	568714	4848856	30.5	5.2	04-Jul-05	Water Supply
6715503	11327289	568674	4848836	20 5	E 1	02-Sep-05	Abandoned Water Supply
6715772	11558293	568669	4848773	30.5	6.1	15-Jun-06	Water Supply
6715910	11695692	568647	4848772	30.5	7.0	06-Sep-06	Water Supply
7050905	23050905	568707	4848791	30.5	5.2	01-Oct-07	Water Supply
	1001599370	568636 568822	4848799 4849009	27.7	3.4	05-May-08 07-May-08	Abandoned Water Supply
7105350					J.4	U/-IVIdV-UO	
7113491	1001839380					,	
	1001839380 1001955780 1002637730	568633 568907	4848757 4849107	44.8	7.0	25-Sep-08 02-Jun-09	Water Supply Water Supply Abandoned

Water Well Record

WELL_ID	BOREHOLE ID	Easting	Northing	Well Depth (m)	Water Table Depth (m)	Date Completed	Final Status
7139080	1002932280	568847	4849013			14-Aug-08	Abandoned
7139081	1002932280	568822	4849009			14-Aug-09	Not Stated
7160498	1003486390	568701	4848883	18.3	3.7	23-Feb-11	Water Supply
7165335	1003534010	568704	4848886			13-Jun-11	Abandoned
7174984	1003633140	568777	4848996			12-Nov-11	Abandoned
7191665	1004205580	568807	4848962			25-Sep-12	Abandoned
7194971	1004232460	568816	4849025			06-Nov-12	Abandoned
7197600	1004256250	568757	4849009			20-Dec-12	Abandoned
7201338	1004288380	568860	4848987			25-Apr-13	Abandoned
7201342	1004288390	568787	4848856			25-Apr-13	Abandoned
7219237	1004731810	567841	4849446			15-Sep-13	Abandoned
7249486	1005717520	568647	4849158			02-Sep-15	Abandoned
7264117	1006030530	568708	4849044			29-May-16	Not Stated
7266474	1006141900	568742	4849038	23.5	6.4	11-Apr-16	Water Supply
7278147	1006322440	568644	4849203			21-Dec-16	Abandoned
7304154	1006975720	568993	4849166	7.6		03-Nov-17	Monitoring and Test Hole
7305135	1006981980	568902	4848916	4.6		29-Nov-17	Monitoring and Test Hole
7305136	1006981980	568773	4848902	5.5		24-Nov-17	Monitoring and Test Hole
7305137	1006981980	568924	4848896	4.6		24-Nov-17	Monitoring and Test Hole

APPENDIX D

DRAWINGS PROVIDED BY THE CLIENT



WATER BALANCE ASSESSMENT PROPOSED BRIARWOOD HILLSBURGH DEVELOPMENT 5916 Trafalgar Road North, Town of Erin, Ontario

Prepared for:

Hillsburgh Heights Inc.

636 Edward Avenue, Suite 14 Richmond Hill, Ontario L4C 0V4



2179 Dunwin Drive, Unit 4 Mississauga, Ontario L5L 1X2

Project No. 2100428AH

January 30, 2023



January 30, 2023

Reference No.: 2100428AH

Hillsburgh Heights Inc. 636 Edward Avenue, Suite 14 Richmond Hill, Ontario L4C 0V4

Email: Fausto@briarwoodhomes.ca

Attention: Mr. Fausto Saponara

Dear Mr. Saponara

RE: Water Balance Assessment for Proposed Briarwood Hillsburgh Development 5916 Trafalgar Road North, Town of Erin, Ontario

HLV2K Engineering Limited (HLV2K) is pleased to provide the water balance assessment report for the above mentioned project. The report presents HLV2K's understanding of the hydrogeological setting of the study area based on exploratory drilling, data collection, analyses, and review.

We trust that this information meets your present requirements. If we can be of additional assistance in this regard, please contact this office.

For and on behalf of HLV2K Engineering Limited,

k. Mohamadi

Kourosh Mohammadi, Ph.D., P.Eng. President & Principal Engineer

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- Appendix B Water Balance Tables

1 INTRODUCTION

HLV2K Engineering Limited (HLV2K) was retained by Hillsburgh Heights Inc. (the Client) with a proposal to conduct the water balance assessment for the proposed Briarwood Hillsburgh Development located at 5916 Trafalgar Road North, Town of Erin, Ontario (the Site). The Site is situated in a mixed rural, residential, and agricultural area. It is on the west side of Trafalgar Road, between Sideroad 27 to the north and Upper Canada Drive to the south. The Site is surrounded by residential housing, agricultural fields, and forested area. The Site location is shown on **Figure 1**. This report is intended to provide the water balance analysis for pre and post proposed development. A hydrogeological report was prepared by HLV2K in 2021 and provides the site characterizations.

Based on the information provided by the client, the proposed development will consist of 195 single family residential lots, 174 townhouse units, one (1) school block, one (1) heritage house, two (2) storm water management (SWM) facilities, one (1) park block, and new private roads with total area of 40.4 ha. The subdivision will be fully connected to municipal services (municipal water and sanitary sewers). Draft plan of subdivision shows the location of these blocks and features provided in **Appendix A**.

2 WATER BALANCE ANALYSIS

When precipitation (P) occurs, it can either run off (R) through the surface water system, infiltrate (I) to the water table, or evapotranspire (ET) from the earth's surface and vegetation. The sum of R and I is defined as the water surplus (S). When long-term averages of P, R, I, and ET are used, there is no net change in groundwater storage (ST). On a yearly basis, however, there is a potential for small changes in ST.

The annual water budget can be stated as,

$$P = ET + R + I + ST$$

The monthly averages of P and temperature (T) were collected from Environment Canada data. Based on the physiographic setting and proximity to weather stations, the Fergus Shand Dam Station (ID 6142400) located approximately 14 km west of the Site chosen as the most representative precipitation and temperature data

Climate Normals are arithmetic calculations of observed climate values over a specified time period and are used to describe the climatic characteristics of a location. Real-time values, such as daily temperature, may be compared to the "climate normal" to compare departures from the "average". The Canadian Climate Normals are calculated based on World Meteorological Organization (WMO) Standards. The WMO considers 30 years sufficient to eliminate year-to-year variations. The most recently published 30-year period from Environment Canada is January 1981 to December 2010.

In addition, the WMO established that normals should be arithmetic means calculated for each month of the year from daily data. To qualify, temperature data, soil temperatures and evaporation must fit the following rule: "If more than 3 consecutive daily values are missing or more than 5 daily values in total in a given month are missing, the monthly mean should not be computed and the year-month mean should be considered missing." This is referred to as the "3/5" rule. For total precipitation, degree-days, and "days with" calculations, no missing days are allowed.

2.1 Thornthwaite Monthly Water-Balance Model

The Thornthwaite water balance (Thornthwaite, 1948; Mather, 1978; 1979) uses an accounting type procedure to analyze the allocation of water among various components of the hydrologic cycle. Inputs to

the model are monthly temperature, precipitation and the site latitude. Outputs include monthly potential and actual evapotranspiration, soil moisture storage, soil moisture storage change, surplus, and runoff. For ease of calculation, an Excel spreadsheet was developed. This water balance was prepared according to the "Hydrogeological Assessment Submissions: Conservation Authority Guidelines to Support Development Application (2013).

2.2 **Pre-Construction Water Balance**

Total proposed development area is 40.32 ha, however, 6.36 ha has been considered for future development. The future development was not considered in the water balance assessment.

To predict water balance elements the 30-year average weather data was used. The detailed calculations are presented in below sections.

Precipitation (P)

Based on the 30-year average (1981-2010) for the Fergus Shand Dam meteorological station, the average precipitation is about 945.9 mm/year. The monthly precipitation distribution is presented in **Table B.1** of **Appendix B**.

Storage (ST)

Long-term annual change in storage is 0, although there is some variation on a monthly basis. It should be noted that for the topography, soil conditions (silty sand till to sandy silt till) and vegetative cover (moderate to deep rooted crops), the maximum soil moisture storage was estimated at about 250 mm according to Table 3.1 of MECP Stormwater Management Planning and Design Manual (2003).

Evapotranspiration

Calculated potential evapotranspiration (PET) based on the Thornthwaite monthly water balance model is about 573 mm/year, or about 61% of the total precipitation. The actual evapotranspiration is calculated based on a potential evapotranspiration (PET) and soil-moisture-storage withdrawal (SMW). PET is estimated from monthly temperature and is defined as a water loss from a homogeneous, vegetation covered area that never lacks water (Thornthwaite, 1948; Mather, 1978). In Thornthwaite water balance, PET is calculated using Thornthwaite Method (Ponce, 1989). The method is based on an annual temperature efficiency index J, defined as the sum of 12 monthly values of heat index I. Each index I is a function of the mean monthly temperature T, in degrees Celsius, as follows:

$$I = \left(\frac{T}{5}\right)^{1.514}$$

Evapotranspiration is calculated by the following formula:

$$PET(0) = 1.6 \left(\frac{10T}{J}\right)^c$$

in which PET(0) is the potential evapotranspiration at 0° latitude in centimeters per month; and c is an exponent to be evaluated as follows:

$$c = 0.00000675J^3 - 0.0000771J^2 + 0.01792J + 0.49239$$

At the latitude other than 0° potential evapotranspiration is calculated by

$$PET = K PET(0)$$

in which K is a constant for each month of the year, varying as a function of latitude. The latitude for Fergus Shand Dam station is 43° 44' and values of K are provided in **Table D.2** in **Appendix D**.

Water Surplus

The overall pre-construction water surplus for study area is estimated at 374 mm/year. Water surplus (S) has two components in Thornthwaite model: a runoff component, which is the overland flow component that occurs when soil moisture capacity is exceeded; and, an infiltration component. Using the MECP SWM manual (MECP, 2003) for guidance, it is estimated that about 50% of the water surplus (187 mm/year) infiltrates and the remaining 50% (187 mm/year) runs off either directly or as interflow. The details calculation is presented in **Table B.2** in **Appendix B**.

Annual Water Balance

The summary of annual water balance assessment for the pre-construction condition is provided in **Table B.3** in **Appendix B**.

2.3 Post-Construction Water Balance without LID

Based on the proposed Draft Plan provided by the Client (**Appendix E**), **Table 1** below shows a summary of post (proposed) construction land statistics.

Item	Area (m²)
Total Area	403,200
Paved roadways/walkway/Vista	87,900
Residential (total area)	170,600
Residentials (Impervious area: 55% of lot area)	93,830
School block (Total area)	22,700
School (Impervious area)	4,500
Park Block	17,500
Park (Impervious area: 20% of lot area)	3,500
Soft landscaped lot lawns, Boulevards, 80% of Park, 45% of residentials, Open space (excluding SWM Pond)	108,970
SWM Ponds	40,900
Future Development (not used in water balance assessment)	63,600

Table 1: Post-Construction (Proposed) Land Statistics

It was estimated that 55% of the residential lots, 20% of the park, and 4,500 m² of the school to be covered with impervious surfaces. The future development (63,600 m²) was not considered in this assessment, and it was considered to remain vacant, however, its contribution to recharge was not counted in water balance analysis.

To predict water balance elements, the 30-year average weather data was used. Based on the provided development information, it is our understanding that about 68% of the post construction surface will be considered impervious (excluding future development). Additionally, the Conservation Authority guidelines suggest infiltration will be lowered by 10% (a factor of 0.1) because of site grading and compaction of the soil due to construction work. However, the soil compaction issue might be resolved by increasing the topsoil depth to 300 mm. **Table B.4** in **Appendix B** presents the components of post construction water balance.

Precipitation (P)

Precipitation remains the same, the 30-year average (1981-2010) for the Fergus Shand Dam Station meteorological station (945.9 mm/year) was used.

Storage (ST)

Long-term change in storage is 0. It should be noted that compared to pre-construction, there is a change in the distribution and magnitude of monthly soil moisture storage. It is assumed that development of the land will result in reduced grades that, with the same soil conditions (clayey silt to sandy silt till) and changed vegetative cover (shallow rooted lawns and gardens), will reduce the maximum soil moisture storage to 125 mm.

Evapotranspiration

In post construction, it was assumed that the increased impervious area would result in an additional 20% in potential evaporation from the areas covered with hard surfaces. The total water lost to evaporation increases, but the PET for pervious areas, calculated at 573 mm/year, remains about the same.

Water Surplus

The post-construction water surplus for the entire Site is calculated to be about 1,130 mm/year. Of this, about 621 mm/year will be converted to runoff on impervious areas and 508 mm/year will be available for infiltration or runoff on pervious areas in post-development condition. This exceeds the infiltration potential for the surficial soils; thus a component of the available infiltration water will also run off.

The results of the post construction water balance calculation suggest that there is enough water to maintain recharge, as there is a positive surplus (S) in the post construction scenario.

Annual Water Balance without LID

The major change between the pre- and post-construction water balance is that in the pre-construction setting, most of the water surplus is carried off the site as interflow and infiltration, whereas in the post construction setting, there is more interflow and overland flow. **Table B.5** in **Appendix B** shows that the volume of runoff will be increased from 63,923 m³/year in pre-development to 192,818 m³/year. The post-development infiltration volume is approximately 22,361 m³/year which is almost 41% of the pre-development, if no mitigation measure is implemented and 68% of the site surface is converted to impervious surface.

Table 2 below summarizes the post-construction water balance and the annual recharge deficit which needs to be compensated by increasing infiltration using the LID measures.

Parameter	Value
Average Annual Rainfall (mm)	946
Pre- Development Infiltration (m ³ /year)	63,166
Post-Development Infiltration without Mitigation (m ³ /year)	22,361
Pre- and Post-Development Infiltration Deficit (m ³ /year)	-40,805

Table 2: Post -Construction Water Balance Summary

2.4 Post-Construction Water Balance with LID

Post development infiltration and runoff rates will be affected by the presence of impervious surfaces (i.e. building/garage rooftops, asphalt driveways and road), which based on the proposed development plan will comprise approximately 68% of the development property. The results of the post-construction water balance assessment without LID measures (Table B.5 in Appendix B) show that there will be enough water to infiltrate in the pervious areas to increase the infiltration rate and reduce the runoff in postconstruction development. Techniques to maximize the water availability in pervious areas such as designing grades to direct roof runoff towards lawns, side and rear yard swales, and other pervious areas throughout the development where possible can considerably increase the volume of infiltration in developed areas. Increasing the topsoil thickness by about two times the normal thickness is also considered as beneficial to enhance storage of water in the topsoil and increase the potential for infiltration. Other mitigation techniques that can be considered to mitigate increases in runoff and reductions in infiltration include such measures as subsurface infiltration trenches, permeable pavements, rain gardens, bioswales, galleries and pervious pipe systems. Surface methods should only be considered in areas where there is sufficient depth to water table to accommodate the systems within the unsaturated zone and sufficient soil hydraulic conductivity to function effectively. The MECP manual recommends that subsurface galleries or trenches should be about 1 m above the high water table.

The proposed LID measures will be designed by others.

2.5 Impact Assessment

To assess the potential impacts of the proposed development on groundwater resources, the draft development plan was reviewed. From a hydrogeological perspective, the following changes will occur as a result of the proposed development.

- The subject site is characteristically homogeneous with respect to soil types at ground surface. It is mainly silty sand over sand and gravel.
- The development will create new hard surfaces over a portion of the site, increasing the impervious area. The amount of impervious areas is estimated to be about 64%.
- As a result of the increase in impervious area, the overall infiltration will decrease and the amount of overland flow runoff will increase, particularly during storm events. Runoff will be managed using

conventional storm water management techniques or Low Impact Development (LID) that include storm water management (SWM) facilities.

- With the inevitable changes in impervious areas and potential changes to groundwater quality and quantity, best management practices (BMPs) that promote groundwater infiltration/recharge for the purpose of trying to establish post-development infiltration at pre-development levels makes a significant contribution to mitigate the effects of development. The type and location of these facilities and the function/operation are addressed by others.
- Although, the increase in impervious area can potentially result in a slight lowering of shallow groundwater levels, maintaining infiltration at levels similar to existing conditions will result water levels within the current range of seasonal fluctuations. No change in the overall flow direction is expected.
- The contribution of groundwater can be an important factor in the overall health of aquatic systems. Implementing mitigation measures to reduce the infiltration deficit will assist in maintaining the current level of groundwater contribution to the surface water features. As such, no negative impact is expected if LID measures are implemented to maintain the groundwater recharge similar to the existing conditions.

3 STATEMENT OF LIMITATIONS

The contents of this report are subject to the attached 'Statement of Limitation' sheet. The reader's attention is specifically drawn to these conditions as it is considered essential that they be followed for proper use and interpretation of this report. The Statement of Limitations is not intended to reduce the level of responsibility accepted by HLV2K, but rather to ensure that all parties who have been given reliance for this report are aware of the responsibilities each assumes in so doing.

This report was prepared by HLV2K exclusively for the account of Hillsburgh Heights Inc. (the CLIENT). Other than by the CLIENT, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of HLV2K. Any use, reliance on or decision made by any person other than CLIENT based on this report is the sole responsibility of such other person. The CLIENT and HLV2K make no representation or warranty to any other person with regard to this report and the work referred to in this report and the CLIENT and HLV2K accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

4 CLOSURE

We trust that this information is satisfactory for your present requirements. Should you have any questions or require additional information, please do not hesitate to contact this office.

For and Behalf of HLV2K Engineering Limited

PROFESSIONAL LICENSED ENGINEER K. Mohammadi 100172155 k. Mohamadi Jan. 30, 2023 Kourosh Mohammadi, PhD., P.E. Principal Hydrogeological Engineer and Groundwater Modeller

REFERENCES

- Conservation Authority (2013). Hydrogeological Assessment Submissions: Conservation Authority Guideline to Support Development Applications.
- Environment Canada (2021). Canadian National Climate Archive, Canadian Climate Norms and Averages (1981 – 2010), Fergus Shand Dam – Station ID 6142400– Website: <u>https://climate.weather.gc.ca/climate_normals/results_1981_2010_e.html?searchType=stnName</u> <u>&txtStationName=fergus+shand+dam&searchMethod=contains&txtCentralLatMin=0&txtCentralLa</u> <u>tSec=0&txtCentralLongMin=0&txtCentralLongSec=0&stnID=4760&dispBack=1</u>
- HLV2K Engineering Limited. (2022). Hydrogeological Investigation for Proposed Briarwood Hillsburgh Development at 5916 Trafalgar Road North, Town of Erin, Ontario, Project Number 2100428AH, dated August 2022.
- MECP (2003). Stormwater Management Planning and Design Manual, Ontario Ministry of Environment, 379p.

HLV2K Engineering Limited

STATEMENT OF LIMITATIONS

Your report has been developed based on your unique project specific requirements as understood by HLV2K Engineering Limited (HLV2K) and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking HLV2K to assess how factors that changed subsequent to the date of the report affect the report's recommendations. HLV2K cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions, which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult HLV2K to be advised how time may have impacted on the project.

The findings derived from this investigation were based on information collected and/or provided by the Client. It may become apparent that soil and groundwater conditions differ between and beyond the testing locations examined during future investigations or other work that could not be detected or anticipated at the time of this study. As such, HLV2K cannot be held liable for environmental conditions that were not apparent from the available information. The conclusions presented represent the best judgment of the assessors based on limited investigations.

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature, external data source review, sampling, and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions, which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of HLV2K through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report is based on the assumption that he site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only HLV2K, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and HLV2K cannot be held responsible for such misinterpretation.

To avoid misuse of the information contained in your report it is recommended that you confer with HLV2K before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

HLV2K Engineering Limited

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain HLV2K to work with other project design professionals who are affected by the report. Have HLV2K explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment.

Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact HLV2K for information relating to geoenvironmental issues.

HLV2K is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with HLV2K to develop alternative approaches to problems that may be of genuine benefit both in time and in cost.

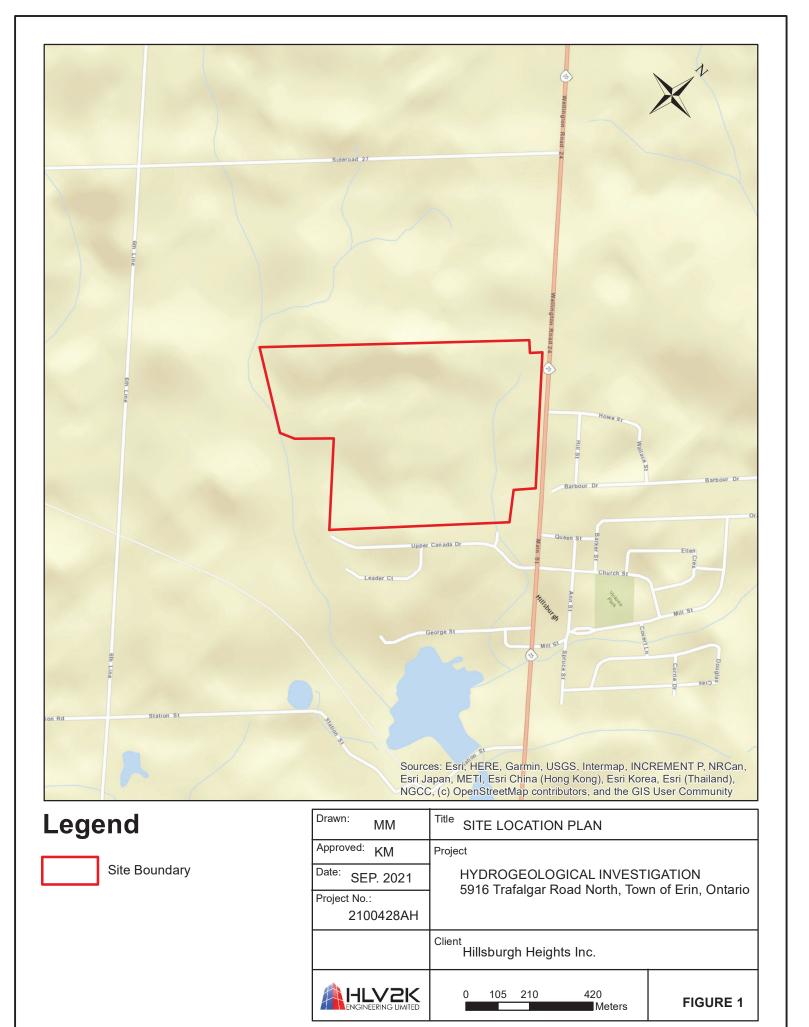
Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from HLV2K to other parties but are included to identify where HLV2K's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from HLV2K closely and do not hesitate to ask any questions you may have.

Third party information reviewed and used to formulate this report is assumed to be complete and correct. HLV2K used this information in good faith and will not accept any responsibility for deficiencies, misinterpretation or incompleteness of the information contained in documents prepared by third parties.

Nothing in this report is intended to constitute or provide a legal opinion.

Should additional information become available, HLV2K requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

FIGURES



APPENDIX A

Drawing Provided by the Client



- 1			
5			
NO. DESCRIPTION		DATE	BY
REVISION	5		
) 25 -
TEL. (905) 794–0600	FAX	(905) 794–0611	
HILLSBURGH RESIDENTIAL			C.
5616 TRAFALGA PART 1 OF P PART OF LOT 26	LAN 6 ⁻	IR-9590	
HILLSBURGH TOWN			
		N	
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DRAWN BY: S.G.K. CHECKED BY:	BAL/ APL/ PROJECT N DRAWING N	ANCE AN	

APPENDIX B

Water Balance Tables

TABLE B.1 - Climate Data

Fergus Shand Dam Station, Ontario

<u>Latitude:</u> 43°44' N

Longitude: 80°19' W

Elevation: 417.6 m

Temperature: Temperature:	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Average (°C)	-7.4	-6.3	-1.9	5.7	12.2	17.5	20.0	19.0	14.9	8.3	2.1	-3.9	6.7
Rainfall (mm)	27.8	25.3	36.7	67.9	86.8	83.8	89.2	96.6	93.1	75.6	80.5	34.7	798
Snowfall (mm)	40.1	30.6	22.9	6.2	0.1	0.0	0.0	0.0	0.0	1.6	12.5	33.9	147.9
Precipitation (mm)	67.9	55.9	59.6	74.1	86.9	83.8	89.2	96.6	93.1	77.2	93.0	68.6	945.9

Water Balance Assessment 5916 Trafalgar Road North Town of Erin, Ontario

TABLE B.2

Potential Evapotranspiration Calculation	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	YEAR
Davily Average Temperature (°C)	-7	-6	-2	6	12	18	20	19	15	8	2	-4	7
Heat index: $i = (t/5)^{1.514}$	0.00	0.00	0.00	1.22	3.86	6.66	8.16	7.55	5.22	2.15	0.27	0.00	35.1
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.00	26.65	59.36	86.76	99.85	94.61	73.26	39.58	9.32	0.00	489
Adjusting Factor K for U (Latitude 43 [°] 44' N)	0.77	0.87	0.99	1.11	1.23	1.29	1.27	1.17	1.05	0.92	0.80	0.74	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	30	73	112	127	111	77	36	7	0	573
PRE-DEVELOPMENT WATER BALANCE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	YEAR
Precipitation (P)	68	56	60	74	87	84	89	97	93	77	93	69	946
Potential Evapotranspiration (PET)	0	0	0	30	73	112	127	111	77	36	7	0	573
P - PET	68	56	60	44	14	-28	-37	-14	16	41	86	69	373
Change in Soil Moisture Storage	0	0	0	0	0	-28	-37	-14	16	41	23	0	0
Soil Moisture Storage (Assume January Soil Moisture Storage = 100% SMS)	250	250	250	250	250	222	184	170	186	227	250	250	
Actual Evapotranspiration (AET)	0	0	0	30	73	112	127	111	77	36	7	0	573
Soil Moisture Deficit (in mm)	0	0	0	0	0	28	66	80	64	23	0	0	
Surplus - available for infiltration or runoff	68	56	60	44	14	0	0	0	0	0	63	69	373
Potential Infiltration (based on MOE metholodogy*; independent of temperature)	34.0	28.0	29.8	22.2	6.9	0.0	0.0	0.0	0.0	0.0	31.4	34.3	187
Potential Surface Water Runoff (independent of temperature)	34.0	28.0	29.8	22.2	6.9	0.0	0.0	0.0	0.0	0.0	31.4	34.3	187
POST- DEVELOPMENT WATER BALANCE ON IMPERVIOUS AREAS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	YEAR
Precipitation (P)	68	56	60	74	87	84	89	97	93	77	93	69	946
Potential Evaporation (PE) from impervious areas (assume 20%)	13.6	11.2	11.9	14.8	17.4	16.8	17.8	19.3	18.6	15.4	18.6	13.7	189
P-PE (surplus available from impervious areas)	54	45	48	59	70	67	71	77	74	62	74	55	757
Water surplus change compared to pre-condition (for areas that change from vegetated open areas to impervious areas)	-14	-11	-12	15	56	67	71	77	74	62	12	-14	384

Pre- and Post-Development Water Balance Components

Soil Moisture Storage 250

PE from impervious areas % 20

*MOE SWM infiltration factor calculation		
topography - Rolling land (approximately 2.8 to 3.8m/km)		
soils - relatively tight silty clay till materials		
cover - predominantly cultivated land	0.1	
Infiltration Factor	0.5	

	Pre-Construction			
	Unpaved Areas	Impervious Areas	Totals	
	- 1	(Existing building)		
Area	338600	1000	339600	
Pervious Area	338600	0	338600	
Impervious Area	0	1000	1000	
	nfiltration Factors	5		
Topography Infiltration Factor	0.2	0.15		
Soil Infiltration Factor	0.2	0.1		
Land Cover Infiltration Factor	0.1	0		
MOE Infiltration Factor	0.5	0.25		
Actual Infiltration Factor	0.5	0		
Runoff Coefficient Pervious Surfaces	0.5	1		
Runoff from Impervious Surfaces	0	0.8		
Inputs (per Unit Area)				
Precipitation (mm/yr)	946	946	946	
Run-On (mm/yr)	0	0	0	
Other Inputs (mm/yr)	0	0	0	
Total Inputs (mm/yr)	946	946	946	
Outputs (per Unit Area)				
Precipitation Surplus (mm/yr)	373	757	374	
Net Surplus (mm/yr)	373	757	374	
Evapotranspiration (mm/yr)	573	189	572	
Infiltration (mm/yr)	187	0	186	
Rooftop Infiltration (mm/yr)	0	0	0	
Total Infiltration (mm/yr)	187	0	186	
Runoff Pervious Areas	187	0	186	
Runoff Impervious Areas	0	757	2	
Total Runoff (mm/yr)	187	757	188	
Total Outputs (mm/yr)	946	946	946	
Difference (Inputs - Outputs)	0	0		
Inputs (Volumes)				
Precipitation (m3/yr)	320282	946	321228	
Run-On (m3/yr)	0	0	0	
Other Inputs (m3/yr)	0	0	0	
Total Inputs (m3/yr)	320282	945.9	321228	
Outputs (Volumes)				
Precipitation Surplus (m3/yr)	126332	757	127089	
Net Surplus (m3/yr)	126332	757	127089	
Evapotranspiration (m3/yr)	193950	189	194139	
Infiltration (m3/yr)	63166	0	63166	
Rooftop Infiltration (m3/yr)	0	0	0	
Total Infiltration (m3/yr)	63166	0	63166	
Runoff Pervious Area (m3/yr)	63166	0	63166	
Runoff Impervious Areas (m3/yr)	0	757	757	
Total Runoff (m3/yr)	63166	757	63923	
Total Outputs (m3/yr)	320282	946	321228	
Difference (Inputs - Outputs) * Evaporation from impervious areas wa	0	0	0	

TABLE B.3 - Annual Pre-Construction Water Balance

* Evaporation from impervious areas was assumed to be 20% of precipitation

POTENTIAL EVAPOTRANSPIRATION CALCULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ост	NOV	DEC	YEAR
Average Temperature ([°] C)	-7.4	-6.3	-1.9	5.7	12.2	17.5	20.0	19.0	14.9	8.3	2.1	-3.9	6.7
Heat index: i = (t/5) ^{1.514}	0.00	0.00	0.00	1.22	3.86	6.66	8.16	7.55	5.22	2.15	0.27	0.00	35.1
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.00	26.65	59.36	86.76	99.85	94.61	73.26	39.58	9.32	0.00	489
Adjusting Factor K for U (Latitude 43 [°] 44' N)	0.77	0.87	0.99	1.11	1.23	1.29	1.27	1.17	1.05	0.92	0.80	0.74	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	30	73	112	127	111	77	36	7	0	573
POST-DEVELOPMENT WATER BALANCE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	YEAR
Pervious areas will receive rainfall plus some runoff from impe		s, so the foll	u owing balan								ion.		L
Precipitation (P)	68	56	60	74	87	84	89	97	93	77	93	69	946
Potential Evaporation (PE) from impervious areas (assume 20% of P)	14	11	12	15	17	17	18	19	19	15	19	14	189
P-PE (surplus available for runoff from impervious areas)	54	45	48	59	70	67	71	77	74	62	74	55	757
WAT (Total water supply to pervious areas = rain plus impervious area runoff)	122	101	107	133	156	151	161	174	168	139	167	123	1703
Potential Evapotranspiration from pervious areas (PET)	0	0	0	30	73	112	127	111	77	36	7	0	573
WAT - PET	122	101	107	104	83	39	34	63	91	103	160	123	1130
Change in Soil Moisture (mm)	0	0	0	0	0	0	0	0	0	0	0	0	0
Soil Moisture Storage (mm)*	125	125	125	125	125	125	125	125	125	125	125	125	
Actual Evapotranspiration (AET)	0	0	0	30	73	112	127	111	77	36	7	0	573
Total surplus - available for infiltration or runoff on pervious areas	122	101	107	104	83	39	34	63	91	103	160	123	1130
Estimate of I and R (based on MOE infiltration factor)*													
Potential Infiltration* (based on soil conditions; independent of temperature)	55.0	45.3	48.3	46.6	37.5	17.5	15.3	28.3	40.9	46.2	72.0	55.6	508
Potential Surface Water Runoff (independent of temperature)	67.2	55.3	59.0	57.0	45.9	21.4	18.7	34.6	50.0	56.4	87.9	67.9	621
Estimate of I and R (based on MOE Factors and CA Guide	line assump	otion of a 10	0% reductio	n in infiltr	ation redu	uction rel	ated to so	oil compa	ction)				
Potential Infiltration (based on soil conditions; independent of temperature)	49.5	40.8	43.4	42.0	33.8	15.7	13.8	25.5	36.8	41.6	64.8	50.0	458
Potential Surface Water Runoff (independent of temperature)	72.7	59.9	63.8	61.7	49.6	23.1	20.2	37.5	54.1	61.0	95.1	73.5	672

TABLE B.4 - WATER BALANCE COMPONENTS FOR CASE WHERE RUNOF

Max SMS	125
PE from impervious areas %	20

topography - flat to rolling	0.2
soils - tight sandy to clayey silt till	0.2
cover - predominantly impervious paved surface	0.05
Infiltration Factor	0.45

	Unpaved Areas	Impervious Areas (Paved/Buildings)	Water (Pond)	Totals
Area	108970	189730	40900	339600
Pervious Area	108970	0	0	108970
Impervious Area	0	189730	40900	230630
	Infiltratio	n Factors		
Topography Infiltration Factor	0.2	0	0	
Soil Infiltration Factor	0.2	0	0	
Land Cover Infiltration Factor	0.05	0	0	
MOE Infiltration Factor	0.45	0	0	
Actual Infiltration Factor	0.55	0	0	
Runoff Coefficient Pervious Surfaces	0.45	1	1	
Runoff from Impervious Surfaces [*]	0	0.8	0.8	
	Inputs (per	r Unit Area)		
Precipitation (mm/yr)	946	946	946	946
Run-On (mm/yr)	0	0	0	0
Other Inputs (mm/yr)	0	0	0	0
Total Inputs (mm/yr)	946	946	946	946
	Outputs (pe	er Unit Area)		
Precipitation Surplus (mm/yr)	373	, 757	757	634
Net Surplus (mm/yr)	373	757	757	634
Evapotranspiration (mm/yr)	573	189	189	312
Infiltration (mm/yr)	205	0	0	66
Rooftop Infiltration (mm/yr)	0	0	0	0
Total Infiltration (mm/yr)	205	0	0	66
Runoff Pervious Areas	168	0	0	54
Runoff Impervious Areas	0	757	757	514
Total Runoff (mm/yr)	168	757	757	568
Total Outputs (mm/yr)	946	946	946	946
Difference (Inputs - Outputs)	0	0	0	
	Inputs (\	/olumes)		
Precipitation (m3/yr)	103075	179466	38687	321228
Run-On (m3/yr)	0	0	0	0
Other Inputs (m3/yr)	0	0	0	0
Total Inputs (m3/yr)	103075	179466	38687	321228
		(Volumes)		
Precipitation Surplus (m3/yr)	40657	143572	30950	215179
Net Surplus (m3/yr)	40657	143572	30950	215179
Evapotranspiration (m3/yr)	62418	35893	7737	106048
Infiltration (m3/yr)	22361	0	0	22361
Rooftop Infiltration (m3/yr)	0	0	0	0
Total Infiltration (m3/yr)	22361	0	0	22361
Runoff Pervious Area (m3/yr)	18296	0	0	18296
Runoff Impervious Areas (m3/yr)	0	143572	30950	174522
Total Runoff (m3/yr)	18296	143572	30950	192818
Total Outputs (m3/yr)	103075	179466	38687	321228
Difference (Inputs - Outputs)	0	0	0	0

TABLE B.5 - Annual Post-Construction Water Balance without LID

* Evaporation from impervious areas was assumed to be 20% of precipitation

APPENDIX "E"

Storm Water Management Calculations

SWM POND - 1 (EAST)

Project Number : W21081 Project Name : Hillsburgh Date : 15/02/2023 Prepared By : S.S Checked By: Scott/D.K.H

Pre-Development Scenario/ Release Rate targets for proposed SWM Pond - EAST ;

Note : Data Extracted from Strittmatter Residential Development SWM Report ;

Revised Stormwater Management Report and Design Drawings	Village of Hillsburgh
Proposed Strittmatter Residential Development	Town of Erin

3.4 Ultimate Development Condition

Consideration was given to the possibility of future development of the McMurchy lands. A hydrologic analysis was conducted to determine if a reasonable sized stormwater management facility could be constructed on McMurchy lands that would allow an appropriate discharge rate during storm events without having adverse effects on the Strittmatter stormwater management system.

For the hydrologic analysis an assumed development scenario was established for the McMurchy lands; this scenario is furthered referred to as the Ultimate Condition. The development of the 22.4 hectare property consisted of the following:

- 10 hectares Open Space (non-developable), and
- 12.4 hectares @ 30% impervious (similar to Strittmatter development)

Under the above conditions the following storage and outflow values were found to adhere to the requirements previously stated:

5 year: 2600 m³ controlled to 0.06 m³/s, and 100 year: 7300 m³ controlled to 0.16 m³/s.

Allowable Release Rate Targets for Proposed East Pond ;

5-Year Target =	0.060 m³/s
100-Year Target =	0.160 m³/s

The SWM Strategy is to control the Post-development peak flows to the above mentioned targets ; routed flows from proposed East SWM Pond will connect to existing 450mm sewers located on McMurchy Lane.

SWM Pond -East - Pond Stage Storage Calculations

240.00 (Excludes 40m³/ha Extended Detention)

	LAND USE TYPES										
	Resid. Dev. Area	Multiple Family (Townhouses)	Road ROW	Retail / Commercial	School	Future Development	External Drainage (Wood Lot-North)	SWM Pond	Total	Composite Runoff Coeff.	Composite Imperv. %
Typical C Value	0.50	0.75	0.90	0.90	0.75	0.75	0.25	0.50			
Typical Impervious %	60%	80%	95%	95%	80%	80%	10%	75%			
Pond No - East	5.19	3.59	4.44	1.80	2.27	0.00	0.00	2.15	19.44	0.704	79%

MOE Standard Requirements = Permanent Pool Volume Required = Permanent Pool Volume Provided =

4,666 m³

12,362 m³

Elevations	Total	Average Area	Depth	Delta	Total	
	Area			Volume	Volume	
(m)	(m²)	(m ²)	(m)	(m ³)	(m ³)	
452.00	4044	F1 22	1.00	5122		
453.00	6222	5133	1.00	5133	5133	
454.00	8236	7229	1.00	7229	12362	Permanent Pool
454.00	8236				0	Storage
454.65	9928	9082	0.65	5903	5903	
455.40	10976	10452	0.75	7839	13742	
		11262	0.30	3378		
455.70	11547	12404	0.00	0	17121	Maintenance Access
455.70	13261				17121	
456.00	14394	13828	0.30	4148	21269	

Contributing Drainage Area (ha) = 19.85 Ha

25mm 4Hr Chicago Post Development Runoff Volume in Depth = 19.968 mm (Refer to VO Results) (R. V x Drainage Area)

25mm 4Hr Chicago Volume Required =

25mm 4Hr Chicago Volume Provided =

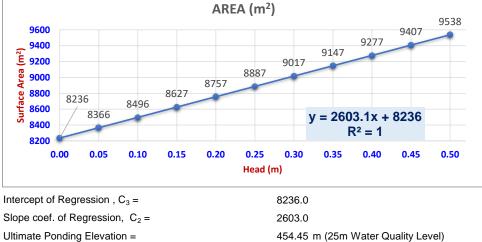
25mm 4-hour Chicago storm to be stored and released over a min. of 48-hour period ;

Drawdown Time for Water Quality Level - EAST POND ;

Based on Equation 4.11 MOE SWM Planning and Design Manual

$t = \frac{0.66 \mathrm{C}_2 \mathrm{h}^{15} + 2 \mathrm{C}_3 \mathrm{h}^{05}}{100}$	Elevation(m)	Head (m)	AREA (m ²)
2.75 A _o	454.00	0.00	8236
	454.05	0.05	8366
t = Drawdown time in seconds	454.10	0.10	8496
$A_p = Surface$ area of the pond (m ²)	454.15	0.15	8627
C = Discharge Coefficient (typically 0.63)	454.20	0.20	8757
$A_o = Cross-sectional area of the orifice (m2)$	454.25	0.25	8887
g = Gravitational acceleration constant (9.81 m/s)	454.30	0.30	9017
h_1 = Starting water elevation above the orifice (m)	454.35	0.35	9147
h_2 = Ending water elevation above the orifice (m)	454.40	0.40	9277
C2 = Slope coefficient from the area-depth linear regression	454.45	0.45	9407
C ₃ = Intercept from the area-depth linear regression	454.50	0.50	9538

3,964 m³ 3970 m³



Depth over orifice = 0.45 m (25mm Level - Permanent Pool Elevation) (454.45 - 454.0) Orifice Diameter = 156 mm Orifice Area = 0.01911 m² Drawdown Time (t)= 220090 seconds

61 hours

EAST POND CONTROL STRUCTURE DESIGN

Project Number : W21081 Project Name : HillsBurgh Prepared By : S.S

Checked By: D.K.H/Scott

Date : 15/02/2023

Orifice No. 1 (25mm Erosion Co	Weir/Orifice No.2 (To	Weir/Orifice No.2 (To Control 2 - 100-Year)					
Orifice Plate Diameter = Area = Orifice Coeff. (C) = Invert = Orifice Plate Centroid =	0.156 m 156 mm 0.0191 m ² 0.63 454.00 m 454.08 m	Orifice Width = Orifice Height = Area of Opening = Orifice Coeff. (C) = Invert = Orifice Centroid =	0.25 m 0.13 m 0.033 m ² 0.63 455.40 m 455.47 m	BOX CUT-OUT DETAILS			
Submerged Orifice Equation = Q _o =	= 0.63 x A x [2 x g x H] ^{1/2}	We	Weir Equation = $Q_w = 1.67 \text{ x L x H}^{1.5}$				
Where,							
Q _o = Flow rate (m ³ /s)		Weir Specifications	Where,				
C = Discharge Coefficien	t	Length of Weir =	0.25 m	$Q_w =$ Flow rate (m ³ /s)			
A = Area of opening (m^2)	A = Area of opening (m^2)		455.40 m	C = Discharge Coefficient			
H = Net head above the	H = Net head above the orifice (m)		455.53 m	L = Weir Length (m)			
g = Acceleration due to g	Weir Coefficient =	1.67	H = Net Head on the Orifice (m)				

Stage (m):	0.05	ORIFICE CONTROL	L-1 (ORIFICE PLATE)	ORIFIC	E/WEIR CONTROL -	2 (BOX CUT-O	UT)		
Active Storage	Elevation	Depth above orifice	Orifice No.1 Flow	Depth above orifice	Orifice No.2 Flow	Depth Above	Weir No.2 Flow	Total Flow	
(m ³)	(m)	Centroid (m)	(m³/s)	Centroid (m)	(m³/s)	Weir (m)	(m³/s)	(m³/s)	
0	454.00	0	0					0.000	Permanent Pool Elevation
415	454.05	0	0					0.000	
837	454.10	0	0					0.000	
1265	454.15	0.07	0.014					0.014	
1699	454.20	0.12	0.019					0.019	
2140	454.25	0.17	0.022					0.022	
2588	454.30	0.22 0.27	0.025 0.028					0.025	
3042 3503	454.35 454.40	0.32	0.028					0.028 0.030	
3970	454.45	0.32	0.030					0.030	25mm Chicago - Erosion Control
4443	454.50	0.42	0.035					0.035	Zomin onloage Erosion control
4923	454.55	0.47	0.037					0.037	
5410	454.60	0.52	0.039					0.039	
5903	454.65	0.57	0.040					0.040	
6401	454.70	0.62	0.042					0.042	
6903	454.75	0.67	0.044					0.044	
7408	454.80	0.72	0.045					0.045	
7917	454.85	0.77	0.047					0.047	
8429	454.90	0.82	0.048					0.048	
8945	454.95	0.87	0.050					0.050	
9464	455.00	0.92	0.051					0.051	
9986	455.05	0.97	0.053					0.053	
10512	455.10	1.02	0.054					0.054	
11042	455.15	1.07	0.055					0.055	
11575	455.20	1.12	0.056					0.056	
12112	455.25	1.17	0.058					0.058	
12652	455.30	1.22	0.059					0.059	
13086	455.34	1.26	0.060					0.060	5-Year (Target - 0.060m ³ /s)
13195	455.35	1.27	0.060					0.060	
13742	455.40	1.32	0.061			0.00	0.000	0.061	
14294	455.45	1.37	0.062			0.05	0.005	0.067	
14849	455.50	1.42	0.064			0.10	0.013	0.077	
15410	455.55	1.47	0.065	0.08	0.027			0.091	
15976	455.60	1.52	0.066	0.13	0.034			0.100	
16546	455.65	1.57	0.067	0.18	0.040			0.106	
17121	455.70	1.62	0.068	0.23	0.045			0.112	
17789	455.75	1.67	0.069	0.28	0.049			0.118	
18466 19152	455.80 455.85	1.72 1.77	0.070 0.071	0.33 0.38	0.053 0.057			0.123 0.128	
19152 19849	455.85 455.90	1.77	0.071	0.38	0.057			0.128 0.133	
20554	455.95	1.87	0.072	0.43	0.064			0.133	
20354 21269	456.00	1.92	0.073	0.53	0.067			0.137	100-Year (Target - 0.160 m ³ /s)
21203	400.00	1.52	0.074	0.00	0.007			0.747	100-10al (1alget - 0.100 11 /5)

Emergency Spillway Design - East Pond

Notes: * As per MOE SWM Manual definition, the Emergency Spillway is designed to convey strom drainage flows out of the facility in the event that the other outlets (in control structure) are not functioning properly.

The Emergency spillway is proposed at 100-year Elevation	on =	456.0	00 m
100-Year Storm Peak Flows (Q _{inflow})* =	8.976	m ^{3/} s	(Refer to 100-Yr VO Model Results)
Hurricane Hazel Storm Peak Flows (Q _{inflow})* =	2.884	m ^{3/} s	(Refer to Regional Storm Model Results)

*Peak Flows generated by 100-year is more than that of Regional (Hurricane Hazel) Storm ; the Spillway is designed for 100-Year Peak Flows

Emergency Spillway Weir Parameters

Top Width of Weir =	35 m
Downstream Width of Weir =	30 m
Median Width (B) =	32.9 m
Weir Sill Elevation =	456.00 m
Weir Top Elevation =	456.30 m
Depth of Weir =	0.30 m
Weir Side Slopes =	10 : 1

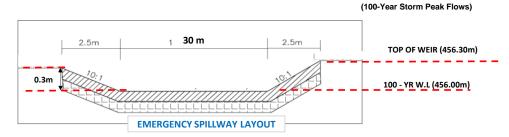
Weir Equation;

 $Q_{w} = (CL(H^{3/2}))$

Stage :	0.05		
	Depth	Cd	Q
456.00	0	1.7	0.000
456.05	0.05	1.7	0.625
456.10	0.10	1.7	1.769
456.15	0.15	1.7	3.249
456.20	0.20	1.7	5.003
456.25	0.25	1.7	6.991
456.30	0.30	1.7	9.190

Therefore, Maximum capacity of Spillway is =

m^{3/}s > 8.976 m^{3/}s



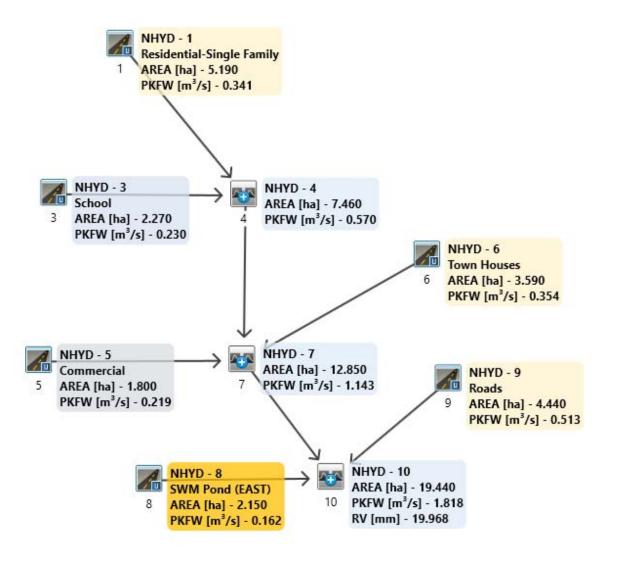
9.190

FOREBAY DESIGN CALCULATIONS - POND WEST

	Calculations
Forebay S	ettling Length based on (MOE Equation 4.5)
FOIEDay 3	
	Dist = $\sqrt{\frac{rQ_p}{N}}$
	γV_s
	Length-to-width ratio of forebay (r) = $2:1$
	lity flow rate (Qp) from pond based on release rate and volume of extended detention. Peak Flow from the Pond (Refer to
Peak flow	rate from the pond during design quality storm (Q_p) = 0.040 m ³ /s Control Structure Design Calcs)
	Settling Velocity $(V_s) = 0.0003 \text{ m/s}$ (Recommended from MOEE Manual)
	Forebay Settling Length Required = 16.3 m
	Total Forebay Length Provided = 60.0 m
	f Dispersion based on (MOE Equation 4.6)
Dept	$\boxed{\begin{array}{lllllllllllllllllllllllllllllllllll$
Dept	$\boxed{\begin{array}{lllllllllllllllllllllllllllllllllll$
Dept	$\boxed{\begin{array}{lllllllllllllllllllllllllllllllllll$
	$\boxed{\begin{array}{lllllllllllllllllllllllllllllllllll$
Minimum	$\boxed{\begin{array}{rcl} Dist & = & \frac{8Q}{dV_{f}} \\ Inlet flow rate (Q) = & 2.907 \text{ m}^{3}/\text{s} (Inlet flow rate from Storm Sewer Design Sheet - 5 Yr Storm-Town of E e th of permanent pool in the forebay (d) = & 2.0 m \\ Desired velocity in the forebay (V_{f}) = & 0.5 m/\text{s} (Recommended from MOEE Manual) \\ Length of Dispersion) = & 23.3 m \\ \hline \textbf{Total Forebay Length Provided = } & 60.0 m \\ \hline \textbf{Forebay Deep Zone Bottom Width} \\ \hline Forebay Deep Zone Bottom Width (MOE Equation 4.7) \\ \hline Dist \\ \hline \textbf{Dist} \\ \hline \textbf{Dist} \\ \hline \textbf{Dist} \\ \hline \textbf{Dist} \\ \hline \end{tabular}$
Minimum	$\boxed{\begin{array}{rcl} Dist & = & \frac{8Q}{dV_{f}} \\ Inlet flow rate (Q) = & 2.907 \text{ m}^{3}/\text{s} (Inlet flow rate from Storm Sewer Design Sheet - 5 Yr Storm-Town of E th of permanent pool in the forebay (d) = & 2.0 m \\ Desired velocity in the forebay (V_{f}) = & 0.5 m/\text{s} (Recommended from MOEE Manual) \\ Length of Dispersion) = & 23.3 m \\ \hline{\textbf{Total Forebay Length Provided = } & 60.0 m \\ \hline \textbf{Forebay Deep Zone Bottom Width} \\ \hline Forebay Deep Zone Bottom Width (MOE Equation 4.7) \\ \hline Width = & \frac{Dist}{8} \\ \hline \end{array}}$

VO MODEL RESULTS

POST-DEVELOPMENT



25mm Erosion Control Results

25mm Erosion Control

_____ (v 6.2.2010) V V I SSSSS U U A L VI SS UUAAL V V V I SS V V I SS U U AAAAA L SS U U A A L VV I SSSSS UUUUU A A LLLLL OOO TTTTT TTTTT H H Y Y M M OOO ΤM O O T T H H Y Y MM MM O O Т Т 0 0 Н Н Ү М М О О Т Н Н Ү М М ООО 000 Т Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** _____ _____ * * ** SIMULATION : 25mm Erosion Control ***** _____ READ STORM | Filename: C:\Users\shuchi\AppD ata\Local\Temp\ | 02f14d05-9cd4-4ad8-a0c2-21d09af9e1d5\36608cdd | Ptotal= 25.00 mm | Comments: 25MM-4HR _____ TIME RAIN | TIME RAIN | ' TIME RAIN | TIME RAIN hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr 0.00 2.07 | 1.00 5.70 | 2.00 5.19 | 3.00 2.80 0.17 2.27 | 1.17 10.78 | 2.17 4.47 | 3.17 2.62 0.33 2.52 | 1.33 50.21 | 2.33 3.95 | 3.33 2.48 2.88 | 1.50 13.37 | 2.50 0.50 3.56 | 3.50 2.35 0.67 3.38 | 1.67 8.29 | 2.67 3.25 | 3.67 2.23 0.83 4.18 | 1.83 6.30 | 2.83 3.01 | 3.83 2.14

| CALIB | | STANDHYD (0001) | Area (ha) = 5.19 |ID= 1 DT=10.0 min | Total Imp(%) = 60.00 Dir. Conn.(%) = 50.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 3.11
 2.08

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 186.01
 40.00

 Mannings n
 =
 0.013
 0.250

 Max.Eff.Inten.(mm/hr)= 50.21 14.81 over (min) 10.00 30.00 Storage Coeff. (min)= 4.88 (ii) 20.03 (ii) Unit Hyd. Tpeak (min)= 10.00 30.00 Unit Hyd. peak (cms)= 0.15 0.05 * TOTALS* PEAK FLOW(cms) =0.320.05TIME TO PEAK(hrs) =1.501.83RUNOFF VOLUME(mm) =24.009.49TOTAL RAINFALL(mm) =25.0025.00RUNOFF COEFFICIENT=0.960.38 0.341 (iii) 1.50 16.74 25.00 0.67 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0003) | Area (ha) = 2.27 |ID= 1 DT=10.0 min | Total Imp(%) = 80.00 Dir. Conn.(%) = 75.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 1.82
 0.45

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 123.02
 40.00

 Mannings n
 =
 0.013
 0.250

 Max.Eff.Inten.(mm/hr) = 50.21 14.81 over (min) 10.00 20.00 Storage Coeff. (min) = 3.81 (ii) 18.96 (ii) Unit Hyd. Tpeak (min) = 10.00 20.00 Unit Hyd. peak (cms) = 0.16 0.06 * TOTALS*
 PEAK FLOW
 (cms) =
 0.22
 0.01

 TIME TO PEAK
 (hrs) =
 1.50
 1.67
 0.230 (iii) 1.50

 RUNOFF VOLUME (mm) =
 24.00
 9.49

 TOTAL RAINFALL (mm) =
 25.00
 25.00

 RUNOFF COEFFICIENT =
 0.96
 0.38

 20.37 25.00 0.81 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ ____ ------| ADD HYD (0004) | | ADD III2 , | 1 + 2 = 3 |

 + 2 = 3
 |
 AREA
 QPEAK
 TPEAK
 R.V.

 ----- (ha)
 (cms)
 (hrs)
 (mm)

 ID1= 1
 0001):
 5.19
 0.341
 1.50
 16.74

 + ID2= 2
 0003):
 2.27
 0.230
 1.50
 20.37

 _____ _____ ID = 3 (0004): 7.46 0.570 1.50 17.84NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ | CALIB | STANDHYD (0006) | Area (ha) = 3.59 |ID= 1 DT=10.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 75.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 2.87
 0.72

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 154.70

 Mannings n
 =
 0.013

 40.00 0.250 Max.Eff.Inten.(mm/hr) = 50.21 14.81 over (min) 10.00 20.00 Storage Coeff. (min) = 4.37 (ii) 19.52 (ii) Unit Hyd. Tpeak (min) = 10.00 20.00 Unit Uvd. peak (men) = 0.15 0.06 Unit Hyd. peak (cms)= 0.15 0.06 * TOTALS* 0.02 1.67 9.49 PEAK FLOW(cms) =0.350.02TIME TO PEAK(hrs) =1.501.67RUNOFF VOLUME(mm) =24.009.49TOTAL RAINFALL(mm) =25.0025.00RUNOFF COEFFICIENT=0.960.38 0.354 (iii) 1.50 20.37 25.00 0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

 $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ | CALIB | | STANDHYD (0005) | Area (ha) = 1.80 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 1.71

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

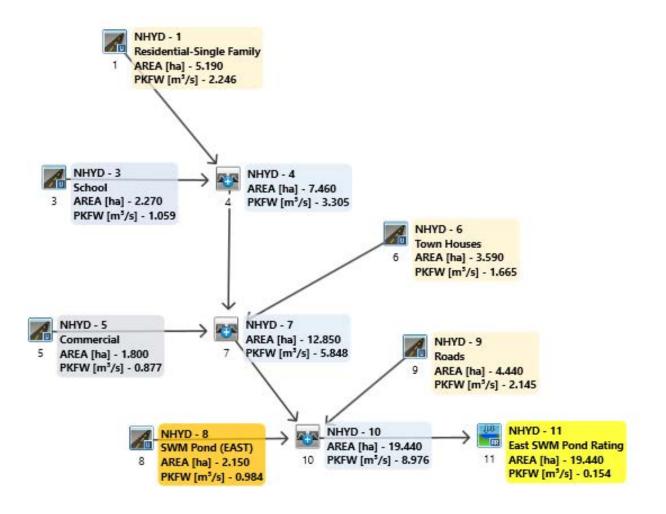
 Length
 (m) =
 109.54

 Mannings n
 =
 0.013

 1.71 0.09 1.50 2.00 40.00 0.013 0.250 50.21 Max.Eff.Inten.(mm/hr) = 48.59 10.00 Over (min)10.0020.00Storage Coeff. (min) =3.55 (ii)12.97Unit Hyd. Tpeak (min) =10.0020.00Unit Hyd. peak (cms) =0.160.07 3.55 (ii) 12.97 (ii) * TOTALS* (cms) = 0.22 0.01 (hrs) = 1.50 1.67 (mm) = 24.00 12.60 PEAK FLOW 0.219 (iii) TIME TO PEAK (hrs) = 1.50 RUNOFF VOLUME (mm) = 22.85 TOTAL RAINFALL (mm) =24.00RUNOFF COEFFICIENT =25.000.96 25.00 25.00 0.50 0.91 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ ____ _____ | ADD HYD (0007) | AREAQPEAKTPEAKR.V.(ha)(cms)(hrs)(mm)7.460.5701.5017.84 | 1 + 2 = 3 | -----(ha)(cms)(hrs)(mm)ID1= 1 (0004):7.460.5701.5017.84+ ID2= 2 (0005):1.800.2191.5022.85 _____ ID = 3 (0007): 9.26 0.789 1.50 18.82NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____

ADD HYD (0007) 3 + 2 = 1 	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
+ ID2= 2 (0006):	3.59	0.354	1.50	20.37	
======================================					
NOTE: PEAK FLOWS DO N	IOT INCLUI	DE BASEFL	OWS IF AN	IY.	
CALIB STANDHYD (0008) Area ID= 1 DT=10.0 min Tota			Dir. Co	onn.(%)=	50.00
Surface Area (ha)= Dep. Storage (mm)= Average Slope (%)= Length (m)= Mannings n =	1. 1. 1. 1.	.61 .00 .00 .72	1.50 2.00 40.00	(i)	
Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)=	10. 3. 10.	.00 .75 (ii) .00	20.00 13.17 (20.00	ii)	
PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =	= 0. = 1. = 24. = 25.	.14 .50 .00	0.04 1.67 12.60 25.00		25.00
***** WARNING: STORAGE COEF	'F. IS SMA	ALLER THA	N TIME SI	'EP!	
 (i) CN PROCEDURE SEI CN* = 85.0 (ii) TIME STEP (DT) S THAN THE STORAGE (iii) PEAK FLOW DOES N 	Ia = Dep HOULD BE COEFFICI	D. Storag SMALLER IENT.	e (Above OR EQUAL	e)	
CALIB STANDHYD (0009) Area ID= 1 DT=10.0 min Tota			Dir. Co	onn.(%)=	90.00
Surface Area (ha)=			PERVIOUS 0.22	(i)	

 ADD HYD (0010)	(ha) 15.00 4.44 19.44	0.513 	(hrs) 1.50 1.50 1.50	(mm) 19.11 22.85 ====== 19.97	
 ADD HYD (0010) 3 + 2 = 1 ID1= 3 (0010): + ID2= 2 (0009):	(ha) 15.00 4.44	(cms) 1.305 0.513	(hrs) 1.50	(mm) 19.11	
 ADD HYD (0010) 3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)	
NOIE. FEAK FLOWS DU					
NOTE: PEAK FLOWS DO	NOT INCLU	DE BASEFLO	WS IF A	NY.	
ID = 3 (0010):					
ID1= 1 (0007): + ID2= 2 (0008):	(ha) 12.85 2.15	0.162	(hrs) 1.50 1.50	(mm) 19.25 18.29	
 (i) CN PROCEDURE SE CN* = 85.0 (ii) TIME STEP (DT) THAN THE STORAG (iii) PEAK FLOW DOES 	LECTED FO Ia = De SHOULD BE E COEFFIC	PR PERVIOUS p. Storage SMALLER O TIENT.	LOSSES (Abov R EQUAL	: e)	
PEAK FLOW (cms) TIME TO PEAK (hrs) RUNOFF VOLUME (mm) TOTAL RAINFALL (mm) RUNOFF COEFFICIENT	= 1 = 24 = 25 = 0	.50 .00 .00 .96	1.67 12.60 25.00 0.50		0.513 (iii) 1.50 22.85 25.00 0.91
Max.Eff.Inten.(mm/hr) over (min) Storage Coeff. (min) Unit Hyd. Tpeak (min) Unit Hyd. peak (cms)	10 = 4 = 10	.00 .66 (ii) .00	20.00 14.08 20.00		TOTALS*
	= 0.	.05 013	2.00 40.00 0.250		



VO LAYOUT for 2 to 100-Year SCS Type II 24 Hr based on Town of Erin IDF Curves

5 Year - Post _____ V V I SSSSS U U A L (v 6.2.2010) V I V SS U U AA L SS U U AAAAA L V V Ι V V SS U U A A L I VV I SSSSS UUUUU A A LLLLL OOO TTTTT TTTTT H H Y Y M M OOO ΤМ т н н үү мм мм о о 0 О Т Т 0 0 Т Н Н Ү м м о о Т Т Н Н Ү М М ООО 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** _____ _____ ** SIMULATION : 5yr 24hr 10min SCS Type II (M ** ***************** _____ READ STORM Filename: C:\Users\shuchi\AppD 1 ata\Local\Temp\ 929281ae-6f09-47a8-9800-99169f2340f3\d563091b | Ptotal= 88.91 mm | Comments: 5yr 24hr 10min SCS Type II (MTO) _____ TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN mm/hr | hrs mm/hr | hrs mm/hr | hrs hrs mm/hr 0.00 0.00 | 6.17 1.60 | 12.33 12.80 | 18.50 1.60 0.17 0.98 | 6.33 1.60 | 12.50 12.80 | 18.67 1.60 0.33 0.98 | 6.50 1.60 | 12.67 6.58 | 18.83 1.60 0.50 0.98 | 6.67 1.60 | 12.83 6.58 | 19.00 1.60 0.67 0.98 | 6.83 1.60 | 13.00 6.58 | 19.17 1.60 0.83 0.98 | 7.00 1.60 | 13.17 4.80 | 19.33 1.60 1.00 0.98 | 7.17 1.96 | 13.33 4.80 | 19.50 1.60 1.17 0.98 | 7.33 1.96 | 13.50 4.80 | 19.67 1.60

	1.33	0.98 7.50	1.96 13.67	3.73 19.83
1.60	1.50	0.98 7.67	1.96 13.83	3.73 20.00
1.60	1.67	0.98 7.83	1.96 14.00	3.73 20.17
1.07		0.98 8.00		2.67 20.33
1.07				
1.07			2.31 14.33	
1.07	2.17	1.16 8.33	2.31 14.50	2.67 20.67
1.07	2.33	1.16 8.50	2.31 14.67	2.67 20.83
1.07	2.50	1.16 8.67	2.49 14.83	2.67 21.00
1.07	2.67	1.16 8.83	2.49 15.00	2.67 21.17
	2.83	1.16 9.00	2.49 15.17	2.67 21.33
1.07	3.00	1.16 9.17	2.85 15.33	2.67 21.50
1.07	3.17	1.16 9.33	2.85 15.50	2.67 21.67
1.07	3.33	1.16 9.50	2.85 15.67	2.67 21.83
1.07	3.50	1.16 9.67	3.20 15.83	2.67 22.00
1.07	3.67	1.16 9.83	3.20 16.00	2.67 22.17
1.07				1.60 22.33
1.07	4.00		4.09 16.33	
1.07				
1.07	4.17	1.42 10.33		
1.07	4.33	1.42 10.50	4.09 16.67	1.60 22.83
1.07	4.50	1.42 10.67	5.51 16.83	1.60 23.00
1.07	4.67	1.42 10.83	5.51 17.00	1.60 23.17
1.07	4.83	1.42 11.00	5.51 17.17	1.60 23.33
	5.00	1.42 11.17	8.54 17.33	1.60 23.50
1.07	5.17	1.42 11.33	8.54 17.50	1.60 23.67
1.07	5.33	1.42 11.50	8.54 17.67	1.60 23.83
1.07	5.50	1.42 11.67	26.32 17.83	1.60 24.00
1.07	5.67	1.42 11.83	67.57 18.00	1.60
	5.83	1.42 12.00	108.83 18.17	1.60

CALIB							
STANDHYD (0001)	Area	(ha)=	5.19				
ID= 1 DT=10.0 min	Total	Imp(%)=	60.00	Dir.	Conn.	(%) =	50.00
		IMPERVIO					
Surface Area							
Dep. Storage							
Average Slope	(%)=	100) 1	2.00)		
Length	(m) =	186.0.	L	40.00)		
Mannings n	=	0.01.	5	0.250	J		
May Eff Inton (mm/hr) -	100 07	2	111 25	7		
Max.Eff.Inten.((min)	10 00))	20 00	,)		
over Storage Coeff. Unit Hyd. Tpeak	(min) =	3.58	- 3 (ji)	10.35	, 5 (ji)		
Unit Hvd. Tpeak	$(\min) =$	10.00)	20.00)		
Unit Hyd. peak	(cms) =	0.10	5	0.08	3		
						*	TOTALS*
PEAK FLOW TIME TO PEAK	(cms) =	0.7	7	0.40)		1.113 (iii)
TIME TO PEAK	(hrs)=	12.1	7	12.33	3		12.17
RUNOFF VOLUME	(mm) =	87.92	1	62.20	0		75.08
RUNOFF VOLUME TOTAL RAINFALL	(mm) =	88.92	1	88.91	L		88.91
RUNOFF COEFFICI	ENT =	0.99	9	0.70)		0.84
***** WARNING: STORA	GE COEFF	. IS SMALI	LER THA	AN TIME	STEP!		
					10		
(i) CN PROCED		Ia = Dep.					
(ii) TIME STEP		-		-			
		COEFFICIEN		UK EQUP	77		
(iii) PEAK FLOW				LOW TE Z	NY		
	DOLD NO.	I INCLUDE	DIIOLII				
CALIB							
STANDHYD (0003)							
ID= 1 DT=10.0 min	Total	Imp(%)=	80.00	Dir.	Conn.	(%)=	75.00
	(b-)	IMPERVI(PERVIOU	. ,		
Surface Area Dep. Storage	• •			0.45 1.50			
Average Slope				2.00			
Length		123.02		40.00			
Mannings n		0.013		0.250			
mannings n	_	0.01	ر.	0.200	,		
Max.Eff.Inten.(mm/hr)=	108.8	3	111.27	7		
		10.00					
Storage Coeff.							
-							

Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= 0.17 0.11 0.11 * TOTALS* 0.510.1112.1712.1787.9162.26 PEAK FLOW (cms) = 0.620 (iii) TIME TO PEAK (hrs) = 12.17 12.17 TIME TO PEAR(HIS) =12.17RUNOFF VOLUME(mm) =87.91TOTAL RAINFALL(mm) =88.91RUNOFF COEFFICIENT=0.99 81.49 88.91 88.91 0.70 0.92 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ ____ _____ | ADD HYD (0004)|

 + 2 = 3
 |
 AREA
 QPEAK
 TPEAK
 R.V.

 ID1= 1 (0001):
 5.19
 1.113
 12.17
 75.08

 + ID2= 2 (0003):
 2.27
 0.620
 12.17
 81.49

 1 + 2 = 3 | _____ ID = 3 (0004): 7.46 1.733 12.1777.03 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ | CALIB | | STANDHYD (0006) | Area (ha) = 3.59 |ID= 1 DT=10.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 75.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 2.87
 0.72

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 154.70
 40.00

 Mannings n
 =
 0.013
 0.250

 Max.Eff.Inten.(mm/hr) = 108.83 111.27 over (min) 10.00 10.00 Storage Coeff. (min) = 3.21 (ii) 9.97 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.16 0.11 * TOTALS* PEAK FLOW(cms) =0.800.17TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =87.9162.26TOTAL RAINFALL(mm) =88.9188.91 0.973 (iii) 12.17 81.50 88.91

RUNOFF COEFFICIENT = 0.99 0.70 0.92***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0005) | Area (ha) = 1.80 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i) 0.09 Surface Area (ha) = 1.71 Surface Area (mm) = 1.00 Average Slope (%) = 1.00 Length (m) = 109.54 = 0.013 1.50 2.00 40.00 0.250 Mannings n 0.013 Max.Eff.Inten.(mm/hr) = 108.83 195.94 over (min) 10.00 10.00 Storage Coeff. (min) = 2.61 (ii) 8.00 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.17 0.12 * TOTALS* 0.01 12.17 70.29 TIME TO PEAK(cms) =0.49TIME TO PEAK(hrs) =12.17RUNOFF VOLUME(mm) =87.91TOTAL RAINFALL(mm) =88.91RUNOFF COEFFICIENT=0.99 PEAK FLOW (cms) = 0.49 0.527 (iii) 12.17 86.15 88.91 88.91 0.79 0.97 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0007)| AREA QPEAK TPEAK R.V. | 1 + 2 = 3 |(cms) (hrs) ------(ha) (mm) ID1= 1 (0004): 7.46 1.733 12.17 77.03 + ID2= 2 (0005): 1.80 0.527 12.17 86.15 _____

ID = 3 (0007): 9.26 2.260 12.17 78.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ ____ _____ | ADD HYD (0007) | _____ ID = 1 (0007): 12.85 3.234 12.17 79.56 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ | CALIB | | STANDHYD (0008) | Area (ha) = 2.15 |ID= 1 DT=10.0 min | Total Imp(%) = 75.00 Dir. Conn.(%) = 50.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 1.61
 0.54

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 119.72
 40.00

 Mannings n
 =
 0.013
 0.250

 0.013 = Mannings n 0.250 Max.Eff.Inten.(mm/hr) = 108.83 195.94 over (min) 10.00 10.00 Storage Coeff. (min) = 2.75 (ii) 8.14 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.17 0.12 * TOTALS* PEAK FLOW(cms) =0.320.25TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =87.9170.29TOTAL RAINFALL(mm) =88.9188.91RUNOFF COEFFICIENT=0.990.79 0.568 (iii) 12.17 79.10 88.91 0.89 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB

| STANDHYD (0009) | Area (ha) = 4.44 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.22

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 172.05

 Mannings n
 =
 0.013

 0.22 4.22 1.50 2.00 40.00 0.013 0.250 Max.Eff.Inten.(mm/hr)= 108.83 195.94 over (min) 10.00 10.00 Unit Hyd. Tpeak (min) =3.42 (ii)8.81Unit Hyd. peak (cms) =10.0010.000.160.12 Storage Coeff. (min) = 3.42 (ii) 8.81 (ii) * TOTALS* PEAK FLOW(cms) =1.18TIME TO PEAK(hrs) =12.17RUNOFF VOLUME(mm) =87.91TOTAL RAINFALL(mm) =88.91RUNOFF COEFFICIENT=0.99 0.10 12.17 70.29 88.91 1.281 (iii) 12.17 86.15 88.91 0.79 0.97 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0010)| | 1 + 2 = 3 | _____ ID = 3 (0010): 15.00 3.802 12.17 79.49NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ | ADD HYD (0010) | | 3 + 2 = 1 | ID = 1 (0010):19.44 5.083 12.17 81.01

_____ ____ _____ | RESERVOIR(0011) | OVERFLOW IS OFF | IN= 2---> OUT= 1 | | DT= 10.0 min | OUTFLOW STORAGE | OUTFLOW STORAGE
 (cms)
 (ha.m.)
 (cms)
 (ha.m.)

 0.0000
 0.0000
 0.1600
 2.1269

 0.0600
 1.3086
 0.0000
 0.0000
 _____ 2.1269 0.0000 AREAQPEAKTPEAKR.V.(ha)(cms)(hrs)(mm)INFLOW: ID= 2 (0010)19.4405.08312.1781.01OUTFLOW: ID= 1 (0011)19.4400.06020.3380.60 PEAK FLOW REDUCTION [Qout/Qin](%) = 1.18 TIME SHIFT OF PEAK FLOW (min)=490.00 MAXIMUM STORAGE USED (ha.m.) = 1.3054_____ ____

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

						100-Year Post		
	I SS I SS I S I	SSS U U S U SS U	U A U A A U AAAA U A	. L		(v 6.2.2010)		
0 0	T T stribut 2021 S	T H T H T H ed by Sma	H Y Y H Y H Y art City	M M M M	000 0 0 000	ТМ		
<pre>***** DETAILED OUTPUT ***** *******************************</pre>								
99169f2340f3\714 Ptotal=145.92		Comments	s: 100yr	24hr 10m:	in SCS (Type II (MTO)		
RAIN	TIME	RAIN	TIME	RAIN '	TIME	RAIN TIME		
mm/hr	hrs 0.00	mm/hr 0.00	hrs 6.17	mm/hr ' 2.63 1	hrs	mm/hr hrs 21.01 18.50		
2.63	0.17	1.61		2.63 1		21.01 18.67		
2.63	0.33	1.61	6.50	2.63 2	12.67	10.80 18.83		
2.63 2.63	0.50	1.61	6.67	2.63 2	12.83	10.80 19.00		
2.63	0.67	1.61	6.83	2.63 2	13.00	10.80 19.17		
2.63	0.83	1.61	7.00	2.63 3		7.88 19.33		
2.63	1.00	1.61 1.61		3.21 2		7.88 19.50 7.88 19.67		
2.63	-• <i>-</i> '	-• V± 1		~•== -				

	1.33	1.61 7.50	3.21 13.67	6.13 19.83
2.63	1.50	1.61 7.67	3.21 13.83	6.13 20.00
2.63		1.61 7.83		
1.75			3.21 14.17	
1.75				
1.75			3.79 14.33	
1.75			3.79 14.50	
1.75	2.33	1.90 8.50	3.79 14.67	4.38 20.83
1.75	2.50	1.90 8.67	4.09 14.83	4.38 21.00
1.75	2.67	1.90 8.83	4.09 15.00	4.38 21.17
1.75	2.83	1.90 9.00	4.09 15.17	4.38 21.33
	3.00	1.90 9.17	4.67 15.33	4.38 21.50
1.75	3.17	1.90 9.33	4.67 15.50	4.38 21.67
1.75	3.33	1.90 9.50	4.67 15.67	4.38 21.83
1.75	3.50	1.90 9.67	5.25 15.83	4.38 22.00
1.75	3.67	1.90 9.83	5.25 16.00	4.38 22.17
1.75			5.25 16.17	
1.75	4.00		6.71 16.33	
1.75				
1.75	4.17		6.71 16.50	
1.75	4.33	2.33 10.50	6.71 16.67	2.63 22.83
1.75	4.50	2.33 10.67	9.05 16.83	2.63 23.00
1.75	4.67	2.33 10.83	9.05 17.00	2.63 23.17
1.75	4.83	2.33 11.00	9.05 17.17	2.63 23.33
1.75	5.00	2.33 11.17	14.01 17.33	2.63 23.50
	5.17	2.33 11.33	14.01 17.50	2.63 23.67
1.75	5.33	2.33 11.50	14.01 17.67	2.63 23.83
1.75	5.50	2.33 11.67	43.19 17.83	2.63 24.00
1.75	5.67	2.33 11.83	110.90 18.00	2.63
	5.83	2.33 12.00	178.61 18.17	2.63

CALIB						
STANDHYD (0001)	Area	(ha) =	5.19		1 (0)	F0 00
ID= 1 DT=10.0 min	Total	1mp(%)=	60.00	Dir. (conn.(%)=	50.00
		IMPERVIC	US	PERVIOUS	5 (i)	
Surface Area	(ha)=	3.11		2.08		
Dep. Storage	(mm) =	1.00 1.00 186.01 0.013)	1.50		
Average Slope	(%) = (m) −	1.00)	2.00		
Length Mannings n	(m) =	186.01		40.00		
Mainings II	—	0.013	,	0.230		
Max.Eff.Inten.(mm/hr)=	178.61		201.76		
over	(min)	10.00)	10.00		
Storage Coeff.	(min) =	2.94	(ii)	8.27	(ii)	
Unit Hyd. Tpeak	(min)=	10.00				
Unit Hyd. peak	(CmS) =	0.16)	0.12	*	TOTALS*
PEAK FLOW	(cms) =	1.27	,	0.98		2.246 (iii)
TIME TO PEAK						12.17
RUNOFF VOLUME	(mm) =	144.92		115.98		130.45
TOTAL RAINFALL						145.92
RUNOFF COEFFICI	ENT =	0.99)	0.79		0.89
**** WARNING: STORA	CF COFFF	TS SMALT	.ਸੁਰ ਸਾਥ	ΔΝ ΨΤΜΈ Ο	יידים!	
		. 10 011111				
(i) CN PROCED	URE SELE	CTED FOR F	PERVIO	JS LOSSES	5:	
		Ia = Dep.		-		
(ii) TIME STEP				OR EQUAI	L	
THAN THE (iii) PEAK FLOW		COEFFICIEN			īv	
(III) PEAR FLOW	DOES NO.	I INCLUDE	DASEF.	LOW IF AN	11.	
CALIB						
STANDHYD (0003)	Area	(ha) =	2 27			
ID= 1 DT=10.0 min					Conn.(%)=	75.00
·						
	(1)	IMPERVIC		PERVIOUS	5 (i)	
Surface Area				0.45		
Dep. Storage Average Slope				1.50 2.00		
Length		123.02		40.00		
Mannings n		0.013		0.250		
Max.Eff.Inten.(
		10.00				
Storage Coeff.	(min) =	2.29) (11)	7.62	(11)	

Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= 0.17 0.12 * TOTALS* 0.84 0.22 12.17 12.17 PEAK FLOW (cms) = 1.059 (iii) TIME TO PEAK (hrs) =12.1712.17RUNOFF VOLUME (mm) =144.92115.98TOTAL RAINFALL (mm) =145.92145.92RUNOFF COEFFICIENT =0.990.79 (hrs) = 12.17 137.68 145.92 0.79 0.94 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0004)|

 + 2 = 3
 |
 AREA
 QPEAK
 TPEAK
 R.V.

 ID1= 1 (0001):
 5.19
 2.246
 12.17
 130.45

 + ID2= 2 (0003):
 2.27
 1.059
 12.17
 137.68

 | 1 + 2 = 3 | _____ ID = 3 (0004): 7.46 3.305 12.17 132.65NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ | CALIB | | STANDHYD (0006) | Area (ha) = 3.59 |ID= 1 DT=10.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 75.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 2.87
 0.72

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 154.70
 40.00

 Mannings n
 =
 0.013
 0.250

 Max.Eff.Inten.(mm/hr) = 178.61 201.76 over (min) 10.00 10.00 Storage Coeff. (min) = 2.63 (ii) 7.96 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.17 0.12 * TOTALS* PEAK FLOW(cms) =1.320.34TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =144.92115.98TOTAL RAINFALL(mm) =145.92145.92 1.665 (iii) 12.17 137.68 145.92

RUNOFF COEFFICIENT = 0.99 0.79 0.94***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0005) | Area (ha) = 1.80 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i) 0.09 Surface Area (ha) = 1.71

 Surface Area
 (mm) =
 1.00

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 109.54

 =
 0.013

 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr) = 178.61 340.12 over (min) 10.00 10.00 Storage Coeff. (min) = 2.14 (ii) 6.46 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.17 0.13 * TOTALS* TIME FLOW(Cms) =0.800.08TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =144.92125.75TOTAL RAINFALL(mm) =145.92145.92RUNOFF COEFFICIENT=0.990.000 0.877 (iii) 12.17 143.00 145.92 0.98 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0007)| AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) | 1 + 2 = 3 |(cms) ------ID1= 1 (0004): 7.46 3.305 12.17 132.65 + ID2= 2 (0005): 1.80 0.877 12.17 143.00 _____

ID = 3 (0007): 9.26 4.182 12.17 134.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ ____ _____ | ADD HYD (0007) | _____ ID = 1 (0007): 12.85 5.848 12.17 135.51 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ | CALIB | | STANDHYD (0008) | Area (ha) = 2.15 |ID= 1 DT=10.0 min | Total Imp(%) = 75.00 Dir. Conn.(%) = 50.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 1.61
 0.54

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 119.72
 40.00

 Mannings n
 =
 0.013
 0.250

 Max.Eff.Inten.(mm/hr)= 178.61 340.12 over (min) 10.00 10.00 Storage Coeff. (min)= 2.26 (ii) 6.58 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= 0.17 0.13 * TOTALS* PEAK FLOW(cms) =0.530.45TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =144.92125.76TOTAL RAINFALL(mm) =145.92145.92RUNOFF COEFFICIENT=0.990.86 0.984 (iii) 12.17 135.34 145.92 0.93 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____

| CALIB

| STANDHYD (0009) | Area (ha) = 4.44 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.22

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 172.05

 Mannings n
 =
 0.013

 4.22 0.22 1.50 2.00 40.00 0.013 0.250 Max.Eff.Inten.(mm/hr)= 178.61 340.12 over (min) 10.00 10.00 Unit Hyd. Tpeak (min) = 2.81 (ii) 7.13 Unit Hyd. peak (cms) = 0.17 7.13 (ii) * TOTALS* PEAK FLOW(cms) =1.960.18TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =144.92125.76TOTAL RAINFALL(mm) =145.92145.92RUNOFF COEFFICIENT=0.990.86 2.145 (iii) 12.17 143.00 145.92 0.98 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0010)| | 1 + 2 = 3 | _____ ID = 3 (0010): 15.00 6.832 12.17 135.48NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ | ADD HYD (0010)| H1D(COTO(1)AREAQPEAKTPEAKR.V.+21(AREAQPEAKTPEAKR.V.ID1=3(001015.006.83212.17135.48+ID2=2(00092.14512.17143.00| 3 + 2 = 1 | _ _ _ | ID = 1 (0010):19.44 8.976 12.17 137.20

_____ ____ _____ | RESERVOIR(0011)| OVERFLOW IS OFF | IN= 2---> OUT= 1 | | DT= 10.0 min | OUTFLOW STORAGE | OUTFLOW STORAGE
 (cms)
 (ha.m.)
 (cms)
 (ha.m.)

 0.0000
 0.0000
 0.1600
 2.1269

 0.0600
 1.3086
 0.0000
 0.0000
 _____ 2.1269 0.0000
 AREA
 QPEAK
 TPEAK
 R.V.

 (ha)
 (cms)
 (hrs)
 (mm)

 INFLOW:
 ID= 2 (0010)
 19.440
 8.976
 12.17
 137.20

 OUTFLOW:
 ID= 1 (0011)
 19.440
 0.154
 16.33
 136.63
 PEAK FLOW REDUCTION [Qout/Qin] (%) = 1.72 TIME SHIFT OF PEAK FLOW (min)=250.00 MAXIMUM STORAGE USED (ha.m.) = 2.0811_____ ____ FINISH _____

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

SWM Pond - (WEST/POND 2) Stage Storage Calculations

		LAND USE TYPE									
	Single Family Resid. Dev. Area	Multiple Family (Townhouses)	Road ROW	Park/ Open Space	External Drainage (Wood Lot-North)	SWM Pond	Total Area (Ha)	Composite Runoff Coeff.	Composite Imperv. %		
Typical C Value	0.50	0.75	0.90	0.25	0.25	0.50					
Typical Impervious %	60%	80%	95%	10%	10%	75%					
Drainage Area (Ha)	6.37	5.35	5.06	1.75	0.00	1.66	20.19	0.645	71%		

Water Quality Requirements

MOE Water Quality Storage Requirement =

226.6 m³/ha (Includes 40m³/ha Extended Detention) for 71% Imperviousness

(Based on MOE Table 3.2 for Enhanced Level , 80% Long Term TSS Removal)

Permanent Pool Volume Required = $4,575 \text{ m}^3$ (20.48 Ha x 225 m 3 /Ha)Permanent Pool Volume Provided = $7,704 \text{ m}^3$

STAGE VS STORAGE TABLE

Elevations	Total Area	Average Area	Depth	Delta Volume	Total Volume	
(m)	(m ²)	(m ²)	(m)	(m ³)	(m ³)	-
456.30	2179		1.00			
457.30	3730	2955 4750	1.00 1.00	2955 4750	2955	
458.30	5769				7704	Permanent Pool
458.30	5769	6440	0.55	3542		
458.85	7110	7702	0.80	6161	3542	
459.65	8293	8523	0.30	2557	9703	
459.95	8753	9553	0.00	0	12260	
459.95	10352	11107	0.35	3887	12260	
460.30	11861			1 DATE : 14/02	16147	

Pre-Development Model Parameters ;

Existing Drainage Area Breakdown ;

Area (Ha)								
External Drainage from North = 4.28 (Refer to Pre-Development Plan - EX-DR-1)								
Note : We are not considering External Drainage flows from North to establish West Pond Release Rate Targets								
Farm Land = 21.63 (Refer to Pre-Development Plan - Area No. A-1, A-2 and A-3)								
A-1 = 4.10 Ha (draining to Adjacent Lands)								
A-2 = 13.10 Ha (draining to a low point the west)								
A-3 = 4.43 Ha (draining to a low point the west)								
NHYD DT (min) Area (Ha) CN IA (mm) N Tp (h								
Farm Land 1 10 21.63 64 8 3 0.2								

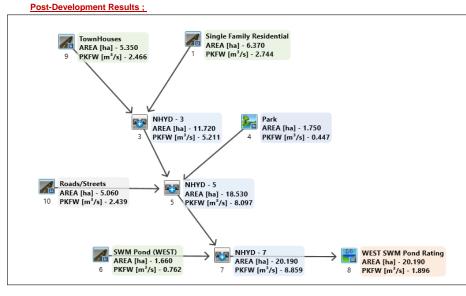
Total Pre-Development Drainage to CVC lands = 21.630 Ha

Pre-Development (Hydrograph Results) ;

	NHYD	Flow Type	DT (Hr)	Area (Ha)	PKFW (m ³ /s)	TP (hr)	RV (mm)
Town of Erin IDF - 2yr 24hr 10min SCS Type II	1	Outflow	0.167	21.63	0.925	12.167	16.87
Town of Erin IDF - 5yr 24hr 10min SCS Type II	1	Outflow	0.167	21.63	1.595	12.167	28.49
Town of Erin IDF - 10yr 24hr 10min SCS Type II	1	Outflow	0.167	21.63	2.089	12.167	37.01
Town of Erin IDF - 25yr 24hr 10min SCS Type II	1	Outflow	0.167	21.63	2.793	12.167	49.08
Town of Erin IDF - 50yr 24hr 10min SCS Type II	1	Outflow	0.167	21.63	3.309	12.167	57.90
Town of Erin IDF - 100yr 24hr 10min SCS Type II	1	Outflow	0.167	21.63	3.783	12.167	65.98

Release Rate Targets for SWM Pond





Total Drainage to West SWM Pond/Pond 2 =

20.19 Ha

Note: Under Post-Development Condition, the overall drainage to the west is less than compared to Pre-development areas as some portion of the West areas will drain to East Pond. Refer to Grading Plan and Storm Drainage Area Plan attached in the Report; hence discrepancies between Pre & post drainage areas

SUMMARY OF VO MODELLING RESULTS FOR WEST POND

	Con	trol Structure	Data	VO RESULTS				
Storm Event	Pre-Dev Targets	Control Structure Release Rate	Storage Provided in Pond	Inflows/Peak Flows Generated	Outflows Storage		Elevation in Pond	
	(m ³ /s)	(m³/s)	(m ³)	(m ³ /s)	(m ³ /s)	(m ³)	(m)	
2-Year	0.925	0.356	6,274	3.491	0.342	6,030	459.22	
5-Year	1.595	0.779	7,914	4.835	0.746	7,798	459.43	
10-Year	2.089	1.273	8,963	6.020	1.188	8,840	459.56	
25-Year	2.793	1.605	10,540	7.249	1.549	10,349	459.75	
50-Year	3.309	1.782	11,564	8.103	1.744	11,408	459.87	
100-Year	3.783	1.956	12,873	8.859	1.896	12,426	460.00	

WEST POND - (Erosion Control)

CVC's 25mm Erosion Control Requirement :

Contributing Drainage Area (ha) = 20.19 Ha

25mm 4Hr Chicago Post Development Runoff Volume in Depth =

(Refer to 25mm VO Results appended)

(R. V x Drainage Area)

18.317 mm

25mm 4Hr Chicago Post Development Storage Volume = 25mm 4Hr Chicago Post Development Storage Volume = 3698 m³ (Required) 3899 m³ (Provided)

25mm 4-hour Chicago storm to be stored and released over a 48-hour period

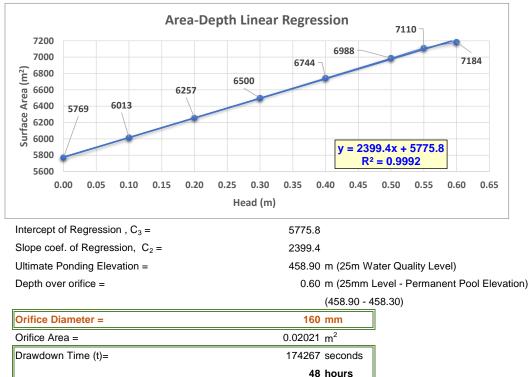
Drawdown Time for Erosion Control - WEST POND ;

Based on Equation 4.11 MOE SWM Planning and Design Manual

$t = \frac{0.66 C_2 h^{1.5} + 2 C_3 h^{0.5}}{2.75 t}$	Elevation(m)	Head (m)	AREA (m ²)
2.75 A.	458.30	0.00	5769
	458.40	0.10	6013
t = Drawdown time in seconds	458.50	0.20	6257
A_p = Surface area of the pond (m ²)	458.60	0.30	6500
C = Discharge Coefficient (typically 0.63)	458.70	0.40	6744
$A_o = Cross-sectional area of the orifice (m2)$	458.80	0.50	6988
g = Gravitational acceleration constant (9.81 m/s)	458.85	0.55	7110
h_1 = Starting water elevation above the orifice (m)	458.90	0.60	7184
h_2 = Ending water elevation above the orifice (m)			

C₂ = Slope coefficient from the area-depth linear regression

C₃ = Intercept from the area-depth linear regression



WEST POND CONTROL STRUCTURE DESIGN

Project Number : W21081 Project Name : HillsBurgh Prepared By : S.S

Date : 14/02/2023

Checked By: D.K.H/Scott

Date : 14/02

Orifice Plate No. 1 (25mm Erosion Control)

H = Net head above the orifice (m) g = Acceleration due to gravity (m/s)

Weir/Orifice No.2 (To Control 2 - 100-Year)

Orifice Plate Diameter =	0.160 m	Orifice Width =
	160 mm	Orifice Height =
Area =	0.0201 m ²	Area of Opening =
Orifice Coeff. (C) =	0.63	Orifice Coeff. (C) =
Invert =	458.30 m	Invert =
Orifice Plate Centroid =	458.38 m	Orifice Centroid =
Submerged Orifice Equation = Where,	$Q_o = 0.63 \times A \times [2 \times g \times H]^{1/2}$	
$Q_o = Flow rate (m^3)$	(s)	Weir Specifications
C = Discharge Coe	fficient	Length of Weir =
A = Area of opening	g (m ²)	Weir Sill =

=	1.30 m 0.60 m BOX CUT-OUT DETAILS
=	0.780 m ²
=	0.63
=	458.95 m
=	459.25 m

Weir Equation = $Q_w = 1.67 \text{ x L x H}^{1.5}$

Neir Specifications		Where,
Length of Weir =	1.30 m	$Q_w =$ Flow rate (m ³ /s)
Weir Sill =	458.95 m	C = Discharge Coefficient
Weir Top =	459.55 m	L = Weir Length (m)
Weir Coefficient =	1.67	H = Net Head on the Orifice (m)

Stage (m):	0.05	ORIFICE CONTRO	OL-1 (Orifice Plate)	ORIFICE/W	ORIFICE/WEIR CONTROL - 2 (Box/Rectangular Weir)				
Active Storage	Elevation	Depth above orifice	Orifice No.1 Flow	Depth above orifice	Orifice No.2 Flow	Depth Above	Weir No.2 Flow	Total Flow	
(m³)	(m)	Centroid (m)	(m³/s)	Centroid (m)	(m³/s)	Weir (m)	(m³/s)	(m³/s)	
0	458.30	0	0					0.000	PPE
292	458.35	0	0					0.000	
589	458.40	0	0					0.000	
893	458.45	0.07	0.015					0.015	
1203	458.50	0.12	0.019					0.019	
1518	458.55	0.17	0.023					0.023	
1840	458.60	0.22	0.026					0.026	
2169	458.65	0.27	0.029					0.029	
2503	458.70	0.32	0.032					0.032	
2843	458.75	0.37	0.034					0.034	
3189	458.80	0.42	0.036					0.036	
3542	458.85	0.47	0.038					0.038	
3899	458.90	0.52	0.040					0.040	25mm Chicago-Erosion C
4260	458.95	0.57	0.042					0.042	
4625	459.00	0.62	0.044			0.05	0.024	0.068	
4993	459.05	0.67	0.046			0.10	0.069	0.115	
5365	459.10	0.72	0.048			0.15	0.126	0.174	
5741	459.15	0.77	0.049			0.20	0.194	0.243	
6121	459.20	0.82	0.051			0.25	0.271	0.322	
6274	459.22	0.84	0.051			0.27	0.305	0.356	2-Year
6504	459.25	0.87	0.052			0.30	0.357	0.409	
6891	459.30	0.92	0.054			0.35	0.450	0.503	
7282	459.35	0.97	0.055			0.40	0.549	0.604	
7676	459.40	1.02	0.057			0.45	0.655	0.712	
7914	459.43	1.05	0.057			0.48	0.722	0.779	5-Year
8074	459.45	1.07	0.058			0.50	0.768	0.826	
8476	459.50	1.12	0.059			0.55	0.886	0.945	
8881	459.55	1.17	0.061			0.60	1.009	1.070	
8963	459.56	1.18	0.061	0.31	1.212			1.273	10-Year
9290	459.60	1.22	0.062	0.35	1.288			1.350	
9703	459.65	1.27	0.063	0.40	1.377			1.440	
10120	459.70	1.32	0.064	0.45	1.460			1.525	05 Y
10540	459.75	1.37	0.066	0.50	1.539			1.605	25-Year
10964	459.80	1.42 1.47	0.067	0.55	1.614			1.681	
11392	459.85		0.068	0.60	1.686			1.754	50 %
11564 11824	459.87 459.90	1.49 1.52	0.068 0.069	0.62 0.65	1.714 1.755			1.782 1.824	50-Year
12260	459.95	1.57	0.070	0.70	1.821			1.891	100 Xoos
12783	460.00	1.62	0.071	0.75	1.885			1.956	100-Year
13317 13861	460.05 460.10	1.67 1.72	0.073 0.074	0.80 0.85	1.947 2.007			2.019 2.080	
13861	460.10	1.72	0.074	0.85	2.007			2.080	
14983	460.15	1.82	0.075	0.90	2.065			2.140	
15559	460.25	1.87	0.077	1.00	2.122			2.197	
16147	460.30	1.92	0.078	1.05	2.230			2.308	
-		-							

Emergency Spillway Design - West Pond

Notes: * As per MOE SWM Manual definition, the Emergency Spillway is designed to convey strom drainage flows out of the facility in the event that the other outlets (in control structure) are not functioning properly.

The Emergency spillway is proposed at 100-year Elevation =	460.00 m
--	----------

100-Year Storm Peak Flows (Q _{inflow})* =	8.859	m ^{3/} s	(Refer to 100-Yr VO Model Results)
RegionalStorm Peak Flows (Q _{inflow})* =	2.971	m ^{3/} s	(Refer to Regional VO Model Results)

*Peak Flows generated by 100-year is more than that of Regional (Hurricane Hazel) Storm ; the Spillway is designed for 100-Year Peak Flows

Emergency Spillway Weir Parameters

Top Width of Weir =	35 m
Downstream Width of Weir =	30 m
Median Width (B) =	32.5 m
Weir Sill Elevation =	460.00 m
Weir Top Elevation =	460.30 m
Depth of Weir =	0.30 m
Weir Side Slopes =	10 : 1

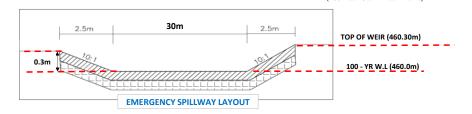
Weir Equation;

 $Q_w = (CL(H^{3/2}))$

Stage :	0.05		
	Depth	Cd	Q
460.00	0	1.7	0.000
460.05	0.05	1.7	0.618
460.10	0.10	1.7	1.747
460.15	0.15	1.7	3.210
460.20	0.20	1.7	4.942
460.25	0.25	1.7	6.906
460.30	0.30	1.7	9.079

Therefore, Maximum capacity of Spillway is =

m^{3/}s > 8.859 m^{3/}s (100-Year Storm Peak Flows)



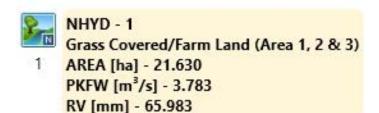
9.079

FOREBAY DESIGN CALCULATIONS - POND WEST/2

Forebay Settling Length based o	on (MOE Equation 4.5)					
	$Dist = \sqrt{\frac{r Q_p}{V_s}}$					
Length-to-width rat	tio of forebay (r) =	2:1				
Peak Quality flow rate (Qp) from	n pond based on release rat	te and volume	of extended detention.			
Peak flow rate from the pond du	uring design quality storm ((Q _p)=	0.040 m ³ /s		om the Pond (Refer to ture Design Calcs)	
	Settling Velo	city (V _s) =	0.0003 m/s (Recomm	nended from MOEE	Manual)	
	Forebay Settling Length F	Required =	16.3 m			
	Total Forebay Length Pi	rovided =	60.0 m			
Dispersion Length Calculations	5					
Length of Dispersion based on	(MOE Equation 4.6)					
Length of Dispersion based on	(MOE Equation 4.6) Dist = $\frac{8Q}{dV_{\rm f}}$					
	80	1.56 m ³ ,	/s (Inlet flow rate from S	Storm Sewer Desig	n Sheet - 5 Yr Storm- ⁻	Town of Erin IDF)
Depth of permanent pool i	$Dist = \frac{8Q}{dV_{f}}$ Inlet flow rate (Q) = in the forebay (d) =	2.0 m			n Sheet - 5 Yr Storm- ⁻	Town of Erin IDF)
Depth of permanent pool i Depth vice velocity ir	$\begin{array}{llllllllllllllllllllllllllllllllllll$	2.0 m 0.5 m/	/s (Inlet flow rate from S s (Recommended from N		n Sheet - 5 Yr Storm- ⁻	Town of Erin IDF)
Depth of permanent pool i Depth of permanent pool i Desired velocity ir Leng	Dist = $\frac{8Q}{dV_r}$ nlet flow rate (Q) = in the forebay (d) = n the forebay (V_r) = gth of Dispersion) =	2.0 m 0.5 m/ 12.5 m			n Sheet - 5 Yr Storm-	Town of Erin IDF)
Depth of permanent pool i Depth of permanent pool i Desired velocity ir Leng	$\begin{array}{llllllllllllllllllllllllllllllllllll$	2.0 m 0.5 m/			n Sheet - 5 Yr Storm-	Town of Erin IDF)
Depth of permanent pool i Depth of permanent pool i Desired velocity ir Leng	Dist = $\frac{8Q}{dV_r}$ nlet flow rate (Q) = in the forebay (d) = n the forebay (V_r) = gth of Dispersion) =	2.0 m 0.5 m/ 12.5 m			n Sheet - 5 Yr Storm- ⁻	Town of Erin IDF)
Depth of permanent pool i Depth of permanent pool i Desired velocity ir Leng	$\begin{array}{llllllllllllllllllllllllllllllllllll$	2.0 m 0.5 m/ 12.5 m			n Sheet - 5 Yr Storm- ⁻	Town of Erin IDF)
Depth of permanent pool i Depth of permanent pool i Desired velocity ir Leng Total Forebay L	$\begin{array}{llllllllllllllllllllllllllllllllllll$	2.0 m 0.5 m/ 12.5 m 60.0 m			n Sheet - 5 Yr Storm- ⁻	Town of Erin IDF)
Depth of permanent pool i Depth of permanent pool i Desired velocity ir Leng Total Forebay L Minimum Forebay Deep Zone	$\begin{array}{llllllllllllllllllllllllllllllllllll$	2.0 m 0.5 m/ 12.5 m 60.0 m			n Sheet - 5 Yr Storm- ⁻	Town of Erin IDF)
Depth of permanent pool i Depth of permanent pool i Desired velocity ir Leng Total Forebay L Minimum Forebay Deep Zone	$Dist = \frac{8Q}{dV_r}$ Inlet flow rate (Q) = in the forebay (d) = in the forebay (V_i) = gth of Dispersion) = ength Provided = Bottom Width Ottom Width (MOE Equation Dist	2.0 m 0.5 m/ 12.5 m 60.0 m		MOEE Manual)	n Sheet - 5 Yr Storm- ⁻	Town of Erin IDF)
Depth of permanent pool i Depth of permanent pool i Desired velocity ir Leng Total Forebay L Minimum Forebay Deep Zone	$\begin{array}{rcl} Dist & = & \displaystyle \frac{8Q}{dV_r} \\ \mbox{in let flow rate (Q) =} \\ \mbox{in the forebay (d) =} \\ \mbox{in the forebay (V_r) =} \\ in the forebay (V_r) $	2.0 m 0.5 m/ 12.5 m 60.0 m n 4.7)	s (Recommended from N	MOEE Manual)	n Sheet - 5 Yr Storm- ⁻	Town of Erin IDF)

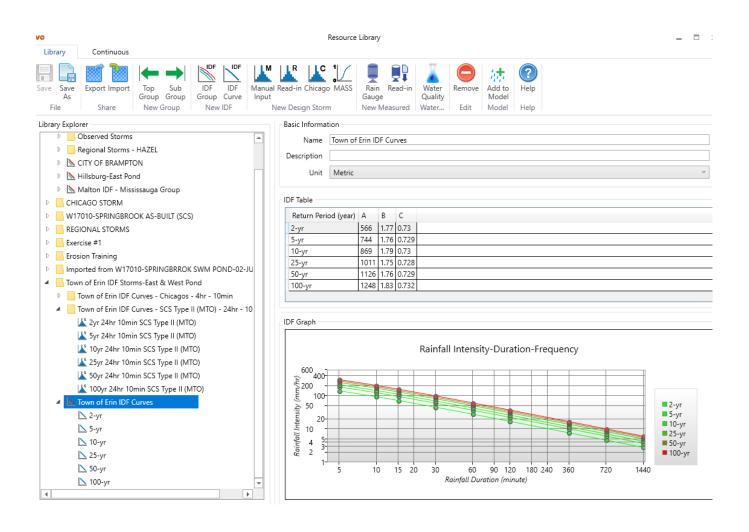
VO MODEL RESULTS

PRE-DEVELOPMENT RESULTS



Pre- Development VO Model Layout

Town of Erin IDF Curves for SCS Type II - 24 Hour Run



_____ _____ (v 6.2.2010) V V I SSSSS U U A L V I V SS U U AA L SS U U AAAAA L V V I V V SS U U A A L I VV I SSSSS UUUUU A A LLLLL OOO TTTTT TTTTT H H Y Y M M OOO ΤM ООТ ТННҮҮ ММММОО Т 0 0 Т Н Н Ү м м о о Т Т Y М М ООО 000 Н Н Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** _____ _____ ** SIMULATION : 2yr 24hr 10min SCS Type II (M ** **** _____ 1 READ STORM | Filename: C:\Users\shuchi\AppD ata\Local\Temp\ beed067c-aded-498a-be37-5ab7a3d89fbe\89c7fa09 | Ptotal= 67.15 mm | Comments: 2yr 24hr 10min SCS Type II (MTO) _____ TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr 0.00 0.00 | 6.17 1.21 | 12.33 9.67 | 18.50 1.21 0.17 0.74 | 6.33 1.21 | 12.50 9.67 | 18.67 1.21 0.33 0.74 | 6.50 1.21 | 12.67 4.97 | 18.83 1.21 1.21 | 12.83 0.50 0.74 | 6.67 4.97 | 19.00 1.21 0.67 0.74 | 6.83 1.21 | 13.00 4.97 | 19.17 1.21 0.83 0.74 | 7.00 1.21 | 13.17 3.63 | 19.33 1.21 1.00 0.74 | 7.17 1.48 | 13.33 3.63 | 19.50 1.21 1.17 0.74 | 7.33 1.48 | 13.50 3.63 | 19.67 1.21

	1.33	0.74 7.50	1.48 13.67	2.82 19.83
1.21	1.50	0.74 7.67	1.48 13.83	2.82 20.00
1.21	1.67	0.74 7.83	1.48 14.00	2.82 20.17
0.81	1.83	0.74 8.00	1.48 14.17	2.01 20.33
0.81		0.74 8.17		
0.81				
0.81		0.87 8.33		
0.81		0.87 8.50	1.75 14.67	
0.81	2.50	0.87 8.67	1.88 14.83	2.01 21.00
0.81	2.67	0.87 8.83	1.88 15.00	2.01 21.17
0.81	2.83	0.87 9.00	1.88 15.17	2.01 21.33
0.81	3.00	0.87 9.17	2.15 15.33	2.01 21.50
0.81	3.17	0.87 9.33	2.15 15.50	2.01 21.67
	3.33	0.87 9.50	2.15 15.67	2.01 21.83
0.81	3.50	0.87 9.67	2.42 15.83	2.01 22.00
0.81	3.67	0.87 9.83	2.42 16.00	2.01 22.17
0.81	3.83	0.87 10.00	2.42 16.17	1.21 22.33
0.81	4.00	0.87 10.17	3.09 16.33	1.21 22.50
0.81	4.17	1.07 10.33		1.21 22.67
0.81	4.33		3.09 16.67	
0.81				1.21 23.00
0.81	4.50	1.07 10.67		
0.81	4.67	1.07 10.83	4.16 17.00	1.21 23.17
0.81	4.83	1.07 11.00	4.16 17.17	1.21 23.33
0.81	5.00	1.07 11.17	6.45 17.33	1.21 23.50
0.81	5.17	1.07 11.33	6.45 17.50	1.21 23.67
0.81	5.33	1.07 11.50	6.45 17.67	1.21 23.83
0.81	5.50	1.07 11.67	19.88 17.83	1.21 24.00
	5.67 5.83	1.07 11.83 1.07 12.00	51.03 18.00 82.19 18.17	1.21 1.21

------| CALIB | | NASHYD (0001) | Area (ha) = 21.63 Curve Number (CN) = 64.0 |ID= 1 DT=10.0 min | Ia (mm) = 8.00 # of Linear Res.(N) = 3.00 ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 4.131 PEAK FLOW (cms) = 0.925 (i) TIME TO PEAK (hrs) = 12.167 RUNOFF VOLUME (mm) = 16.868 TOTAL RAINFALL (mm) = 67.150 RUNOFF COEFFICIENT = 0.251 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

_____ (v 6.2.2010) V V I SSSSS U U A L SS U U AA L V V I SS U U AAAAA L V V I V V SS U U A A L I VV I SSSSS UUUUU A A LLLLL OOO TTTTT TTTTT H H Y Y M M OOO ТΜ ООТ Т Н Н ҮҮ ММ ММ ОО Т 0 0 Т Н Н Ү М М О О Н Н Ү Т Т М М ООО 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** _____ _____ ** SIMULATION : 5yr 24hr 10min SCS Type II (M ** ***************** _____ READ STORM | Filename: C:\Users\shuchi\AppD 1 ata\Local\Temp\ beed067c-aded-498a-be37-5ab7a3d89fbe\e85488a6 | Ptotal= 88.91 mm | Comments: 5yr 24hr 10min SCS Type II (MTO) _____ TIME RAIN | TIME RAIN | ' TIME RAIN | TIME RAIN hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr 0.00 0.00 | 6.17 1.60 | 12.33 12.80 | 18.50 1.60 0.17 0.98 | 6.33 1.60 | 12.50 12.80 | 18.67 1.60 0.33 0.98 | 6.50 1.60 | 12.67 6.58 | 18.83 1.60 0.50 0.98 | 6.67 1.60 | 12.83 6.58 | 19.00 1.60 0.67 0.98 | 6.83 1.60 | 13.00 6.58 | 19.17 1.60 0.83 0.98 | 7.00 1.60 | 13.17 4.80 | 19.33 1.60 1.00 0.98 | 7.17 1.96 | 13.33 4.80 | 19.50 1.60 1.17 0.98 | 7.33 1.96 | 13.50 4.80 | 19.67 1.60

5-Year-Pre

	1.33	0.98 7.50	1.96 13.67	3.73 19.83
1.60	1.50	0.98 7.67	1.96 13.83	3.73 20.00
1.60	1.67	0.98 7.83	1.96 14.00	3.73 20.17
1.07		0.98 8.00		2.67 20.33
1.07				
1.07			2.31 14.33	
1.07	2.17	1.16 8.33	2.31 14.50	2.67 20.67
1.07	2.33	1.16 8.50	2.31 14.67	2.67 20.83
1.07	2.50	1.16 8.67	2.49 14.83	2.67 21.00
1.07	2.67	1.16 8.83	2.49 15.00	2.67 21.17
	2.83	1.16 9.00	2.49 15.17	2.67 21.33
1.07	3.00	1.16 9.17	2.85 15.33	2.67 21.50
1.07	3.17	1.16 9.33	2.85 15.50	2.67 21.67
1.07	3.33	1.16 9.50	2.85 15.67	2.67 21.83
1.07	3.50	1.16 9.67	3.20 15.83	2.67 22.00
1.07	3.67	1.16 9.83	3.20 16.00	2.67 22.17
1.07				1.60 22.33
1.07	4.00		4.09 16.33	
1.07				
1.07	4.17	1.42 10.33		
1.07	4.33	1.42 10.50	4.09 16.67	1.60 22.83
1.07	4.50	1.42 10.67	5.51 16.83	1.60 23.00
1.07	4.67	1.42 10.83	5.51 17.00	1.60 23.17
1.07	4.83	1.42 11.00	5.51 17.17	1.60 23.33
	5.00	1.42 11.17	8.54 17.33	1.60 23.50
1.07	5.17	1.42 11.33	8.54 17.50	1.60 23.67
1.07	5.33	1.42 11.50	8.54 17.67	1.60 23.83
1.07	5.50	1.42 11.67	26.32 17.83	1.60 24.00
1.07	5.67	1.42 11.83	67.57 18.00	1.60
	5.83	1.42 12.00	108.83 18.17	1.60

------| CALIB | | NASHYD (0001) | Area (ha) = 21.63 Curve Number (CN) = 64.0 |ID= 1 DT=10.0 min | Ia (mm) = 8.00 # of Linear Res.(N) = 3.00 ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 4.131 PEAK FLOW (cms) = 1.595 (i) TIME TO PEAK (hrs) = 12.167 RUNOFF VOLUME (mm) = 28.493 TOTAL RAINFALL (mm) = 88.910 RUNOFF COEFFICIENT = 0.320 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

6.00 1.42 | 12.17 12.80 | 18.33 1.60 |

							1	0-Year-Pre
======	=============	=======	=========		:=====:		======	
	V V V V V V VV	I S I I	SSSS U S U SS U SS U SSSS UU	ט ט ט טטטט	I A A AAAA A			(v 6.2.2010)
Copyri	000 T 0 0 000 ped and D ght 2007 ghts rese	T T T istribu - 2021			Y Y Y Y T City	Y MM MM M M M M Y Water In	0 0 000	ТМ
		***	** D E	ТА	ILI	ED OU	TPUT	****
**** R 5ab7a3	IMULATION ******** EAD STORM d89fbe\d7 al=103.09	******* [cd7d34	*******		C:\Us ata\] beed(sers\shuch Local\Temp)67c-aded	*** ni\AppD o\ -498a-be	37- ype II (MTO)
		TIME	RAIN		TIME	RAIN	' TIME	RAIN TIME
RAIN mm/hr		hrs	mm/hr	Ι	hrs	mm/hr	hrs	mm/hr hrs
1.86		0.00	0.00		6.17	1.86	12.33	14.84 18.50
1.86		0.17	1.13		6.33	1.86	12.50	14.84 18.67
1.86		0.33	1.13		6.50	1.86	12.67	7.63 18.83
1.86		0.50	1.13		6.67	1.86	12.83	7.63 19.00
1.86		0.67	1.13		6.83	1.86	13.00	7.63 19.17
		0.83	1.13		7.00	1.86	13.17	5.57 19.33
1.86		1.00	1.13		7.17	2.27	13.33	5.57 19.50
1.86		1.17	1.13		7.33	2.27	13.50	5.57 19.67
1.86								

	1.33	1.13 7.50	2.27 13.67	4.33 19.83
1.86	1.50	1.13 7.67	2.27 13.83	4.33 20.00
1.86	1.67	1.13 7.83	2.27 14.00	4.33 20.17
1.24	1.83	1.13 8.00	2.27 14.17	3.09 20.33
1.24	2.00	1.13 8.17	2.68 14.33	3.09 20.50
1.24	2.17	1.34 8.33	2.68 14.50	3.09 20.67
1.24	2.33		2.68 14.67	
1.24			2.89 14.83	
1.24			2.89 15.00	
1.24			2.89 15.17	
1.24				
1.24			3.30 15.33	
1.24			3.30 15.50	
1.24			3.30 15.67	
1.24		1.34 9.67		
1.24	3.67	1.34 9.83	3.71 16.00	3.09 22.17
1.24	3.83	1.34 10.00	3.71 16.17	1.86 22.33
1.24	4.00	1.34 10.17	4.74 16.33	1.86 22.50
1.24	4.17	1.65 10.33	4.74 16.50	1.86 22.67
1.24	4.33	1.65 10.50	4.74 16.67	1.86 22.83
1.24	4.50	1.65 10.67	6.39 16.83	1.86 23.00
1.24	4.67	1.65 10.83	6.39 17.00	1.86 23.17
1.24	4.83	1.65 11.00	6.39 17.17	1.86 23.33
	5.00	1.65 11.17	9.90 17.33	1.86 23.50
1.24	5.17	1.65 11.33	9.90 17.50	1.86 23.67
1.24	5.33	1.65 11.50	9.90 17.67	1.86 23.83
1.24	5.50	1.65 11.67	30.51 17.83	1.86 24.00
1.24	5.67 5.83	1.65 11.83 1.65 12.00	78.35 18.00 126.18 18.17	1.86 1.86

------| CALIB | | NASHYD (0001) | Area (ha) = 21.63 Curve Number (CN) = 64.0 |ID= 1 DT=10.0 min | Ia (mm) = 8.00 # of Linear Res.(N) = 3.00 ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 4.131 PEAK FLOW (cms) = 2.089 (i) TIME TO PEAK (hrs) = 12.167 RUNOFF VOLUME (mm) = 37.010 TOTAL RAINFALL (mm) = 103.090 RUNOFF COEFFICIENT = 0.359 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

6.00 1.65 | 12.17 14.84 | 18.33 1.86 |

25-Year-Pre

V V I SSSSS U U A L (v 6.2.2010) SS U U AA L V V I SS U U AAAAA L V V I V V SS U U A A L I I SSSSS UUUUU A A LLLLL VV OOO TTTTT TTTTT H H Y Y M M OOO ΤM ООТ ТННҮҮ ММММОО Т 0 0 Т Н Н Ү м м о о Т Т Н Н Ү М М ООО 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\94dcb993-ab51-4e54-a787-a7d17a3f01cf\scena Summary filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\94dcb993-ab51-4e54-a787-a7d17a3f01cf\scena _____ _____ ** SIMULATION : 25yr 24hr 10min SCS Type II (** _____ READ STORM | Filename: C:\Users\shuchi\AppD 1 ata\Local\Temp\ beed067c-aded-498a-be37-5ab7a3d89fbe\bed76262 | Ptotal=121.70 mm | Comments: 25yr 24hr 10min SCS Type II (MTO) _____ ____ TIME RAIN | TIME RAIN | ' TIME RAIN | TIME RAIN hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr 0.00 0.00 | 6.17 2.19 | 12.33 17.52 | 18.50 2.19 0.17 1.34 | 6.33 2.19 | 12.50 17.52 | 18.67 2.19 0.33 1.34 | 6.50 2.19 | 12.67 9.01 | 18.83 2.19 0.50 1.34 | 6.67 2.19 | 12.83 9.01 | 19.00 2.19

	0.67	1.34 6.83	2.19 13.00	9.01 19.17
2.19	0.83	1.34 7.00	2.19 13.17	6.57 19.33
2.19	1.00	1.34 7.17	2.68 13.33	6.57 19.50
2.19	1.17	1.34 7.33	2.68 13.50	6.57 19.67
2.19	1.33	1.34 7.50	2.68 13.67	5.11 19.83
2.19	1.50	1.34 7.67	2.68 13.83	5.11 20.00
2.19	1.67	1.34 7.83	2.68 14.00	5.11 20.17
1.46	1.83	1.34 8.00	2.68 14.17	3.65 20.33
1.46	2.00	1.34 8.17	3.16 14.33	3.65 20.50
1.46	2.17	1.58 8.33	3.16 14.50	3.65 20.67
1.46	2.33	1.58 8.50	3.16 14.67	3.65 20.83
1.46	2.50	1.58 8.67	3.41 14.83	3.65 21.00
1.46	2.67	1.58 8.83	3.41 15.00	3.65 21.17
1.46	2.83	1.58 9.00	3.41 15.17	3.65 21.33
1.46	3.00	1.58 9.17	3.89 15.33	3.65 21.50
1.46	3.17	1.58 9.33		
1.46	3.33	1.58 9.50	3.89 15.67	3.65 21.83
1.46	3.50	1.58 9.67	4.38 15.83	3.65 22.00
1.46	3.67	1.58 9.83	4.38 16.00	
1.46	3.83	1.58 10.00	4.38 16.17	2.19 22.33
1.46	4.00	1.58 10.17	5.60 16.33	2.19 22.50
1.46	4.17	1.95 10.33	5.60 16.50	2.19 22.67
1.46	4.33	1.95 10.50	5.60 16.67	2.19 22.83
1.46	4.50	1.95 10.67	7.55 16.83	2.19 23.00
1.46	4.67	1.95 10.83	7.55 17.00	2.19 23.17
1.46	4.83	1.95 11.00	7.55 17.17	2.19 23.33
1.46	5.00	1.95 11.17	11.68 17.33	2.19 23.50
1.46	0.00	1.70 11.1/		2.13 20.00

5.17 1.95 | 11.33 11.68 | 17.50 2.19 | 23.67 1.46 5.33 1.95 | 11.50 11.68 | 17.67 2.19 | 23.83 1.46 1.95 | 11.67 36.02 | 17.83 2.19 | 24.00 5.50 1.46 5.671.95 | 11.8392.49 | 18.002.19 |5.831.95 | 12.00148.96 | 18.172.19 | 6.00 1.95 | 12.17 17.52 | 18.33 2.19 | _____ ____ _____ | CALIB | | NASHYD (0001) | Area (ha) = 21.63 Curve Number (CN) = 64.0 |ID= 1 DT=10.0 min | Ia (mm) = 8.00 # of Linear Res.(N) = 3.00 ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 4.131 PEAK FLOW (cms) = 2.793 (i) TIME TO PEAK (hrs) = 12.167RUNOFF VOLUME (mm) = 49.076 TOTAL RAINFALL (mm) = 121.700 RUNOFF COEFFICIENT = 0.403 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ ____

50-Year-Pre V V I SSSSS U U A L (v 6.2.2010) V I V SS U U AA L SS U U AAAAA L V V I V V SS U U A A L I VV I SSSSS UUUUU A A LLLLL OOO TTTTT TTTTT H H Y Y M M OOO ΤМ ООТТННҮҮ ММ ММОО Т 0 0 Т Н Н Ү м м о о Т Т Y М М ООО 000 Н Н Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\35386cb2-c3f3-4324-855f-21dc2a9f7cb9\scena Summary filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\35386cb2-c3f3-4324-855f-21dc2a9f7cb9\scena _____ ** SIMULATION : 50yr 24hr 10min SCS Type II (** ------READ STORM | Filename: C:\Users\shuchi\AppD 1 ata\Local\Temp\ beed067c-aded-498a-be37-5ab7a3d89fbe\b12258bd | Ptotal=134.56 mm | Comments: 50yr 24hr 10min SCS Type II (MTO) _____ TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr 0.00 | 6.17 0.00 2.42 | 12.33 19.38 | 18.50 2.42 0.17 1.48 | 6.33 2.42 | 12.50 19.38 | 18.67 2.42 0.33 1.48 | 6.50 2.42 | 12.67 9.96 | 18.83 2.42 0.50 1.48 | 6.67 2.42 | 12.83 9.96 | 19.00 2.42 0.67 1.48 | 6.83 2.42 | 13.00 9.96 | 19.17 2.42

			0 40 4 10 15	
2.42	0.83	1.48 7.00	2.42 13.17	7.27 19.33
2.42	1.00	1.48 7.17	2.96 13.33	7.27 19.50
	1.17	1.48 7.33	2.96 13.50	7.27 19.67
2.42	1.33	1.48 7.50	2.96 13.67	5.65 19.83
2.42	1.50	1.48 7.67	2.96 13.83	5.65 20.00
2.42	1.67	1.48 7.83	2.96 14.00	5.65 20.17
1.61	1.83	1.48 8.00	2.96 14.17	4.04 20.33
1.61	2.00	1.48 8.17	3.50 14.33	
1.61				
1.61	2.17	1.75 8.33	3.50 14.50	
1.61	2.33	1.75 8.50	3.50 14.67	4.04 20.83
1.61	2.50	1.75 8.67	3.77 14.83	4.04 21.00
1.61	2.67	1.75 8.83	3.77 15.00	4.04 21.17
	2.83	1.75 9.00	3.77 15.17	4.04 21.33
1.61	3.00	1.75 9.17	4.31 15.33	4.04 21.50
1.61	3.17	1.75 9.33	4.31 15.50	4.04 21.67
1.61	3.33	1.75 9.50	4.31 15.67	4.04 21.83
1.61	3.50	1.75 9.67	4.84 15.83	4.04 22.00
1.61	3.67	1.75 9.83		4.04 22.17
1.61				
1.61	3.83		4.84 16.17	
1.61	4.00	1.75 10.17	6.19 16.33	2.42 22.50
1.61	4.17	2.15 10.33	6.19 16.50	2.42 22.67
1.61	4.33	2.15 10.50	6.19 16.67	2.42 22.83
	4.50	2.15 10.67	8.34 16.83	2.42 23.00
1.61	4.67	2.15 10.83	8.34 17.00	2.42 23.17
1.61	4.83	2.15 11.00	8.34 17.17	2.42 23.33
1.61	5.00	2.15 11.17	12.92 17.33	2.42 23.50
1.61	5.17	2.15 11.33	12.92 17.50	2.42 23.67
1.61	- • - /		,	,

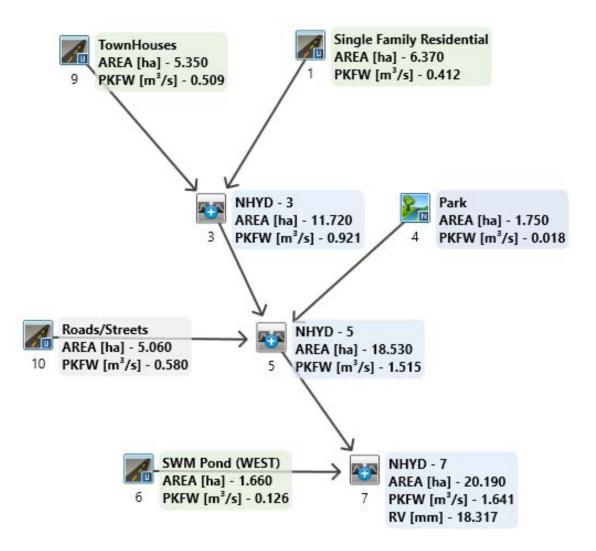
1.61	5.33 2	.15 11.5	0 12.92	17.67	2.42 23.83
	5.50 2	.15 11.6	7 39.83	17.83	2.42 24.00
1.61				18.00	
				18.17 18.33	
CALIB NASHYD (00 ID= 1 DT=10.0 m	01) Area	(mm) =	8.00		
Unit Hyd Qp	eak (cms)=	= 4.131			
PEAK FLOW TIME TO PEA RUNOFF VOLU TOTAL RAINF RUNOFF COEF	K (hrs)= ME (mm)= ALL (mm)=	= 12.167 = 57.904 = 134.560	(i)		
(i) PEAK FL	OW DOES NOT	I INCLUDE 1	BASEFLOW I	IF ANY.	

100-Year-Pre V V I SSSSS U U A L (v 6.2.2010) V I V SS U U A A L SS U U AAAAA L V V Ι V V SS U U A A L I VV I SSSSS UUUUU A A LLLLL OOO TTTTT TTTTT H Н Ү Ү М М ООО ТΜ Т Т н н үү мм мм о о 0 0 Т 0 0 Т Н Н Ү м м о о Т Т Y 000 Н Н М М ООО Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\e3ad4dcd-98f3-485e-abaf-04de8b8ac021\scena Summary filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\e3ad4dcd-98f3-485e-abaf-04de8b8ac021\scena ** SIMULATION : 100yr 24hr 10min SCS Type II ** **** ------READ STORM | Filename: C:\Users\shuchi\AppD 1 ata\Local\Temp\ beed067c-aded-498a-be37-5ab7a3d89fbe\337e82e6 | Ptotal=145.92 mm | Comments: 100yr 24hr 10min SCS Type II (MTO) _____ TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN mm/hr | hrs mm/hr | hrs mm/hr | hrs hrs mm/hr 0.00 | 6.17 0.00 2.63 | 12.33 21.01 | 18.50 2.63 0.17 1.61 | 6.33 2.63 | 12.50 21.01 | 18.67 2.63 0.33 1.61 | 6.50 2.63 | 12.67 10.80 | 18.83 2.63 0.50 1.61 | 6.67 2.63 | 12.83 10.80 | 19.00 2.63 0.67 1.61 | 6.83 2.63 | 13.00 10.80 | 19.17 2.63

	0.83	1.61 7.00	2.63 13.17	7.88 19.33
2.63	1.00	1.61 7.17	3.21 13.33	7.88 19.50
2.63	1.17	1.61 7.33	3.21 13.50	7.88 19.67
2.63	1.33	1.61 7.50	3.21 13.67	6.13 19.83
2.63	1.50	1.61 7.67	3.21 13.83	6.13 20.00
2.63	1.67	1.61 7.83	3.21 14.00	6.13 20.17
1.75	1.83		3.21 14.17	
1.75	2.00		3.79 14.33	
1.75	2.17		3.79 14.50	
1.75	2.33		3.79 14.67	
1.75			4.09 14.83	
1.75	2.50			
1.75	2.67		4.09 15.00	
1.75	2.83		4.09 15.17	
1.75	3.00		4.67 15.33	
1.75	3.17		4.67 15.50	
1.75	3.33	1.90 9.50	4.67 15.67	4.38 21.83
1.75	3.50	1.90 9.67	5.25 15.83	4.38 22.00
1.75	3.67	1.90 9.83	5.25 16.00	4.38 22.17
1.75	3.83	1.90 10.00	5.25 16.17	2.63 22.33
1.75	4.00	1.90 10.17	6.71 16.33	2.63 22.50
1.75	4.17	2.33 10.33	6.71 16.50	2.63 22.67
1.75	4.33	2.33 10.50	6.71 16.67	2.63 22.83
	4.50	2.33 10.67	9.05 16.83	2.63 23.00
1.75	4.67	2.33 10.83	9.05 17.00	2.63 23.17
1.75	4.83	2.33 11.00	9.05 17.17	2.63 23.33
1.75	5.00	2.33 11.17	14.01 17.33	2.63 23.50
1.75	5.17	2.33 11.33	14.01 17.50	2.63 23.67
1.75				

1.75	5.33	2.33 11.50	14.01 1	7.67	2.63 23.83
1.75	5.50	2.33 11.67	43.19 1	7.83	2.63 24.00
1.75	5.83	2.33 11.83 2.33 12.00	178.61 1	.8.17	2.63
	6.00	2.33 12.17	21.01 1	.8.33	2.63
Unit Hyd Q PEAK FLOW TIME TO PE RUNOFF VOL	min Ia U. peak (cms (cms AK (hrs UME (mm	(mm) = H. Tp(hrs) =) = 4.131) = 3.783 (i) = 12.167 c) = 65.983	8.00 # c 0.20		
TOTAL RAIN RUNOFF COE					
(i) PEAK F	LOW DOES N	OT INCLUDE BA	SEFLOW IF A	ANY.	
FINISH					
	===========				

POST-DEVELOPMENT SCENARIO



25mm Erosion Control Layout

25mm Erosion Control ______ V V I SSSSS U U A L (v 6.2.2010) VI SS UUAAL V I SS U U AAAAA L V V V V SS U U A A L I I SSSSS UUUUU A A LLLLL VV OOO TTTTT TTTTT H H Y Y M M OOO ΤM ООТ ТННҮҮ ММММОО Т Т 0 0 Н Н Ү М М О О Т Т Н Н Ү М М ООО 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\4c65e329-79c5-4d63-a31c-975113909b6e\scena Summary filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\4c65e329-79c5-4d63-a31c-975113909b6e\scena _____ _____ ** ** SIMULATION : 25mm-Erosion Control _____ READ STORM | Filename: C:\Users\shuchi\AppD 1 ata\Local\Temp\ 3ace684b-8633-4455-8ee0-3491e34bff1d\d8fc9c9e | Ptotal= 25.00 mm | Comments: 25MM-4HR _____ TIME RAIN | TIME RAIN | ' TIME RAIN | TIME RAIN hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr 0.00 2.07 | 1.00 5.70 | 2.00 5.19 | 3.00 2.80 0.17 2.27 | 1.17 10.78 | 2.17 4.47 | 3.17 2.62 0.33 2.52 | 1.33 50.21 | 2.33 3.95 | 3.33 2.48 0.50 2.88 | 1.50 13.37 | 2.50 3.56 | 3.50 2.35

0.67 3.38 | 1.67 8.29 | 2.67 3.25 | 3.67 2.23 0.83 4.18 | 1.83 6.30 | 2.83 3.01 | 3.83 2.14 _____ _____ CALIB | NASHYD (0004) | Area (ha) = 1.75 Curve Number (CN) = 80.0 |ID= 1 DT=10.0 min | Ia (mm) = 5.00 # of Linear Res.(N) = 3.00 ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 0.334 PEAK FLOW (cms) = 0.018 (i) TIME TO PEAK (hrs) = 1.667 RUNOFF VOLUME (mm) = 4.664 TOTAL RAINFALL (mm) = 24.997 RUNOFF COEFFICIENT = 0.187 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0001) | Area (ha) = 6.37 |ID= 1 DT=10.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =3.82Dep. Storage(mm) =1.00Average Slope(%) =1.00Length(m) =206.07Mannings n=0.0132.55 1.50 2.00 Length Mannings n 40.00 = 0.013 0.250 Max.Eff.Inten.(mm/hr) = 50.21 14.81 over (min) 10.00 30.00 Storage Coeff. (min) = 5.19 (ii) 20.34 (ii) Unit Hyd. Tpeak (min) = 10.00 30.00 Unit Hyd. peak (cms) = 0.15 0.05 Unit Hyd. peak (cms)= 0.15 0.05 * TOTALS* 0.06 PEAK FLOW (cms) = 0.39 0.412 (iii) 0.06 1.83 9.45 TIME TO PEAK (hrs) =1.50RUNOFF VOLUME (mm) =24.00TOTAL RAINFALL (mm) =25.00RUNOFF COEFFICIENT =0.96 1.50 16.74 9.49 25.00 25.00 0.38 0.67 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

> (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0009) | Area (ha) = 5.35 |ID= 1 DT=10.0 min | Total Imp(%) = 80.00 Dir. Conn.(%) = 75.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.28

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 188.86

 Mannings n
 =
 0.013

 1.07 4.28 1.50 2.00 40.00 0.013 0.250 Max.Eff.Inten.(mm/hr) = 50.21 14.81 over (min) 10.00 30.00 Storage Coeff. (min) = 4.93 (ii) 20.08 (ii) Unit Hyd. Tpeak (min) = 10.00 30.00 Unit Hyd. peak (cms) = 0.15 0.05 * TOTALS* 0.03 1.83 PEAK FLOW(cms) =0.50TIME TO PEAK(hrs) =1.50RUNOFF VOLUME(mm) =24.00TOTAL RAINFALL(mm) =25.00RUNOFF COEFFICIENT=0.96 0.509 (iii) 1.50 9.49 20.37 25.00 25.00 0.38 0.81 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0003)| | 1 + 2 = 3 | AREA QPEAK TPEAK R.V. _____ (mm) ID = 3 (0003): 11.72 0.921 1.50 18.40NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ ------

| CALIB | STANDHYD (0010) | Area (ha) = 5.06 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =4.810.25Dep. Storage(mm) =1.001.50Average Slope(%) =1.002.00Length(m) =183.6740.00Mannings n=0.0130.250 Max.Eff.Inten.(mm/hr)= 50.21 48.59 over (min) 10.00 20.00 Storage Coeff. (min)= 4.85 (ii) 14.27 Unit Hyd. Tpeak (min)= 10.00 20.00 Unit Hyd. peak (cms)= 0.15 0.07 4.85 (ii) 14.27 (ii) * TOTALS*

 PEAK FLOW
 (cms) =
 0.57
 0.02

 TIME TO PEAK
 (hrs) =
 1.50
 1.67

 RUNOFF VOLUME
 (mm) =
 24.00
 12.60

 TOTAL RAINFALL
 (mm) =
 25.00
 25.00

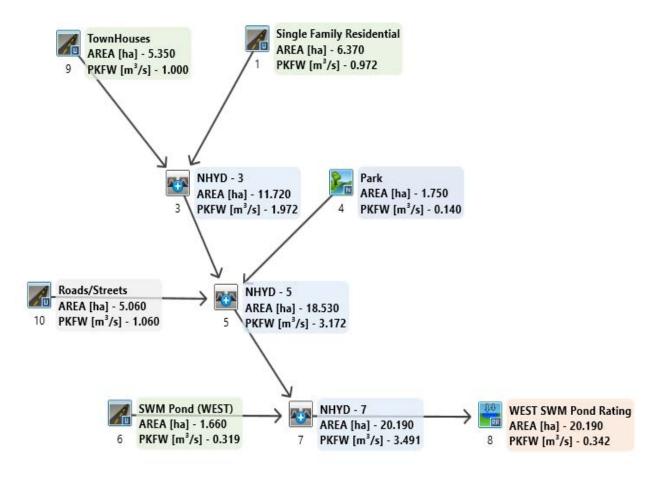
 0.580 (iii) 1.50 22.86 TOTAL RAINFALL(mm) =25.00RUNOFF COEFFICIENT=0.96 25.00 0.96 0.50 0.91 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ | ADD HYD (0005)| | ADD III | 1 + 2 = 3 |_____ ID = 3 (0005): 16.78 1.501 1.50 19.74NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ | ADD HYD (0005)| | 3 + 2 = 1 |AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) (cms) _____ ID1= 3 (0005): 16.78 1.501 1.50 19.74 + ID2= 2 (0004): 1.75 0.018 1.67 4.66 _____

ID = 1 (0005): 18.53 1.515 1.50 18.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ | CALIB | | STANDHYD (0006) | Area (ha) = 1.66 |ID= 1 DT=10.0 min | Total Imp(%) = 75.00 Dir. Conn.(%) = 50.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area (na)-Dep. Storage (mm) = 1.00 Average Slope (%) = 1.00 (m) = 105.20 = 0.013 1.25 0.42 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr)= 50.21 48.59 over (min) 10.00 20.00 Storage Coeff. (min)= 3.47 (ii) 12.89 (ii) 10.00 20.00 Unit Hyd. Tpeak (min) = 0.07 Unit Hyd. peak (cms) = 0.16 * TOTALS* 0.03 1.67 12.60 25.00 PEAK FLOW(cms) =0.11TIME TO PEAK(hrs) =1.50RUNOFF VOLUME(mm) =24.00TOTAL RAINFALL(mm) =25.00 0.126 (iii) 1.50 18.29 25.00 RUNOFF COEFFICIENT = 0.96 0.50 0.73 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ ____ _____ | ADD HYD (0007)| AREA QPEAK TPEAK R.V. | 1 + 2 = 3 | (ha) (cms) (hrs) _____ (mm) ID1= 1 (0005): 18.53 1.515 1.50 18.32 + ID2= 2 (0006): 1.66 0.126 1.50 18.29 _____ ID = 3 (0007): 20.19 1.641 1.50 18.32 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____

FINISH

POST-DEVELOPMENT RESULTS



2 to 100-Year VO Results SCS Type II - 24 Hour Runs

2-Year-Post _____ V V I SSSSS U U A L (v 6.2.2010) V I V SS U U AA L SS V V U U AAAAA L I V V SS U U A A L I VV I SSSSS UUUUU A A LLLLL OOO TTTTT TTTTT H H Y Y M M OOO ТΜ Т 0 0 Т н н үү мм мм о о Т Т 0 0 Н Н Ү м м о о Т Т Y М М ООО 000 Н Н Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\d9597df3-c1ae-40dc-b105-7bc0b4cd899f\scena Summary filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\d9597df3-c1ae-40dc-b105-7bc0b4cd899f\scena ***************** ** SIMULATION : 2yr 24hr 10min SCS Type II (M ** ------READ STORM | Filename: C:\Users\shuchi\AppD 1 ata\Local\Temp\ 03ddde23-12c1-4881-ac3e-e542d956e93c\b248018d | Ptotal= 67.15 mm | Comments: 2yr 24hr 10min SCS Type II (MTO) _____ TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN mm/hr | hrs mm/hr | hrs mm/hr | hrs hrs mm/hr 0.00 0.00 | 6.17 1.21 | 12.33 9.67 | 18.50 1.21 0.17 0.74 | 6.33 1.21 | 12.50 9.67 | 18.67 1.21 0.33 0.74 | 6.50 1.21 | 12.67 4.97 | 18.83 1.21 0.50 0.74 | 6.67 1.21 | 12.83 4.97 | 19.00 1.21 0.67 0.74 | 6.83 1.21 | 13.00 4.97 | 19.17 1.21

	0.83	0.74 7.00	1.21 13.17	3.63 19.33
1.21	1.00	0.74 7.17	1.48 13.33	3.63 19.50
1.21	1.17	0.74 7.33	1.48 13.50	3.63 19.67
1.21	1.33	0.74 7.50	1.48 13.67	2.82 19.83
1.21		0.74 7.67		
1.21		0.74 7.83	1.48 14.00	
0.81		0.74 8.00	1.48 14.17	
0.81		0.74 8.17		
0.81		0.87 8.33		
0.81				
0.81		0.87 8.50	1.75 14.67	
0.81		0.87 8.67		
0.81		0.87 8.83	1.88 15.00	
0.81		0.87 9.00	1.88 15.17	
0.81		0.87 9.17		
0.81		0.87 9.33	2.15 15.50	2.01 21.67
0.81	3.33	0.87 9.50	2.15 15.67	2.01 21.83
0.81	3.50	0.87 9.67	2.42 15.83	2.01 22.00
0.81	3.67	0.87 9.83	2.42 16.00	2.01 22.17
0.81	3.83	0.87 10.00	2.42 16.17	1.21 22.33
0.81	4.00	0.87 10.17	3.09 16.33	1.21 22.50
0.81	4.17	1.07 10.33	3.09 16.50	1.21 22.67
0.81	4.33	1.07 10.50	3.09 16.67	1.21 22.83
0.81	4.50	1.07 10.67	4.16 16.83	1.21 23.00
	4.67	1.07 10.83	4.16 17.00	1.21 23.17
0.81	4.83	1.07 11.00	4.16 17.17	1.21 23.33
0.81	5.00	1.07 11.17	6.45 17.33	1.21 23.50
0.81	5.17	1.07 11.33	6.45 17.50	1.21 23.67
0.81				

5.33 1.07 | 11.50 6.45 | 17.67 1.21 | 23.83 0.81 5.50 1.07 | 11.67 19.88 | 17.83 1.21 | 24.00 0.81 5.67 1.07 | 11.83 51.03 | 18.00 1.21 | 1.07 | 12.00 82.19 | 18.17 1.21 | 5.83 6.00 1.07 | 12.17 9.67 | 18.33 1.21 | _____ | CALIB | | NASHYD (0004) | Area (ha) = 1.75 Curve Number (CN) = 80.0 |ID= 1 DT=10.0 min | Ia (mm) = 5.00 # of Linear Res.(N) = 3.00 ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 0.334 PEAK FLOW (cms) = 0.140 (i) (hrs) = 12.167 TIME TO PEAK RUNOFF VOLUME (mm) = 29.942TOTAL RAINFALL (mm) = 67.150RUNOFF COEFFICIENT = 0.446 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0001) | Area (ha) = 6.37 |ID= 1 DT=10.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 3.82

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 206.07

 Mannings n
 =
 0.013

 2.55 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr) = 82.19 77.26 over (min) 10.00 20.00 Storage Coeff. (min) = 4.26 (ii) 12.09 Unit Hyd. Tpeak (min) = 10.00 20.00 Unit Hyd. peak (cms) = 0.15 0.07 4.26 (ii) 12.09 (ii) 0.07 Unit Hyd. peak (cms) = 0.15 PEAK FLOW (cms) = 0.70 TIME TO PEAK (hrs) = 12.17 (mm) = 66.15 C7.15 * TOTALS* 0.32 0.972 (iii) 0.32 12.17 54.43 42.72 67.15 67.15 67.15 TOTAL RAINFALL (mm) = RUNOFF COEFFICIENT = 0.99 0.64 0.81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0009) | Area (ha) = 5.35 |ID= 1 DT=10.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 75.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =4.281.07Dep. Storage(mm) =1.001.50Average Slope(%) =1.002.00Length(m) =188.8640.00Mannings n=0.0130.250 Mannings n = 0.013 0.250 Max.Eff.Inten.(mm/hr) = 82.19 77.26 over (min) 10.00 20.00 Storage Coeff. (min) = 4.05 (ii) 11.87 (ii) Unit Hyd. Tpeak (min) = 10.00 20.00 Unit Hyd. peak (cms) = 0.16 0.08 * TOTALS*
 0.88
 0.14

 12.17
 12.33

 66.15
 42.72

 67.15
 67.15
 PEAK FLOW(cms) =0.880.14TIME TO PEAK(hrs) =12.1712.33RUNOFF VOLUME(mm) =66.1542.72TOTAL RAINFALL(mm) =67.1567.15RUNOFF COEFFICIENT=0.990.64 1.000 (iii) 12.17 60.29 67.15 0.90 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^{\star} = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ ____ | ADD HYD (0003)| _____ ID = 3 (0003): 11.72 1.97212.17 57.11 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

_____ | CALIB | | STANDHYD (0010) | Area (ha) = 5.06 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.81

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 183.67

 Marring on p
 =
 0.013

 0.25 1.50 40.00 = 0.013 0.250 Mannings n Max.Eff.Inten.(mm/hr) = 82.19 140.61 over (min) 10.00 20.00 Storage Coeff. (min) = 3.98 (ii) 10.14 (ii) Unit Hyd. Tpeak (min) = 10.00 20.00 Unit Hyd. peak (cms) = 0.16 0.08 * TOTALS* 0.06 12.33 49.64 1.01 1.060 (iii) PEAK FLOW (cms) =

 TIME TO PEAK (hrs) =
 12.17
 12.33

 RUNOFF VOLUME (mm) =
 66.15
 49.64

 TOTAL RAINFALL (mm) =
 67.15
 67.15

 RUNOFF COEFFICIENT =
 0.99
 0.74

 12.17 64.50 67.15 0.96 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ | ADD HYD (0005)|

 + 2 = 3
 |
 AREA
 QPEAK
 TPEAK
 R.V.

 ----- (ha)
 (cms)
 (hrs)
 (mm)

 ID1= 1
 (0010):
 5.06
 1.060
 12.17
 64.50

 + ID2= 2
 (0003):
 11.72
 1.972
 12.17
 57.11

 | 1 + 2 = 3 | | 1 + 2 = 3 | ID = 3 (0005):16.78 3.032 12.17 59.34 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ | ADD HYD (0005)| | 3 + 2 = 1 | AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) -----

ID1= 3 (0005): 16.78 3.032 12.17 59.34 + ID2= 2 (0004): 1.75 0.140 12.17 29.94 _____ ID = 1 (0005): 18.53 3.172 12.17 56.56 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ ------| CALIB | STANDHYD (0006) | Area (ha) = 1.66 |ID= 1 DT=10.0 min | Total Imp(%)= 75.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =1.25Dep. Storage(mm) =1.00Average Slope(%) =1.00Leneth(%) =1.00 0.42 (mm) = 1.00(%) = 1.00(m) = 105.20= 0.0131.50 2.00 Length 40.00 Mannings n 0.250 Max.Eff.Inten.(mm/hr) = 82.19 140.61 over (min) 10.00 10.00 Storage Coeff. (min) = 2.85 (ii) 9.01 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.16 0.11 * TOTALS* 0.19 12.17 0.13 12.17 PEAK FLOW (cms) = 0.319 (iii) TIME TO PEAK 12.17 (hrs)= 12.17 RUNOFF VOLUME(mm) =66.15TOTAL RAINFALL(mm) =67.15RUNOFF COEFFICIENT=0.99 57.89 49.64 67.15 67.15 0.74 0.86 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0007) | | 1 + 2 = 3 |AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) _____ ID1= 1 (0005): 18.53 3.172 12.17 56.56 + ID2= 2 (0006): 1.66 0.319 12.17 57.89 ID = 3 (0007): 20.19 3.491 12.17 56.67 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) OVERFLOW IS OFF						
IN= 2> OUT= 1						
DT= 10.0 min	OUTFL	OW STOR	AGE	OUTFLOW	STORAGE	
	(cms) (ha.	m.)	(cms)	(ha.m.)	
	0.00	00 0.0	000	1.6050	1.0540	
	0.35	60 0.6	274	1.7820	1.1564	
	0.77	90 0.7	914	1.9560	1.2783	
	1.27	30 0.8	963	0.0000	0.0000	
		AREA	QPEAK	TPEAK	R.V.	
		(ha)	(cms)	(hrs)	(mm)	
INFLOW : ID= 2	(0007)	20.190	3.491	12.17	56.67	
OUTFLOW: ID= 1	(0008)	20.190	0.342	12.83	56.65	
	PEAK FLOW	REDUCTI	ON [Qout/	′Qin](%)=	9.79	
TIME SHIFT OF PEAK FLOW (min) = 40.00					10.00	
	MAXIMUM ST	ORAGE US	ED	(ha.m.)=	0.6030	

5-Year-Post V V I SSSSS U U A L (v 6.2.2010) SS U U AA L V V I I SS U U AAAAA L V V V V SS U U A A L I I SSSSS UUUUU A A LLLLL VV OOO TTTTT TTTTT H H Y Y M M OOO ΤM ООТ ТННҮҮ ММММОО Т 0 0 Т Н Н Ү м м о о Т Т Н Н Ү М М ООО 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\f85bafac-346a-4aa2-a14f-b8e955dbdbe3\scena Summary filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\f85bafac-346a-4aa2-a14f-b8e955dbdbe3\scena _____ _____ ** SIMULATION : 5yr 24hr 10min SCS Type II (M ** _____ READ STORM | Filename: C:\Users\shuchi\AppD 1 ata\Local\Temp\ 03ddde23-12c1-4881-ac3e-e542d956e93c\936566f3 | Ptotal= 88.91 mm | Comments: 5yr 24hr 10min SCS Type II (MTO) _____ ____ TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr 0.00 0.00 | 6.17 1.60 | 12.33 12.80 | 18.50 1.60 0.17 0.98 | 6.33 1.60 | 12.50 12.80 | 18.67 1.60 0.33 0.98 | 6.50 1.60 | 12.67 6.58 | 18.83 1.60 0.50 0.98 | 6.67 1.60 | 12.83 6.58 | 19.00 1.60

1.60	0.67	0.98 6.83	1.60 13.00	6.58 19.17
1.60	0.83	0.98 7.00	1.60 13.17	4.80 19.33
1.60	1.00	0.98 7.17	1.96 13.33	4.80 19.50
	1.17	0.98 7.33	1.96 13.50	4.80 19.67
1.60	1.33	0.98 7.50	1.96 13.67	3.73 19.83
1.60	1.50	0.98 7.67	1.96 13.83	3.73 20.00
1.60	1.67	0.98 7.83	1.96 14.00	3.73 20.17
1.07	1.83	0.98 8.00	1.96 14.17	2.67 20.33
1.07	2.00	0.98 8.17	2.31 14.33	2.67 20.50
1.07	2.17	1.16 8.33	2.31 14.50	2.67 20.67
1.07	2.33	1.16 8.50	2.31 14.67	2.67 20.83
1.07	2.50	1.16 8.67	2.49 14.83	2.67 21.00
1.07	2.67	1.16 8.83	2.49 15.00	2.67 21.17
1.07	2.83		2.49 15.17	
1.07	3.00		2.85 15.33	
1.07	3.17	1.16 9.33		
1.07	3.33	1.16 9.50	2.85 15.67	
1.07	3.50	1.16 9.67		
1.07	3.67	1.16 9.83	3.20 16.00	
1.07				1.60 22.33
1.07	3.83	1.16 10.00	3.20 16.17	
1.07	4.00	1.16 10.17	4.09 16.33	1.60 22.50
1.07	4.17	1.42 10.33	4.09 16.50	1.60 22.67
1.07	4.33	1.42 10.50	4.09 16.67	1.60 22.83
1.07	4.50	1.42 10.67	5.51 16.83	1.60 23.00
1.07	4.67	1.42 10.83	5.51 17.00	1.60 23.17
1.07	4.83	1.42 11.00	5.51 17.17	1.60 23.33
1.07	5.00	1.42 11.17	8.54 17.33	1.60 23.50

5.17 1.42 | 11.33 8.54 | 17.50 1.60 | 23.67 1.07 5.33 1.42 | 11.50 8.54 | 17.67 1.60 | 23.83 1.07 5.50 1.42 | 11.67 26.32 | 17.83 1.60 | 24.00 1.07 5.67 1.42 | 11.83 67.57 | 18.00 1.60 | 5.83 1.42 | 12.00 108.83 | 18.17 1.60 | 6.00 1.42 | 12.17 12.80 | 18.33 1.60 | _____ ____ _____ | CALIB | | NASHYD (0004) | Area (ha) = 1.75 Curve Number (CN) = 80.0 |ID= 1 DT=10.0 min | Ia (mm) = 5.00 # of Linear Res.(N) = 3.00 | NASHYD (0004)| Area ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 0.334 PEAK FLOW (cms) = 0.219 (i) TIME TO PEAK (hrs) = 12.167RUNOFF VOLUME (mm) = 46.523 TOTAL RAINFALL (mm) = 88.910RUNOFF COEFFICIENT = 0.523 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0001) | Area (ha) = 6.37 |ID= 1 DT=10.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 3.82
 2.55

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 206.07
 40.00

 Mannings n
 =
 0.013
 0.250

 Max.Eff.Inten.(mm/hr) = 108.83 111.27 over (min) 10.00 20.00 Storage Coeff. (min) = 3.81 (ii) 10.57 (ii) Unit Hyd. Tpeak (min) = 10.00 20.00 Unit Hyd. peak (cms) = 0.16 0.08 * TOTALS* (cms) = 0.95(2mc) = 12.170.93 12.17 0.48 12.33 PEAK FLOW 1.358 (iii) TIME TO PEAK 12.17 RUNOFF VOLUME (mm) = 87.91 62.26 75.08 TOTAL RAINFALL(mm) =88.91RUNOFF COEFFICIENT=0.99 88.91 88.91 0.70 0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0009) | Area (ha) = 5.35 |ID= 1 DT=10.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 75.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.28
 1.07

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 188.86
 40.00

 Mannings n
 =
 0.013
 0.250

 Max.Eff.Inten.(mm/hr) = 108.83 111.27 over (min) 10.00 20.00 Storage Coeff. (min) = 3.62 (ii) 10.38 (ii) Unit Hyd. Tpeak (min) = 10.00 20.00 Unit Hyd. peak (cms) = 0.16 0.08 * TOTALS* PEAK FLOW(cms) =1.180.20TIME TO PEAK(hrs) =12.1712.33RUNOFF VOLUME(mm) =87.9162.26TOTAL RAINFALL(mm) =88.9188.91RUNOFF COEFFICIENT=0.990.70 0.20 1.361 (iii) 12.17 81.50 88.91 0.92 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EOUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. ____ _____ | ADD HYD (0003) | ID = 3 (0003): 11.72 2.719 12.17 78.01

_____ | CALIB | STANDHYD (0010) | Area (ha) = 5.06 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.81

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 183.67

 Mannings n
 =
 0.013

 0.25 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr) = 108.83 195.94 over (min) 10.00 10.00 Storage Coeff. (min) = 3.56 (ii) 8.95 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.16 0.11 * TOTALS* 1.456 (iii) PEAK FLOW(cms) =1.34TIME TO PEAK(hrs) =12.17RUNOFF VOLUME(mm) =87.91TOTAL RAINFALL(mm) =88.91RUNOFF COEFFICIENT=0.99 0.11 12.17 70.29 88.91 0.79 0.11 12.17 86.15 88.91 0.97 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0005) | AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) | 1 + 2 = 3 | ID1= 1 (0010): 5.06 1.456 12.17 86.15 + ID2= 2 (0003): 11.72 2.719 12.17 78.01 ID = 3 (0005):16.78 4.175 12.17 80.46 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0005)|

_____ ID = 1 (0005): 18.53 4.394 12.17 77.26 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ ____ _____ 1 | CALIB | STANDHYD (0006) | Area (ha) = 1.66 |ID= 1 DT=10.0 min | Total Imp(%)= 75.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 1.25

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 105.20

 Mannings n
 =
 0.013

 0.42 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr) = 108.83 195.94 over (min) 10.00 10.00 Storage Coeff. (min) = 2.55 (ii) 7.94 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.17 0.12 * TOTALS* 0.19 12.17 70.29 88.91 PEAK FLOW 0.25 (cms) = 0.441 (iii) TIME TO PEAK (hrs) =12.17RUNOFF VOLUME (mm) =87.91TOTAL RAINFALL (mm) =88.91RUNOFF COEFFICIENT =0.99 12.17 79.10 88.91 0.79 0.89 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0007) |

 |
 1 + 2 = 3
 |
 AREA
 QPEAK
 TPEAK
 R.V.

 ----- (ha)
 (cms)
 (hrs)
 (mm)

 ID1=
 1
 (0005):
 18.53
 4.394
 12.17
 77.26

 +
 ID2=
 2
 (0006):
 1.66
 0.441
 12.17
 79.10

 ID = 3 (0007): 20.19 4.835 12.17 77.41

			BASEFLOWS	IF ANI.	
RESERVOIR(0008) IN= 2> OUT= 1		FLOW IS OF	ΓF		
DT= 10.0 min	OUTFI	LOW STO	DRAGE	OUTFLOW	STORAGE
	- (cm:	s) (ha	a.m.)	(cms)	(ha.m.)
	0.0	.0 000	0000	1.6050	1.0540
	0.3	560 0.	6274	1.7820	1.1564
	0.7	790 0.	7914	1.9560	1.2783
	1.2	730 0.	8963	0.0000	0.0000
		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0007)	20.190	4.835	5 12.17	77.41
OUTFLOW: ID= 1 (0008)	20.190	0.740	12.67	77.39
	PEAK FLO	W REDUCI	ION [Qout	c/Qin](%)= :	15.44
	TIME SHIFT	OF PEAK B	LOW	(min) = 3	30.00
	MAXIMUM S	TORAGE U	JSED	(ha.m.)=	0.7798

10-Year-Post V V I SSSSS U U A L (v 6.2.2010) V I V SS U U A A L SS V V U U AAAAA L Ι V V SS U U A A L I VV I SSSSS UUUUU A A LLLLL OOO TTTTT TTTTT H H Y Y M M 000 ТΜ Т 0 0 Т н н үү мм мм о о Т 0 0 Т Н Н Ү м м о о Т Т Y 000 Н Н М М ООО Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\e5dfa7e2-7e48-45c7-abe9-bc7da5e3421a\scena Summary filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\e5dfa7e2-7e48-45c7-abe9-bc7da5e3421a\scena DATE: 02/14/2023 TIME: 02:37:15 USER: -----** SIMULATION : 10yr 24hr 10min SCS Type II (** _____ Filename: C:\Users\shuchi\AppD READ STORM | ata\Local\Temp\ 03ddde23-12c1-4881-ac3ee542d956e93c\312c39e7 | Ptotal=103.09 mm | Comments: 10yr 24hr 10min SCS Type II (MTO) _____ RAIN | TIME RAIN | ' TIME TIME RAIN | TIME RATN hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr 0.00 0.00 | 6.17 1.86 | 12.33 14.84 | 18.50 1.86 0.17 1.13 | 6.33 1.86 | 12.50 14.84 | 18.67 1.86

	0.33	1.13 6.50	1.86 12.67	7.63 18.83
1.86	0.50	1.13 6.67	1.86 12.83	7.63 19.00
1.86	0.67		1.86 13.00	7.63 19.17
1.86	0.83		1.86 13.17	
1.86				
1.86	1.00		2.27 13.33	
1.86	1.17		2.27 13.50	
1.86	1.33		2.27 13.67	
1.86	1.50	1.13 7.67	2.27 13.83	4.33 20.00
1.24	1.67	1.13 7.83	2.27 14.00	4.33 20.17
1.24	1.83	1.13 8.00	2.27 14.17	3.09 20.33
1.24	2.00	1.13 8.17	2.68 14.33	3.09 20.50
1.24	2.17	1.34 8.33	2.68 14.50	3.09 20.67
	2.33	1.34 8.50	2.68 14.67	3.09 20.83
1.24	2.50	1.34 8.67	2.89 14.83	3.09 21.00
1.24	2.67	1.34 8.83	2.89 15.00	3.09 21.17
1.24	2.83	1.34 9.00	2.89 15.17	3.09 21.33
1.24	3.00	1.34 9.17	3.30 15.33	3.09 21.50
1.24	3.17	1.34 9.33	3.30 15.50	3.09 21.67
1.24	3.33	1.34 9.50	3.30 15.67	3.09 21.83
1.24	3.50	1.34 9.67	3.71 15.83	3.09 22.00
1.24	3.67	1.34 9.83	3.71 16.00	3.09 22.17
1.24	3.83	1.34 10.00	3.71 16.17	1.86 22.33
1.24	4.00	1.34 10.17	4.74 16.33	1.86 22.50
1.24	4.17		4.74 16.50	
1.24				1.86 22.67
1.24	4.33	1.65 10.50	4.74 16.67	1.86 22.83
1.24	4.50	1.65 10.67	6.39 16.83	1.86 23.00
1.24	4.67	1.65 10.83	6.39 17.00	1.86 23.17

4.83 1.65 | 11.00 6.39 | 17.17 1.86 | 23.33 1.24 5.00 1.65 | 11.17 9.90 | 17.33 1.86 | 23.50 1.24 5.17 1.65 | 11.33 9.90 | 17.50 1.86 | 23.67 1.24 1.65 | 11.50 9.90 | 17.67 1.86 | 23.83 5.33 1.24 5.50 1.65 | 11.67 30.51 | 17.83 1.86 | 24.00 1.24 5.67 1.65 | 11.83 78.35 | 18.00 1.86 | 5.83 1.65 | 12.00 126.18 | 18.17 1.86 | 6.00 1.65 | 12.17 14.84 | 18.33 1.86 | _____ ____ _____ CALIB | NASHYD (0004) | Area (ha) = 1.75 Curve Number (CN) = 80.0 |ID= 1 DT=10.0 min | Ia (mm) = 5.00 # of Linear Res.(N) = 3.00 ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 0.334 PEAK FLOW (cms) = 0.274 (i) TIME TO PEAK (hrs) = 12.167 RUNOFF VOLUME (mm) = 57.996TOTAL RAINFALL (mm) = 103.090 RUNOFF COEFFICIENT = 0.563 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0001) | Area (ha) = 6.37 |ID= 1 DT=10.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i) 2.55 Surface Area (ha) = 3.82 1.00 1.00 (mm) = 1.50 Dep. Storage (%) = Average Slope 2.00 (%) = 1.00(m) = 206.07 40.00 Length Mannings n = 0.013 0.250 Max.Eff.Inten.(mm/hr) = 126.18 133.71 over (min) 10.00 10.00 Storage Coeff. (min) = 3.59 (ii) 9.88 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 0.16 Unit Hyd. peak (cms)= 0.11 * TOTALS* 0.75 PEAK FLOW (cms) = 1.09 1.834 (iii)

TIME TO PEAK (hrs) =12.1712.17RUNOFF VOLUME (mm) =102.0975.3788.73TOTAL RAINFALL (mm) =103.09103.09103.09RUNOFF COEFFICIENT =0.990.730.86 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0009) | Area (ha) = 5.35 |ID= 1 DT=10.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 75.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =4.281.07Dep. Storage(mm) =1.001.50Average Slope(%) =1.002.00Length(m) =188.8640.00Mannings n=0.0130.250 Max.Eff.Inten.(mm/hr) = 126.18 133.71 over (min) 10.00 10.00 Storage Coeff. (min) = 3.41 (ii) 9.69 (Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.16 0.11 9.69 (ii) * TOTALS* PEAK FLOW(cms) =1.380.32TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =102.0975.37TOTAL RAINFALL(mm) =103.09103.09RUNOFF COEFFICIENT=0.990.73 1.692 (iii) 12.17 95.41 103.09 0.93 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0003)|

 |
 1 + 2 = 3
 |
 AREA
 QPEAK
 TPEAK
 R.V.

 ----- (ha)
 (cms)
 (hrs)
 (mm)

ID1= 1 (0001): 6.37 1.834 12.17 88.73 + ID2= 2 (0009): 5.35 1.692 12.17 95.41 _____ ID = 3 (0003): 11.72 3.525 12.1791.78 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ ------| CALIB | STANDHYD (0010) | Area (ha) = 5.06 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =4.81Dep. Storage(mm) =1.00Average Slope(%) =1.00Length(%) =1.00 0.25 $\begin{array}{c} (mm) = & 1.00 & 1.50 \\ (\%) = & 1.00 & 2.00 \\ (m) = & 183.67 & 40.00 \\ = & 0.013 & 0.250 \end{array}$ Length Mannings n Max.Eff.Inten.(mm/hr) = 126.18 231.95 over (min) 10.00 10.00 Storage Coeff. (min) = 3.35 (ii) 8.39 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.16 0.12 * TOTALS* (cms) = 1.56 0.14 (hrs) = 12.17 12.17 PEAK FLOW 1.700 (iii) TIME TO PEAK (hrs)= 12.17

 TIME TO PEAK
 (hrs) =
 12.17
 12.17

 RUNOFF VOLUME
 (mm) =
 102.09
 83.95

 TOTAL RAINFALL
 (mm) =
 103.09
 103.09

 RUNOFF COEFFICIENT =
 0.99
 0.81

 100.28 103.09 0.97 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0005)| | 1 + 2 = 3 |AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) _____ ID1= 1 (0010): 5.06 1.700 12.17 100.28 + ID2= 2 (0003): 11.72 3.525 12.17 91.78 ID = 3 (0005): 16.78 5.226 12.17 94.34NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

_____ | ADD HYD (0005)| AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) | 3 + 2 = 1 | _____ ID1= 3 (0005): 16.78 5.226 12.17 94.34 + ID2= 2 (0004): 1.75 0.274 12.17 58.00 ID = 1 (0005): 18.53 5.499 12.1790.91 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ I | CALIB | STANDHYD (0006) | Area (ha) = 1.66 |ID= 1 DT=10.0 min | Total Imp(%)= 75.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 1.25
 0.42

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 105.20
 40.00

 Mannings n
 =
 0.013
 0.250

 Max.Eff.Inten.(mm/hr)= 126.18 231.95 over (min) 10.00 10.00 Storage Coeff. (min)= 2.40 (ii) 7.44 Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= 0.17 0.13 7.44 (ii) * TOTALS* PEAK FLOW(cms) =0.290.23TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =102.0983.95TOTAL RAINFALL(mm) =103.09103.09RUNOFF COEFFICIENT=0.990.81 0.520 (iii) 12.17 93.02 103.09 103.09 0.90 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^{\star} = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0007)| | 1 + 2 = 3 |AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) -----

ID1= 1 ((+ ID2= 2 ((,	18.53 1.66	0.133		90.91 93.02
======================================	======================================	======= 20.19	6.020	12.17	91.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) IN= 2> OUT= 1	•	LOW IS OF	ſΈ		
DT= 10.0 min	OUTFL	OW STO	DRAGE	OUTFLOW	STORAGE
	(cms) (ha	a.m.)	(cms)	(ha.m.)
	0.00	00 0.			1.0540
			6274		
		90 0.		1.9560	
		30 0.	-	0.0000	
			10000		
		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2	(0007)				
OUTFLOW: ID= 1					
	(,				
	PEAK FLOW	REDUCT	TON [Oout	-/Oinl(%)= '	19 74
	TIME SHIFT				
			JSED	. ,	
				(110 • 111 •)	0.0010

25-Year-Post _____ V V I SSSSS U U A L (v 6.2.2010) V I V SS U U AA L SS V V U U AAAAA L I V V SS U U A A L I VV I SSSSS UUUUU A A LLLLL OOO TTTTT TTTTT H H Y Y M M OOO ТΜ Т 0 0 Т н н үү мм мм о о Т 0 0 Т Н Н Ү м м о о Т Т Y 000 Н Н M M 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\e533238e-bbc7-4fec-807b-c39ddf24577d\scena Summary filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\e533238e-bbc7-4fec-807b-c39ddf24577d\scena ** SIMULATION : 25yr 24hr 10min SCS Type II (** ------READ STORM | Filename: C:\Users\shuchi\AppD 1 ata\Local\Temp\ 03ddde23-12c1-4881-ac3e-e542d956e93c\06899552 | Ptotal=121.70 mm | Comments: 25yr 24hr 10min SCS Type II (MTO) _____ TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr 0.00 | 6.17 0.00 2.19 | 12.33 17.52 | 18.50 2.19 2.19 | 12.50 17.52 | 18.67 0.17 1.34 | 6.33 2.19 0.33 1.34 | 6.50 2.19 | 12.67 9.01 | 18.83 2.19 0.50 1.34 | 6.67 2.19 | 12.83 9.01 | 19.00 2.19 0.67 1.34 | 6.83 2.19 | 13.00 9.01 | 19.17 2.19

	0.83	1.34 7.00	2.19 13.17	6.57 19.33
2.19	1.00	1.34 7.17	2.68 13.33	6.57 19.50
2.19	1.17	1.34 7.33	2.68 13.50	6.57 19.67
2.19	1.33	1.34 7.50	2.68 13.67	5.11 19.83
2.19	1.50	1.34 7.67	2.68 13.83	5.11 20.00
2.19	1.67	1.34 7.83	2.68 14.00	5.11 20.17
1.46	1.83	1.34 8.00	2.68 14.17	3.65 20.33
1.46	2.00	1.34 8.17	3.16 14.33	3.65 20.50
1.46	2.17	1.58 8.33	3.16 14.50	3.65 20.67
1.46	2.33	1.58 8.50	3.16 14.67	3.65 20.83
1.46	2.50	1.58 8.67	3.41 14.83	3.65 21.00
1.46	2.67	1.58 8.83	3.41 15.00	3.65 21.17
1.46	2.83	1.58 9.00	3.41 15.17	3.65 21.33
1.46	3.00	1.58 9.17	3.89 15.33	3.65 21.50
1.46	3.17	1.58 9.33	3.89 15.50	3.65 21.67
1.46	3.33	1.58 9.50	3.89 15.67	3.65 21.83
1.46	3.50	1.58 9.67	4.38 15.83	3.65 22.00
1.46	3.67	1.58 9.83	4.38 16.00	3.65 22.17
1.46	3.83		4.38 16.17	
1.46	4.00	1.58 10.17	5.60 16.33	2.19 22.50
1.46	4.17	1.95 10.33	5.60 16.50	2.19 22.67
1.46	4.33	1.95 10.50	5.60 16.67	2.19 22.83
1.46	4.50	1.95 10.67	7.55 16.83	2.19 23.00
1.46	4.67	1.95 10.83	7.55 17.00	2.19 23.17
1.46	4.83	1.95 11.00	7.55 17.17	2.19 23.33
1.46	5.00	1.95 11.17	11.68 17.33	2.19 23.50
1.46	5.17	1.95 11.33	11.68 17.50	2.19 23.67
1.46	. ⊥ /	1.30 11.00		

5.33 1.95 | 11.50 11.68 | 17.67 2.19 | 23.83 1.46 5.50 1.95 | 11.67 36.02 | 17.83 2.19 | 24.00 1.46 5.67 1.95 | 11.83 92.49 | 18.00 2.19 | 1.95 | 12.00 148.96 | 18.17 2.19 | 5.83 6.00 1.95 | 12.17 17.52 | 18.33 2.19 | _____ | CALIB | | NASHYD (0004) | Area (ha) = 1.75 Curve Number (CN) = 80.0 |ID= 1 DT=10.0 min | Ia (mm) = 5.00 # of Linear Res.(N) = 3.00 ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 0.334 PEAK FLOW (cms) = 0.348 (i) (hrs) = 12.167 TIME TO PEAK RUNOFF VOLUME (mm) = 73.612 TOTAL RAINFALL (mm) = 121.700 RUNOFF COEFFICIENT = 0.605 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0001) | Area (ha) = 6.37 |ID= 1 DT=10.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 3.82

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 206.07

 Mannings n
 =
 0.013

 2.55 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr)= 148.96 163.27 over (min) 10.00 10.00 Storage Coeff. (min)= 3.36 (ii) 9.16 9.16 (ii)

 Storage coeff.
 (min) =
 3.30 (ii)
 3.10

 Unit Hyd.
 Tpeak (min) =
 10.00
 10.00

 0.11 Unit Hyd. peak (cms) = 0.16 * TOTALS* PEAK FLOW(cms) =1.29TIME TO PEAK(hrs) =12.17RUNOFF VOLUME(mm) =120.70TOTAL PAINEALL(mm) =121.70 0.94 12.17 92.86 121.70 0.94 2.227 (iii) 12.17 106.78 121.70 121.70 TOTAL RAINFALL (mm) = 0.99 RUNOFF COEFFICIENT = 0.76 0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0009) | Area (ha) = 5.35 |ID= 1 DT=10.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 75.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =4.281.07Dep. Storage(mm) =1.001.50Average Slope(%) =1.002.00Length(m) =188.8640.00Mannings n=0.0130.250 Max.Eff.Inten.(mm/hr) = 148.96 163.27 over (min) 10.00 10.00 Storage Coeff. (min) = 3.19 (ii) 8.99 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.16 0.11 * TOTALS*

 PEAK FLOW (cms) =
 1.63
 0.40
 2.027

 TIME TO PEAK (hrs) =
 12.17
 12.17
 12.17

 RUNOFF VOLUME (mm) =
 120.70
 92.86
 113.74

 TOTAL RAINFALL (mm) =
 121.70
 121.70
 121.70

 RUNOFF COEFFICIENT =
 0.99
 0.76
 0.93

 2.027 (iii) ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^{\star} = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ ____ | ADD HYD (0003)| _____ ID = 3 (0003): 11.72 4.255 12.17 109.96NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

_____ | CALIB | | STANDHYD (0010) | Area (ha) = 5.06 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.81

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 183.67

 Mannings n
 =
 0.013

 0.25 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr) = 148.96 279.06 over (min) 10.00 10.00 Storage Coeff. (min) = 3.14 (ii) 7.82 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.16 0.12 * TOTALS* PEAK FLOW(cms) =1.850.17TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =120.70102.04TOTAL RAINFALL(mm) =121.70121.70RUNOFF COEFFICIENT=0.990.84 2.021 (iii) 12.17 118.83 121.70 0.98 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ | ADD HYD (0005)|

 + 2 = 3
 |
 AREA
 QPEAK
 TPEAK
 R.V.

 ----- (ha)
 (cms)
 (hrs)
 (mm)

 ID1= 1
 (0010):
 5.06
 2.021
 12.17
 118.83

 + ID2= 2
 (0003):
 11.72
 4.255
 12.17
 109.96

 | 1 + 2 = 3 | | 1 + 2 = 3 | ID = 3 (0005):16.78 6.276 12.17 112.63 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ | ADD HYD (0005)| 3 + 2 = 1 AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) _____

ID1= 3 (0005): 16.78 6.276 12.17 112.63 + ID2= 2 (0004): 1.75 0.348 12.17 73.61 _____ ID = 1 (0005): 18.53 6.624 12.17 108.95 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ ------| CALIB | STANDHYD (0006) | Area (ha) = 1.66 |ID= 1 DT=10.0 min | Total Imp(%)= 75.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =1.25Dep. Storage(mm) =1.00Average Slope(%) =1.00Leneth(%) =1.00 0.42 $\begin{array}{ll} (mm) = & 1.00\\ (\%) = & 1.00\\ (\%) = & 105.20\\ = & 0.013 \end{array}$ 1.50 2.00 Length 40.00 Mannings n 0.250 Max.Eff.Inten.(mm/hr) = 148.96 279.06 over (min) 10.00 10.00 Storage Coeff. (min) = 2.25 (ii) 6.93 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.17 0.13 * TOTALS* (cms) = 0.34 0.28 (hrs) = 12.17 12.17 PEAK FLOW 0.625 (iii) TIME TO PEAK 12.17 (hrs)= 12.1/ 102.04 121.70 TIME TO PEAK(hrs) =12.17RUNOFF VOLUME(mm) =120.70TOTAL RAINFALL(mm) =121.70RUNOFF COEFFICIENT=0.99 111.37 121.70 0.84 0.92 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0007) | | 1 + 2 = 3 |AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) _____ ID1= 1 (0005): 18.53 6.624 12.17 108.95 + ID2= 2 (0006): 1.66 0.625 12.17 111.37 ID = 3 (0007): 20.19 7.249 12.17 109.15 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) OVERFLOW IS OFF						
IN= 2> OUT= 1						
DT= 10.0 min	OUTFL	OW STOF	RAGE	OUTFLOW	STORAGE	
	(cms) (ha.	m.)	(cms)	(ha.m.)	
	0.00	00 0.0	0000	1.6050	1.0540	
	0.35	60 0.6	5274	1.7820	1.1564	
	0.77	90 0.7	914	1.9560	1.2783	
	1.27	30 0.8	963	0.0000	0.0000	
		AREA	QPEAK	TPEAK	R.V.	
		(ha)	(cms)	(hrs)	(mm)	
INFLOW : ID= 2	(0007)	20.190	7.249	12.17	109.15	
OUTFLOW: ID= 1	(0008)	20.190	1.549	12.33	109.13	
	PEAK FLOW	REDUCTI	ON [Qout/	′Qin](%)= 2	1.37	
TIME SHIFT OF PEAK FLOW (min) = 10.00					0.00	
	MAXIMUM ST	ORAGE US	ED	(ha.m.)=	1.0349	

50-Year-Post V V I SSSSS U U A L (v 6.2.2010) V I U U AA L V SS SS U U AAAAA L V V Ι V V SS U U A A L I VV I SSSSS UUUUU A A LLLLL OOO TTTTT TTTTT H H Y Y M M OOO ΤM ООТ ТННҮҮ ММ ММОО Т 0 0 Т Н Н Ү м м о о Т Т Н Н Ү М М ООО 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\e9dd6c69-ea78-4297-b73c-f8c1ab7ae385\scena Summary filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\e9dd6c69-ea78-4297-b73c-f8c1ab7ae385\scena _____ _____ ** SIMULATION : 50yr 24hr 10min SCS Type II (** _____ Filename: C:\Users\shuchi\AppD 1 READ STORM ata\Local\Temp\ 03ddde23-12c1-4881-ac3e-e542d956e93c\5b4e85d6 | Ptotal=134.56 mm | Comments: 50yr 24hr 10min SCS Type II (MTO) _____ ____ TIME RAIN | TIME RAIN | ' TIME RAIN | TIME RAIN hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr 0.00 0.00 | 6.17 2.42 | 12.33 19.38 | 18.50 2.42 0.17 1.48 | 6.33 2.42 | 12.50 19.38 | 18.67 2.42 0.33 1.48 | 6.50 2.42 | 12.67 9.96 | 18.83 2.42 0.50 1.48 | 6.67 2.42 | 12.83 9.96 | 19.00 2.42

2.42	0.67	1.48 6.83	2.42 13.00	9.96 19.17
2.42	0.83	1.48 7.00	2.42 13.17	7.27 19.33
2.42	1.00	1.48 7.17	2.96 13.33	7.27 19.50
	1.17	1.48 7.33	2.96 13.50	7.27 19.67
2.42	1.33	1.48 7.50	2.96 13.67	5.65 19.83
2.42	1.50	1.48 7.67	2.96 13.83	5.65 20.00
2.42	1.67	1.48 7.83	2.96 14.00	5.65 20.17
1.61	1.83	1.48 8.00	2.96 14.17	4.04 20.33
1.61	2.00	1.48 8.17	3.50 14.33	4.04 20.50
1.61	2.17	1.75 8.33	3.50 14.50	4.04 20.67
1.61	2.33	1.75 8.50	3.50 14.67	
1.61	2.50	1.75 8.67		
1.61	2.67	1.75 8.83	3.77 15.00	
1.61				
1.61	2.83	1.75 9.00	3.77 15.17	
1.61	3.00		4.31 15.33	
1.61	3.17		4.31 15.50	
1.61	3.33	1.75 9.50	4.31 15.67	4.04 21.83
1.61	3.50	1.75 9.67	4.84 15.83	4.04 22.00
1.61	3.67	1.75 9.83	4.84 16.00	4.04 22.17
1.61	3.83	1.75 10.00	4.84 16.17	2.42 22.33
1.61	4.00	1.75 10.17	6.19 16.33	2.42 22.50
1.61	4.17	2.15 10.33	6.19 16.50	2.42 22.67
	4.33	2.15 10.50	6.19 16.67	2.42 22.83
1.61	4.50	2.15 10.67	8.34 16.83	2.42 23.00
1.61	4.67	2.15 10.83	8.34 17.00	2.42 23.17
1.61	4.83	2.15 11.00	8.34 17.17	2.42 23.33
1.61	5.00	2.15 11.17	12.92 17.33	2.42 23.50
1.61				

5.17 2.15 | 11.33 12.92 | 17.50 2.42 | 23.67 1.61 5.33 2.15 | 11.50 12.92 | 17.67 2.42 | 23.83 1.61 5.50 2.15 | 11.67 39.83 | 17.83 2.42 | 24.00 1.61 5.67 2.15 | 11.83 102.27 | 18.00 2.42 | 5.83 2.15 | 12.00 164.70 | 18.17 2.42 | 6.00 2.15 | 12.17 19.38 | 18.33 2.42 | _____ ____ _____ | CALIB | | NASHYD (0004) | Area (ha) = 1.75 Curve Number (CN) = 80.0 |ID= 1 DT=10.0 min | Ia (mm) = 5.00 # of Linear Res.(N) = 3.00 | NASHYD (0004)| Area ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 0.334 PEAK FLOW (cms) = 0.400 (i) TIME TO PEAK (hrs) = 12.167RUNOFF VOLUME (mm) = 84.687 TOTAL RAINFALL (mm) = 134.560RUNOFF COEFFICIENT = 0.629 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0001) | Area (ha) = 6.37 |ID= 1 DT=10.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 3.82

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 206.07

 Mannings n
 =
 0.013

 2.55 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr) = 164.70 183.71

 over (min)
 10.00
 10.00

 Storage Coeff. (min) =
 3.23 (ii)
 8.76 (ii)

 Unit Hyd. Tpeak (min) =
 10.00
 10.00

 Unit Hyd. peak (cms) =
 0.16
 0.12

 * TOTALS* (cms) = 1.45(2mc) = 12.171.431.0712.1712.17133.56105.10134.56134.56 PEAK FLOW 2.501 (iii) TIME TO PEAK 12.17 RUNOFF VOLUME(mm) =133.56TOTAL RAINFALL(mm) =134.56RUNOFF COEFFICIENT0.99 119.33 134.56 0.78 0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0009) | Area (ha) = 5.35 |ID= 1 DT=10.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 75.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.28
 1.07

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 188.86
 40.00

 Mannings n
 =
 0.013
 0.250

 Max.Eff.Inten.(mm/hr) = 164.70 183.71 over (min) 10.00 10.00 Storage Coeff. (min) = 3.06 (ii) 8.60 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.16 0.12 * TOTALS*

 PEAK FLOW
 (cms) =
 1.81
 0.45
 2.260

 TIME TO PEAK
 (hrs) =
 12.17
 12.17
 12.17

 RUNOFF VOLUME
 (mm) =
 133.56
 105.10
 126.44

 TOTAL RAINFALL
 (mm) =
 134.56
 134.56
 134.56

 RUNOFF COEFFICIENT
 0.99
 0.78
 0.94

 2.260 (iii) ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EOUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. ____ _____ | ADD HYD (0003) | ID = 3 (0003): 11.72 4.762 12.17 122.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

_____ _____ | CALIB | STANDHYD (0010) | Area (ha) = 5.06 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.81

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 183.67

 Mannings n
 =
 0.013

 0.25 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr) = 164.70 311.52 over (min) 10.00 10.00 Storage Coeff. (min) = 3.01 (ii) 7.49 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.16 0.13 * TOTALS* PEAK FLOW(cms) =2.050.19TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =133.56114.61TOTAL RAINFALL(mm) =134.56134.56RUNOFF COEFFICIENT=0.990.85 2.243 (iii) 12.17 131.66 134.56 0.98 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0005) | AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) | 1 + 2 = 3 | 5.06 2.243 12.17 131.66 ID1 = 1 (0010):+ ID2= 2 (0003): 11.72 4.762 12.17 122.58 ID = 3 (0005):16.78 7.005 12.17 125.32 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____

| ADD HYD (0005)|

_____ ID = 1 (0005): 18.53 7.405 12.17 121.48 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ ____ _____ 1 | CALIB | STANDHYD (0006) | Area (ha) = 1.66 |ID= 1 DT=10.0 min | Total Imp(%)= 75.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i) 0.42

 Surface Area
 (ha) =
 1.25

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 105.20

 Mannings n
 =
 0.013

 1.50 2.00 2.00 40.00 2.50 Max.Eff.Inten.(mm/hr) = 164.70 311.52 over (min) 10.00 10.00 Storage Coeff. (min) = 2.16 (ii) 6.64 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.17 0.13 * TOTALS* PEAK FLOW(cms) =0.380.32TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =133.56114.61TOTAL RAINFALL(mm) =134.56134.56RUNOFF COEFFICIENT=0.990.85 0.698 (iii) 12.17 124.08 134.56 0.92 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0007) | ID = 3 (0007): 20.19 8.103 12.17 121.69

NOTE: PEAK F	LOWS DO NO!	INCLUDE	BASEFLOW	S IF AI	NY.	
RESERVOIR(0008 IN= 2> OUT= 1		RFLOW IS O	FF			
DT= 10.0 min	OUTI	FLOW STO	DRAGE	OUT	FLOW	STORAGE
	(cr	ns) (h	a.m.)	(CI	ms)	(ha.m.)
	0.0	0 0000	.0000	1.	6050	1.0540
	0.3	3560 0	.6274	1.	7820	1.1564
	0.	7790 0	.7914	1.	9560	1.2783
	1.2	2730 0	.8963	0.0	0000	0.0000
			QPEAK (cms)			R.V. (mm)
INFLOW : ID= 2	(0007)					
OUTFLOW: ID= 1						
PEAK FLOW REDUCTION [Qout/Qin](%)= 21.52						
		F OF PEAK				
	MAXIMUM S	STORAGE	JSED	(ha	.m.) = 1	1.1408

100-Year-Post V V I SSSSS U U A L (v 6.2.2010) V I V SS U U A A L SS U AAAAA L V V Ι U V V SS U U A A L I VV I SSSSS UUUUU A A LLLLL ΟΟΟ ΤΤΤΤΤ ΤΤΤΤΤ Η Н Ү Ү М М 000 ТΜ Т Н Н ҮҮ ММ ММ О О Т 0 0 Т 0 0 Т Н Н Ү м м о 0 Т Y 000 Т н н M M 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2021 Smart City Water Inc All rights reserved. ***** DETAILED OUTPUT ***** Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat Output filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\2d9ac17e-7051-47f4-9aaf-49e3be44a95b\scena Summary filename: C:\Users\shuchi\AppData\Local\Civica\VH5\7b32db7dcfd4-42bf-b204-af6a18cc82b1\2d9ac17e-7051-47f4-9aaf-49e3be44a95b\scena ** SIMULATION : 100yr 24hr 10min SCS Type II ** **** ------READ STORM Filename: C:\Users\shuchi\AppD 1 ata\Local\Temp\ 03ddde23-12c1-4881-ac3e-e542d956e93c\7c511a0b | Ptotal=145.92 mm | Comments: 100yr 24hr 10min SCS Type II (MTO) _____ RAIN | TIME RAIN | ' TIME RAIN | TIME TIME RAIN mm/hr | hrs mm/hr | hrs mm/hr | hrs hrs mm/hr 0.00 | 6.17 0.00 2.63 | 12.33 21.01 | 18.50 2.63 0.17 1.61 | 6.33 2.63 | 12.50 21.01 | 18.67 2.63 0.33 1.61 | 6.50 2.63 | 12.67 10.80 | 18.83 2.63 0.50 1.61 | 6.67 2.63 | 12.83 10.80 | 19.00 2.63 1.61 | 6.83 2.63 | 13.00 10.80 | 19.17 0.67 2.63

	0.83	1.61 7.00	2.63 13.17	7.88 19.33
2.63	1.00	1.61 7.17	3.21 13.33	7.88 19.50
2.63	1.17	1.61 7.33	3.21 13.50	7.88 19.67
2.63	1.33	1.61 7.50	3.21 13.67	6.13 19.83
2.63	1.50	1.61 7.67	3.21 13.83	6.13 20.00
2.63	1.67	1.61 7.83	3.21 14.00	6.13 20.17
1.75	1.83		3.21 14.17	
1.75	2.00		3.79 14.33	
1.75	2.17		3.79 14.50	
1.75	2.33		3.79 14.67	
1.75			4.09 14.83	
1.75	2.50			
1.75	2.67		4.09 15.00	
1.75	2.83		4.09 15.17	
1.75	3.00		4.67 15.33	
1.75	3.17		4.67 15.50	
1.75	3.33	1.90 9.50	4.67 15.67	4.38 21.83
1.75	3.50	1.90 9.67	5.25 15.83	4.38 22.00
1.75	3.67	1.90 9.83	5.25 16.00	4.38 22.17
1.75	3.83	1.90 10.00	5.25 16.17	2.63 22.33
1.75	4.00	1.90 10.17	6.71 16.33	2.63 22.50
1.75	4.17	2.33 10.33	6.71 16.50	2.63 22.67
1.75	4.33	2.33 10.50	6.71 16.67	2.63 22.83
	4.50	2.33 10.67	9.05 16.83	2.63 23.00
1.75	4.67	2.33 10.83	9.05 17.00	2.63 23.17
1.75	4.83	2.33 11.00	9.05 17.17	2.63 23.33
1.75	5.00	2.33 11.17	14.01 17.33	2.63 23.50
1.75	5.17	2.33 11.33	14.01 17.50	2.63 23.67
1.75				

5.33 2.33 | 11.50 14.01 | 17.67 2.63 | 23.83 1.75 5.50 2.33 | 11.67 43.19 | 17.83 2.63 | 24.00 1.75 5.67 2.33 | 11.83 110.90 | 18.00 2.63 | 2.33 | 12.00 178.61 | 18.17 2.63 | 5.83 6.00 2.33 | 12.17 21.01 | 18.33 2.63 | _____ | CALIB | | NASHYD (0004) | Area (ha) = 1.75 Curve Number (CN) = 80.0 |ID= 1 DT=10.0 min | Ia (mm) = 5.00 # of Linear Res.(N) = 3.00 ----- U.H. Tp(hrs) = 0.20 Unit Hyd Qpeak (cms) = 0.334 PEAK FLOW (cms) = 0.447 (i) (hrs) = 12.167 TIME TO PEAK RUNOFF VOLUME (mm) = 94.621 TOTAL RAINFALL (mm) = 145.920 RUNOFF COEFFICIENT = 0.648 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0001) | Area (ha) = 6.37 |ID= 1 DT=10.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 3.82

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 206.07

 Mannings n
 =
 0.013

 2.55 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr)= 178.61 201.76 over (min) 10.00 10.00 Storage Coeff. (min)= 3.13 (ii) 8.46 Unit Hyd. Tpeak (min) =3.13 (ii)8.46Unit Hyd. peak (cms) =10.0010.00 8.46 (ii) 0.12 * TOTALS*

 PEAK FLOW
 (cms) =
 1.55

 TIME TO PEAK
 (hrs) =
 12.17

 RUNOFF VOLUME
 (mm) =
 144.92

 TOTAL RAINFALL
 (mm) =
 145.92

 1.19 12.17 115.98 145.92 2.744 (iii) 12.17 130.45 145.92 0.99 RUNOFF COEFFICIENT = 0.79 0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | CALIB | | STANDHYD (0009) | Area (ha) = 5.35 |ID= 1 DT=10.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 75.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.28
 1.07

 Dep. Storage
 (mm) =
 1.00
 1.50

 Average Slope
 (%) =
 1.00
 2.00

 Length
 (m) =
 188.86
 40.00

 Mannings n
 =
 0.013
 0.250

 Max.Eff.Inten.(mm/hr)= 178.61 201.76 over (min) 10.00 10.00 Storage Coeff. (min)= 2.97 (ii) 8.30 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= 0.16 0.12 * TOTALS* PEAK FLOW(cms) =1.960.50TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =144.92115.98TOTAL RAINFALL(mm) =145.92145.92RUNOFF COEFFICIENT=0.990.79 2.466 (iii) 12.17 137.68 145.92 0.94 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^{\star} = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ ____ | ADD HYD (0003)| _____ ID = 3 (0003): 11.72 5.211 12.17 133.75NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

_____ | CALIB | | STANDHYD (0010) | Area (ha) = 5.06 |ID= 1 DT=10.0 min | Total Imp(%)= 95.00 Dir. Conn.(%)= 90.00 _____ IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 4.81

 Dep. Storage
 (mm) =
 1.00

 Average Slope
 (%) =
 1.00

 Length
 (m) =
 183.67

 Mannings n
 =
 0.013

 0.25 1.50 2.00 40.00 0.250 Max.Eff.Inten.(mm/hr) = 178.61 340.12 over (min) 10.00 10.00 Storage Coeff. (min) = 2.92 (ii) 7.24 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.16 0.13 * TOTALS* PEAK FLOW(cms) =2.230.21TIME TO PEAK(hrs) =12.1712.17RUNOFF VOLUME(mm) =144.92125.75TOTAL RAINFALL(mm) =145.92145.92RUNOFF COEFFICIENT=0.990.86 2.439 (iii) 12.17 143.00 145.92 0.98 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 85.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ | ADD HYD (0005)|

 + 2 = 3
 |
 AREA
 QPEAK
 TPEAK
 R.V.

 ----- (ha)
 (cms)
 (hrs)
 (mm)

 ID1= 1
 (0010):
 5.06
 2.439
 12.17
 143.00

 + ID2= 2
 (0003):
 11.72
 5.211
 12.17
 133.75

 | 1 + 2 = 3 | | 1 + 2 = 3 | ID = 3 (0005):16.78 7.650 12.17 136.54 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ _____ | ADD HYD (0005)| 3 + 2 = 1 AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) _____

ID1= 3 (0005): 16.78 7.650 12.17 136.54 + ID2= 2 (0004): 1.75 0.447 12.17 94.62 _____ ID = 1 (0005): 18.53 8.097 12.17 132.58 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. _____ ------| CALIB | STANDHYD (0006) | Area (ha) = 1.66 |ID= 1 DT=10.0 min | Total Imp(%)= 75.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =1.25Dep. Storage(mm) =1.00Average Slope(%) =1.00Leneth(%) =1.00 0.42 (mm) = 1.00 (%) = 1.00 (m) = 105.20 = 0.0131.50 2.00 40.00 Length Mannings n 0.250 Max.Eff.Inten.(mm/hr) = 178.61 340.12 over (min) 10.00 10.00 Storage Coeff. (min) = 2.09 (ii) 6.41 (ii) Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = 0.17 0.13 * TOTALS* (cms) = 0.41 0.35 (hrs) = 12.17 12.17 PEAK FLOW 0.762 (iii) RUNOFF VOLUME(mm) =12.17RUNOFF VOLUME(mm) =144.92TOTAL RAINFALL(mm) =145.92RUNOFF COEFFICIENT=0.99 TIME TO PEAK 12.17 12.17 125.76 145.92 135.34 145.92 0.86 0.93 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ _____ | ADD HYD (0007) | | 1 + 2 = 3 |AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) _____ ID1= 1 (0005): 18.53 8.097 12.17 132.58 + ID2= 2 (0006): 1.66 0.762 12.17 135.34 ID = 3 (0007): 20.19 8.859 12.17 132.81 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) IN= 2> OUT= 1	OVERFLOW	N IS OFF			
DT= 10.0 min	OUTFLOW	STORAGE	G	OUTFLOW	STORAGE
	(cms)	(ha.m.)		(cms)	(ha.m.)
	0.0000	0.0000)	1.6050	1.0540
	0.3560	0.6274	1	1.7820	1.1564
	0.7790	0.7914	1	1.9560	1.2783
	1.2730	0.8963	3	0.0000	0.0000
	2	AREA QI	PEAK	TPEAK	R.V.
		(ha) (c	cms)	(hrs)	(mm)
INFLOW : ID= 2 (0007) 20	0.190	8.859	12.17	132.81
OUTFLOW: ID= 1 (0008) 20	0.190	1.896	12.33	132.79
P	EAK FLOW	REDUCTION	[Qout,	/Qin](%)= 2	21.40
Т	IME SHIFT OF	PEAK FLOW			
M.	AXIMUM STORA	AGE USED		(ha.m.)=	1.2426
FINISH					

Roof Top & Rear Yard Drainge to Infiltration Trenches :

- Assume infiltration trenches to collect roof runoff from half of the lot areas
- Assume infiltration media = gravel with 40% void ratio
- Calculations for cross-sectional area of trenches is given below :

Total Area draining to Trenches = 12.00 Ha

Rainfall data for the below calculations is extracted from Environmental Canada's historical weather data for Fergus Shand Dam Station Id : 6142400

Rainfall Data									
Events	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep
> = 0.2mm	4.70	4.50	7.40	12.90	14.30	12.00	11.50	12.40	13.90
> = 5mm	1.80	1.60	2.60	4.30	5.10	4.90	5.20	4.60	5.40
> = 10mm	1.00	0.77	1.30	2.10	3.10	3.00	3.20	3.00	3.00
> = 25mm	0.08	0.23	0.04	0.27	0.54	0.77	0.77	1.10	0.62

Trench Calculations											
			Average		T	Trench		Cumulative			
Storm Events	То	Storm Events	Depth of Events	No. of Events per Year	Infiltration Depth per event	Infiltration Volume per event	Infiltration Volume per event	Infiltration Volume per Year	Infiltration Volume per Year	Swale overflow	
Col A		Col B	Col C	Col D	Col E	Col F	Col G	Col H	Col I	Col F	
						(Col E x Area)		(Col F x Col D)			
(mm)		(mm)	(mm)		(mm)	(m ³)	(m ³)	(m ³)	(m ³)	(mm)	
0.2	-	5	2.6	129.7	2.60	312.00	312.00	40,466	40,466	0	
5.0	-	10	7.5	48.0	7.50	900.00	1212.00	43,200	83,666	0	
10.0	-	25	17.5	26.6	7.50	900.00	2112.00	23,940	107,606	10	
25.0	-	50	37.5	5.3	7.50	900.00	3012.00	4,770	112,376	30	

Required	
Infiltration Trench Length Required	1,000 m
Infiltration Trench Width	1.50 m
Infiltration Trench Height	1.50 m
Infiltration Trench Absolute Volume	2,250.00 m ³
Porosity Of Filter Material	0.40
Infiltration Trench Net Volume	900.00 m ³
Provided	
Infiltration Trench Length Provided	1100 m
Infiltration Trench Width	1.50 m
Infiltration Trench Height	1.50 m
Infiltration Trench Absolute Volume	2,475.00 m ³
Porosity Of Filter Material	0.40
Infiltration Trench Net Volume	990.00 m ³

ì	Satisfies Infiltration Deficit target of 40,805 m ³ /year
---	---

APPENDIX "F"

Stittmater SWM Report

Stormwater Management Report & Design Drawings Proposed Strittmatter Subdivision Village of Hillsburgh, Town of Erin

July 2000

RJB File: S-405

Prepared For: Triton Engineering

Prepared By: Burnside Development Services A Division of R. J. Burnside & Associates Limited 8500 Torbram Road, Suite 56 BRAMPTON, ON L6T 5C6

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Appendix

Appendix A	SWMHYMO Modelling Results (Post Strittmatter Development)						
Appendix B	SWMHYMO Modelling Results (Ultimate Condition - Post McMurchy						
	Development)						

1.0 Introduction

The proposed Strittmatter residential development (Figure 1) is located in the north end of the Village of Hillsburgh, Town of Erin (formerly Township of Erin). Andrew Brodie & Associates Inc. prepared a hydrologic analysis and preliminary stormwater management study for this development in June 1987. That report was updated in January of 1988.

This report uses Brodie's findings as background for the detailed grading design and drainage systems. In order to accurately address the stormwater management concerns, significant revisions have been made to Pond 1 and its hydrologic modelling. This report addresses the peak flow quantity control, erosion and sediment control during construction and reflects the modifications to design and hydrologic modelling of Pond 1.

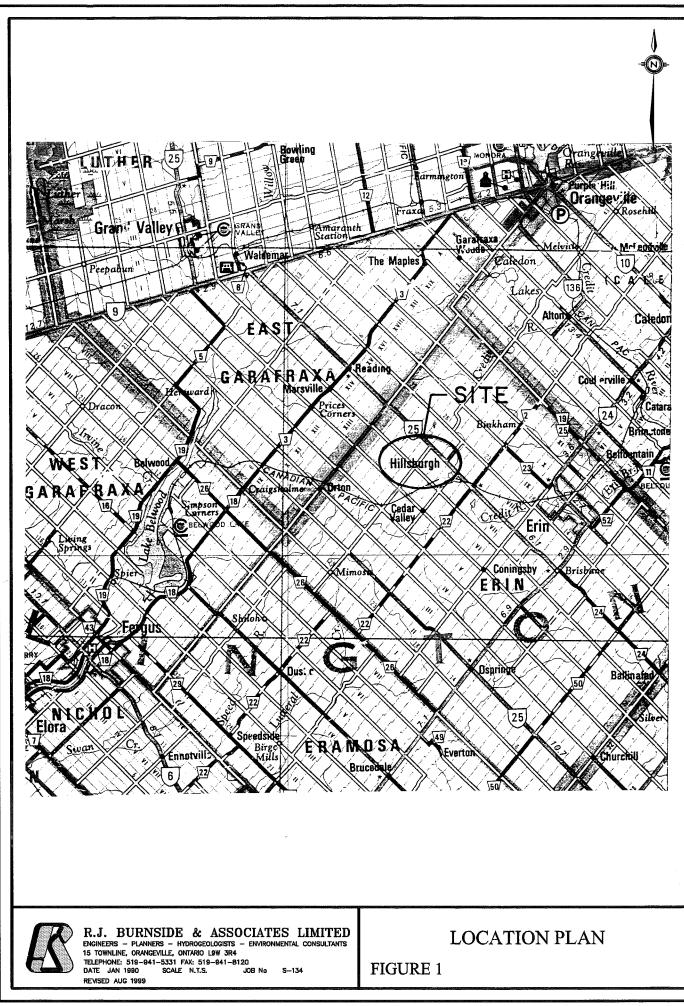
2.0 Site Description

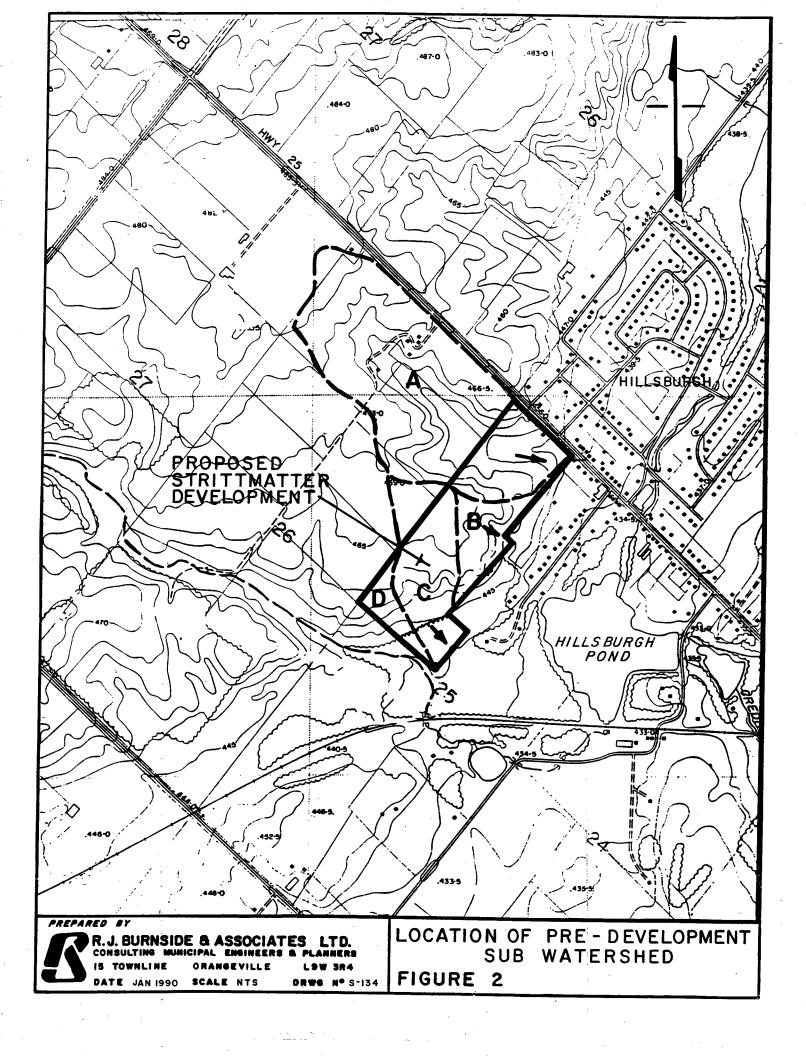
The proposed Strittmatter development is located within the watershed of the Credit River. Drainage from the subject lands flows southerly, outletting into an existing pond in the Village referred to as the Hillsburgh Pond. The flow from the pond discharges into the Erin branch of the Credit River.

The drainage areas for the property are delineated in Figure 2. Sub-area A drains to the southeast corner of the property, continuing southward through a culvert under George Street, and eventually into the Hillsburgh pond. The remainder of the development area, sub-areas B, C and D drain westerly to a second outlet, which also discharges into the Hillsburgh pond.

The existing land is agricultural and mainly used for pasture. The proposed development consists of single family residential housing. The Ministry of Natural Resources has requested that the treed area in the southwest corner of the development remain undisturbed. This area has been zoned as open space and forms part of Lot 30.

The soils in this area consist of sandy loam and are classified in hydrologic soil Group A. The site is fairly hilly with slopes ranging from approximately four percent in the east to approximately twenty percent in the south.





3.0 Hydrology

The Credit Valley Conservation Authority require that the post-development peak flows do not exceed the pre-development levels. This has been used as the design criteria for the detention ponds.

3.1 Pre-development Hydrologic Parameters

The pre-development flows were calculated using the OTTHYMO hydrologic computer model with the NASHYD sub-routine designed for use with rural areas. The characteristics of sub-watersheds A, B, C and D for pre-development conditions are listed in Table 1.

Table 1 Pre-Development Parameters									
Sub-Watershed	Area (ha.)	CN	Slope (%)	Tp (hr.)					
А	26.7	58	5.0	0.30					
В	3.44	64	8.0	0.08					
С	7.32	64	6.0	0.12					
D	1.61	64	6.0	0.11					

3.2 Post Development Conditions

Following development of the Strittmatter property, drainage area A will be somewhat different than for pre-development conditions. The upstream lands (22.4 hectares), including the McMurchy farm, will continue to drain through the Strittmatter development. However, a separate storage facility is proposed for this drainage area, to be located on the McMurchy lands. This facility will release runoff very slowly into Pond 1 of the Strittmatter development.

Furthermore, approximately 3.3 hectares of drainage from County Road 24 will also be routed through Pond 1 in an effort to reduce peak flows in the County stormsewer. Hydrologic studies completed by Triton Engineering Services Limited in 1998 on the County stormsewer indicated that, while having sufficient capacity in the steep sections, the stormsewer is under surcharge where the gradient is reduced near the Credit River (across from the Hillsburgh arena) for a 5 year storm event. By routing it through Pond 1 on the Strittmatter property, flows are reduced significantly.

To this date, the CVC has been concerned with Pond 1 outletting to the natural outlet, a swale which drains through several backyards, before flowing under an existing house on George Street. The CVC has previously requested, as a condition of Draft Plan approval, that Mr. Strittmatter secure

easements along the swale to the Hillsburgh Pond in order to have access in the event of a flooding or potential flooding problem. Costs to secure the easements were prohibitive and Mr. Strittmatter chose to consider alternative drainage options.

The additional controls now provided by the McMurchy facility, the diversion of County Road drainage and the enlargement of Pond 1 into the area previously occupied by Lot 1 has reduced Mr. Strittmatter's runoff rates to a level which has permitted the routing of Pond 1 away from the natural outlet towards the County Road system without any adverse impacts. In fact, the 5 year flows in the County sewer are still significantly lower than pre-development rates and the 100 year flow at the outlet to the Credit River is lower also.

Routing the County Road drainage through Mr. Strittmatter's pond, as previously discussed, has the added benefit of providing some level of water quality treatment for this otherwise untreated runoff. As the West Credit River is the direct receiver of this road drainage, the water quality treatment aspect of the diversion is considered to be as important as the flow attenuation.

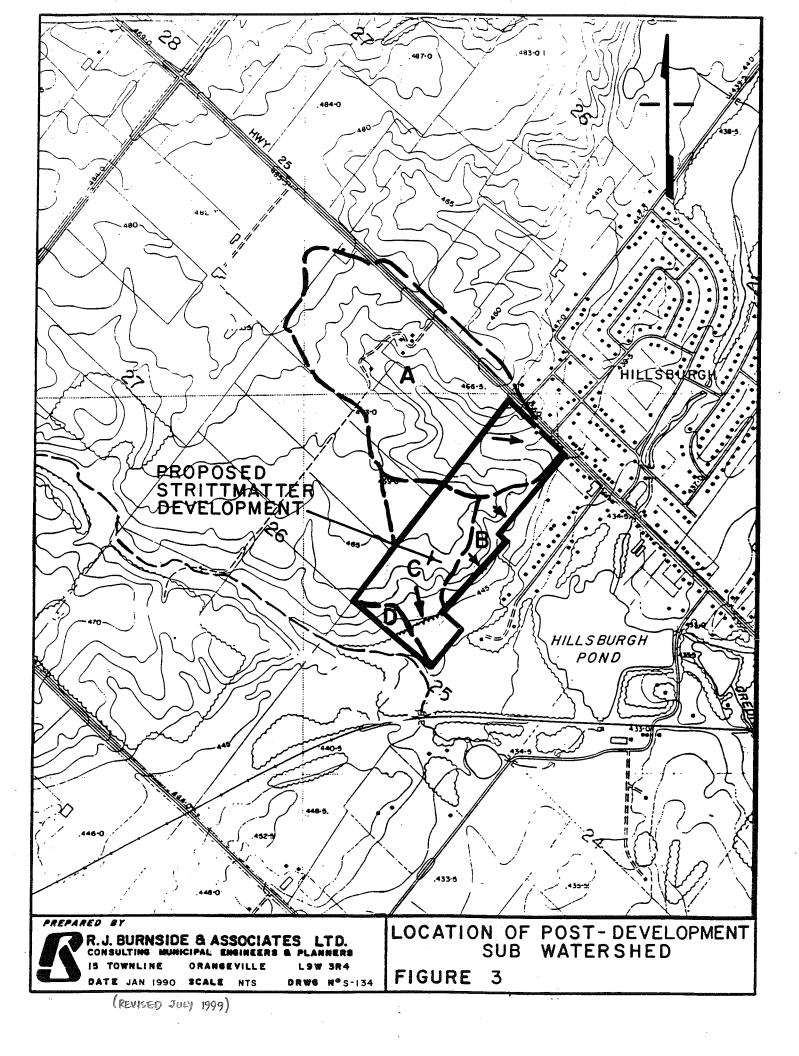
Sub-areas B, C and D were modified slightly to reflect the drainage changes resulting from the proposed road pattern. Sub-areas B and D are left to drain uncontrolled over the rear yards. The revised sub-areas are illustrated in Figure 3. Sub-area characteristics for post development conditions as revised are shown in the schematic in Figure 4.

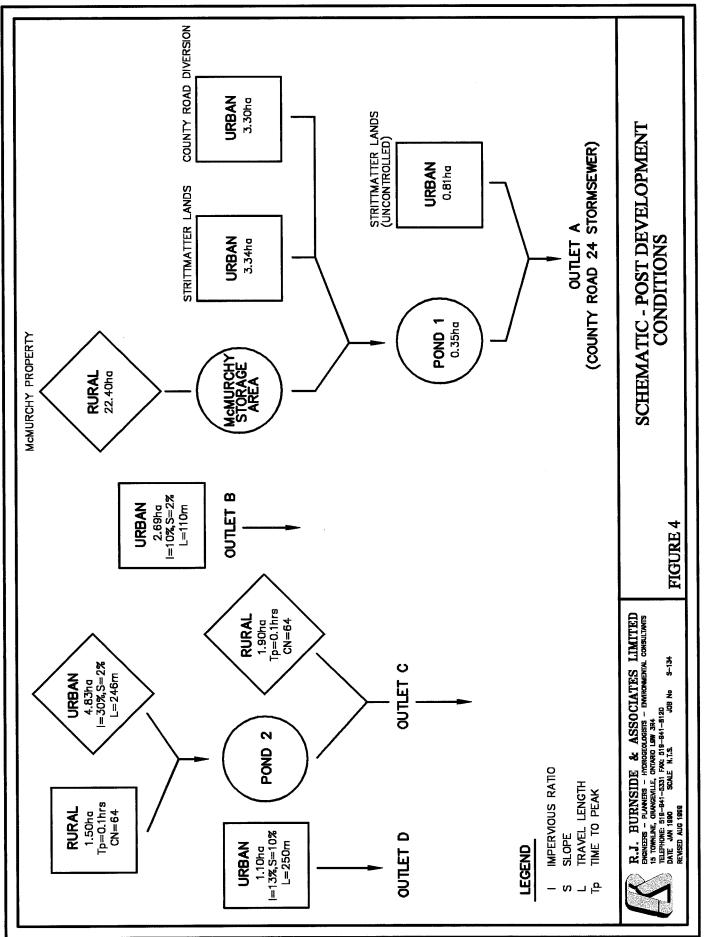
3.3 Results

The areas and peak flows calculated for predevelopment and post Strittmatter development controlled conditions are summarized in Table 2. Sub-areas C and D drain to a common point at the southeast corner of the property. As a result, the flows from areas C and D are combined for the pre to post-development comparison. Table 2 reflects the combined flows for these two areas as well as the individual peak flows. It is clearly indicated, on this table, that pre to post-development control is met.

	Table 2 Summary of Peak Flows (m³/s)									
		Pre-De	velopmen	t	Post	Strittmat	ter Develo	opment		
Outlet	Area	2 Year	5 Year	100 Year	Area	2 Year	5 Year	100 Year		
А	26.7	.637	.806	2.344	30.20	.186	.269	.495		
В	3.44	.149	.188	.534	2.69	.102	.128	.373		
С	7.32	.296	.374	1.077	8.23	.209	.340	.908		
D	1.61	.067	.085	.244	1.10	.050	.123	.362		
Combined C & D	8.93	.363	.459	1.322	9.33	.300	.450	1.303		

- * Notes: I) Results are summarized from original OTTHYMO runs by R. J. Burnside & Associates Limited (1989). Due to changes in drainage areas to Outlet A (1999) for Post Development Conditions (diversion of County Road 24 drainage, additional storage facility on McMurchy property), post development runoff scenarios to Outlet A were re-modelled.
 - ii) A schematic model for drainage to Outlet A and the County Road system is provided in Appendix A with detailed output for 5 year event and 100 year event.





S134.DWC

3.4 Ultimate Development Condition

Consideration was given to the possibility of future development of the McMurchy lands. A hydrologic analysis was conducted to determine if a reasonable sized stormwater management facility could be constructed on McMurchy lands that would allow an appropriate discharge rate during storm events without having adverse effects on the Strittmatter stormwater management system.

For the hydrologic analysis an assumed development scenario was established for the McMurchy lands; this scenario is furthered referred to as the Ultimate Condition. The development of the 22.4 hectare property consisted of the following:

- 10 hectares Open Space (non-developable), and
- 12.4 hectares @ 30% impervious (similar to Strittmatter development)

Under the above conditions the following storage and outflow values were found to adhere to the requirements previously stated:

- 5 year: 2600 m^3 controlled to 0.06 m^3 /s, and
- 100 year: 7300 m^3 controlled to $0.16 \text{ m}^3/\text{s}$.

These figures are rounded from the Summary of Hydrologic Analysis for Ultimate Condition chart provided in Appendix B. The 100 year flood storage could be provided in an area approximately 60m x 60m x 2m deep which is not excessive for a stormwater management pond. Of course, water quality volumes and potentially erosion control storage volumes may be required in addition to flood storage. These storage values are reasonable for the McMurchy development and should merely be used as indications that future expansion of the property, such that the needs of both Strittmatter and McMurchy land owners are satisfied, is possible. The invert of the storm sewer within the Strittmatter system, at the north end of Street 'C', has been deepened to allow maximum flexibility for future development of the McMurchy property.

Appendix B contains SWMHYMO modelling results and a storm sewer design sheet for the Ultimate Condition (post McMurchy development). In addition, tables showing a summary of the peak flows and pond performance under the Ultimate Condition are provided in Appendix B.

4.0 **Detention Ponds**

4.1 Location

Storage required to control post Strittmatter development runoff rates from sub-area A will be provided by Pond #1. This facility will take advantage of the embankments required for the construction of Upper Canada Drive. Figure 5 shows Pond #1 in detail. The location of Pond #1 is shown on Drawing No. S-405-8/G8 and in detail on Drawing S-405-25/S1.

Storage for outlet C will be provided in Pond #2 located in the southwest portion of the

development immediately north of the treed Open Space area. A drainage easement around the detention area will be granted to the Township for maintenance purposes. Figure 6 shows Pond #2 in detail.

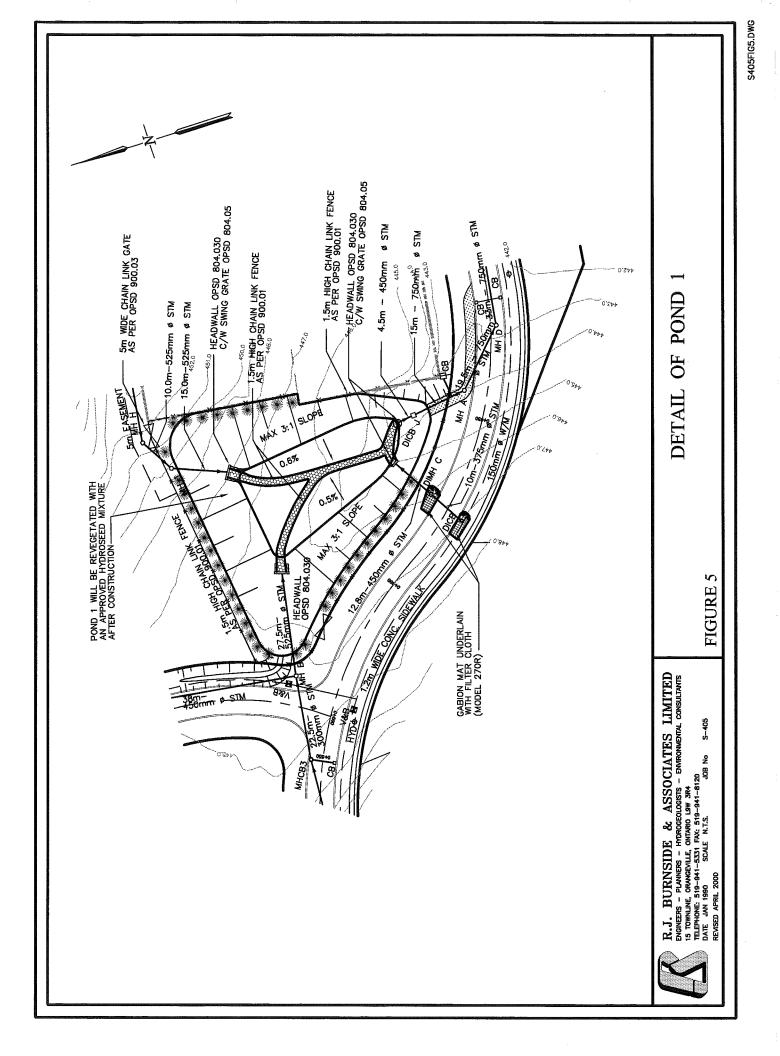
Storage required to control run-off from the McMurchy property will be provided by the temporary pond located on the McMurchy property immediately north of Street 'C'. Figure 7 shows the McMurchy pond in detail.

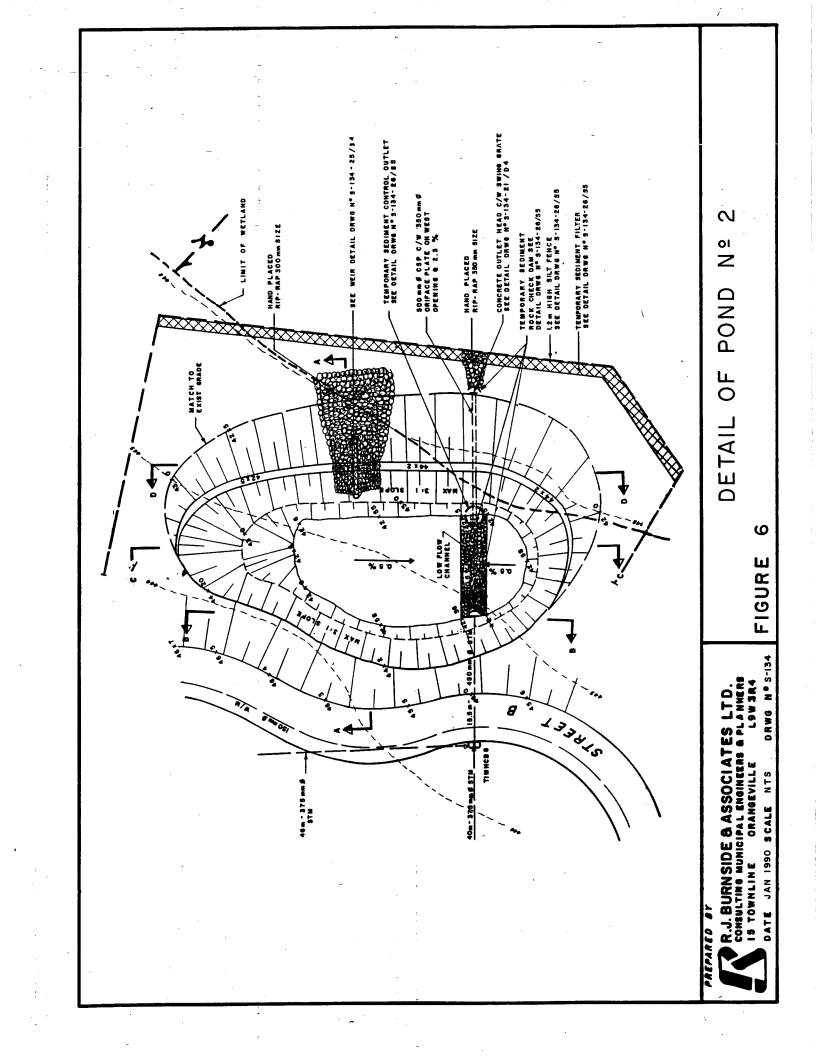
4.2 Detention Pond Details

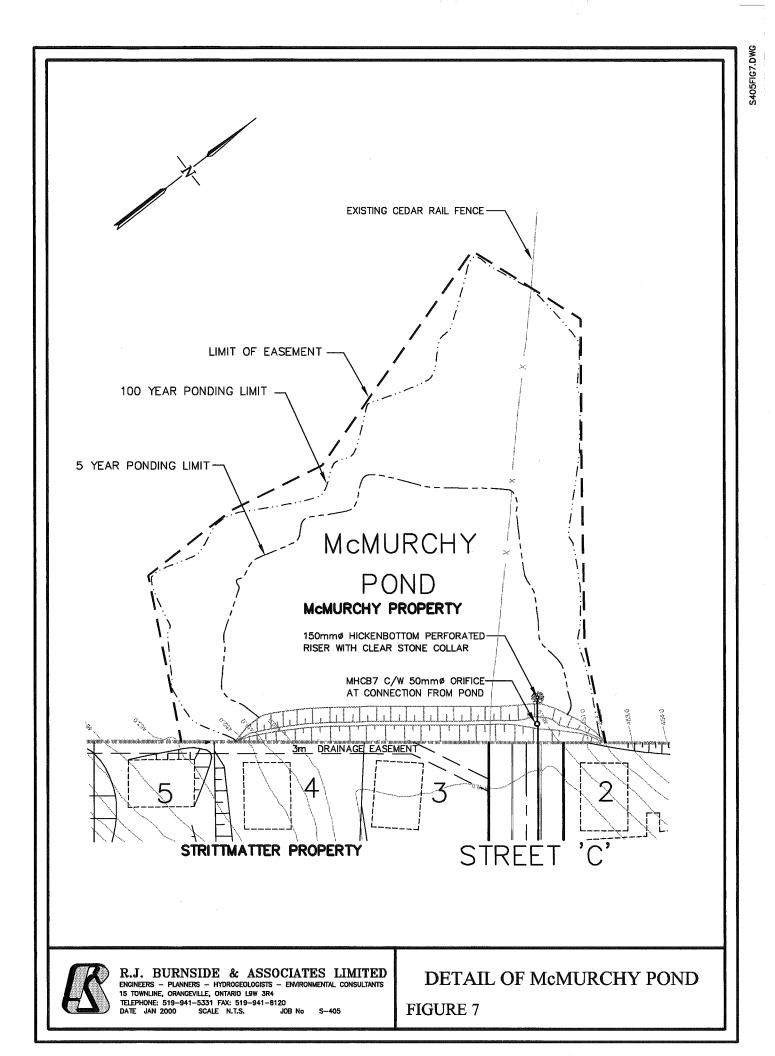
Both detention ponds on the Strittmatter property (i.e. Pond #'s 1 and 2) will have maximum side slopes of 3:1 to facilitate maintenance. The pond bottom will be graded at 0.5%. Pond #1 has a low flow channel at a grade of 1.0%. Pond #2 will also incorporate a low flow channel at a grade of 0.5%.

The temporary pond facility on the McMurchy property will be created by constructing a berm along the north property line of the Strittmatter development at the end of Street 'C'. The berm will allow the McMurchy runoff to pond on their site thereby creating the facility. The release of the stormwater from the McMurchy pond will be facilitated by a Hickenbottom perforated riser which will convey flows in a controlled manner to the Strittmatter storm sewers through a 75mm diameter orifice.

	Table 3 Post Strittmatter Development Pond Performance										
	Pond #1			Pond #2			McMurchy Pond				
Rainfall Event	Outflow, m ³ /s	Depth, m	Volume, m ³	Outflow, m ³ /s	Depth, m	Volume, m ³	Outflow m ³ /s	Volume, m³			
25 mm	0.133	0.46	165			—	_	—			
2 Year	0.165	0.57	300	.209	0.64	105	0.003	780			
5 Year	0.233	1.02	660	.267	1.00	268	0.008	1820			
100 Year	0.412	1.88	1620	.908	1.76	765	0.013	6120			







5.0 Sedimentation And Erosion Control Plan

Sedimentation and erosion control measures are shown on the Sediment Control Plan (Dwg. No. S-405-30/S6). The grading plans indicate that the proposed gradient and length of the slopes are moderate to steep. These, according to the MNR (1987), the site is characterised as moderate to high potential for erodibility.

The site will have measures installed to reduce the impact of sedimentation and erosion on site and downstream, including two sediment basins. One will be constructed for drainage Area A (Pond #1 location) as shown on Drawing S-405-25/S1 and one for drainage Area C (Pond #2 location) as shown on Drawing S-405-27/S3. The McMurchy property will also have a sediment collection area where the McMurchy pond will be located. According MNR criteria the sediment basin will be designed to provide 125 m³/ha of disturbed land. For Area A, a 500 m³ capacity is required for the sediment basin. The outfall for Pond #1 will be controlled by a temporary sediment control structure as detailed in Drawing S-405-29/S5.

For Area C a 600 m³ capacity is required for the sediment basin. The proposed stormwater management area (i.e. Pond #2) will act as a sediment basin during the construction period. Similar to Pond #1, the outfall for the sediment basin at Pond #2 will also be controlled by a temporary sediment control structure as detailed on Drawing S-405-29/S5.

A riser pipe surrounded by clear stone and filter cloth will ensure sediment control during the construction period. The weir for Pond #2 will not be installed until after all other construction on the site is completed and the site is stabilized.

The schedule of construction is a vital component of sedimentation and erosion control. Prior to any site grading or construction, the berm at the McMurchy property line must be constructed. This will control the sediment transport from the McMurchy farm and protect the Strittmatter property from damaging sheet flow. In conjunction with the berm construction, the two sediment basins, Pond #1 and Pond #2 must be constructed to collect sediment from the site.

If either of the sediment basins lose 25% of their total volume during the construction period, the contractor on-site will be responsible for cleaning out the facility.

A silt fence and temporary sediment filters will be installed as per grading plans around the site to provide additional sedimentation and erosion control. Buffer strips and a second line of silt fence have been provided along the south property line. In addition, silt fence will be installed around the entire perimeter of the topsoil and earth stockpiles. After the stripping and removal of topsoil within the road allowance, an interceptor ditch with a minimum depth of 0.6 m will be put in place as shown on the Sediment Control Drawing, S-405-30/S6. Finally, all inlets to the storm sewers will have silt traps placed around them. Details on these measures can be found in Drawing S-405-29/S5. Site inspectors will ensure that all sediment control structures are properly maintained. Any deficiencies are to be reported to the site contractor for immediate repair.

Both ponds will incorporate low flow channels which will be lined with rip-rap (150 to 200 mm) to prevent erosion when the storm sewers are flowing full. Rock check dams are proposed at the inlets and outlets of both ponds. Stockpiling of all topsoil and earth will be on lots 8 to 16 and 20 to 28 inclusive.

All sediment basins will be thoroughly cleaned out and temporary control structures removed before they are commissioned as the new stormwater management ponds.

6.0 Summary

This stormwater management report was originally prepared and submitted in 1989 in support of this development proposal by Mr. Frank Strittmatter. The purpose of the report was to document the design details of the stormwater management plan.

In response to several drainage issues raised by the Credit Valley Conservation and the Town of Erin, we have made some modifications to the drainage system. Mr. Strittmatter's land will no longer drain to the swale outlet which used to accept approximately 26 hectares of drainage (including 22.4 hectares of upstream drainage). An additional stormwater storage area on the McMurchy property has helped to reduce outflows from Pond 1 to a level which can be accommodated in the County storm sewer without adverse effects on that system. In fact, 5 year flows are reduced appreciably and 100 year flows near the outlet at the Credit River are also reduced.

The stormwater management areas provide quantity controls for up to a 100 year storm event for the development.

Sedimentation and erosion controls, including two sediment basins, will be in place to minimize the migration of sediment from the site during the construction period.

Respectfully Submitted:

R. J. Burnside & Associates Limited

Dunant

Lorena Durrant, BSc. Eng.

LD:mm J:\AJOBRJB\S-405\060600report.wpd

Christopher Crozier, P.Eng.

APPENDIX A

Post Strittmatter Development SWMHYMO Modelling Results

July 11, 1999 (revised Jan. 04, 2000 & April 25, 2000) Strittmatter Property Sewer Design

			ENGINEER	ENGINEERS-HYDROGEOLIGISTS-ENVIRONMENTAL CONSULTANTS	JGISTS-ENVIR	ONMENTAL C	ENGINEERS-HYDROGEOLIGISTS-ENVIRONMENTAL CONSULTANT	(A)	
Project : Strittmatter Property cipality : Township of Erin seigner : LD hecker : Location me From MHCB 5 MHCB 4 0.54 0.4 MHCB 3 0.53 0.4 MHCB 3 0.53 0.4 MHCB 3 0.53 0.4 MHCB 4 0.5 MHCB 4 0.5 MHCB 4 0.3 MHCB 7 0.5 MHCB 7 0.4 MHCB 7 0.5 MHCB 7 0.4 MHCB 7 0.4 MHCB 7 0.5 MHCB 0.5 MHC 7 0			8500 TORE	9500 TORBRAM ROAD, SUITE 56, BRAMPTON, ONTARIO LET5C6	JITE 56, BRAMF	PTON, ONTAF	IO LETSC6		
Miles Miles <th< th=""><th>_</th><th></th><th>TELEPHOR</th><th>TELEPHONE: 905-793-9239 FAX: 905-793-5018</th><th>9 FAX: 905-793 D-:-6-11 : D F</th><th></th><th>atorno torno</th><th></th><th></th></th<>	_		TELEPHOR	TELEPHONE: 905-793-9239 FAX: 905-793-5018	9 FAX: 905-793 D-:-6-11 : D F		atorno torno		
Indext To AREA COEF Incation To AREA COEF From To AREA COEF MHCB 5 MHCB 4 0.54 0.4 MHCB 7 MHCB 3 0.41 0.4 MHCB 7 DCBMH 6 22.4 0.3 MHCB 7 DCBMH 6 22.4 0.3 MHCB 7 DCBMH 6 22.4 0.3 MHCB 7 DCBMH 6 MH 8 1.04 0.4 MHCB 7 DCBMH 6 MH 8 1.04 0.4 MH 8 HAB 1.04 0.4 0.4 MH 8 MH 9 MH 9 0.41 0.4 DICB (RT) DIMH C headwall 0.41 0.4 MH 9 MH 9 MH 9 0.41 0.4 MH 7 MH 9 MH 9 0.104 0.4 MH 7 MH 7 MH 7 0.104 0.5 DICB 69 DICB 67 0.25 0.5 0.5			(Standards based	Cownship of Entry (Standards based on Malton I.D.F. curves)	tion I.D.F. curve		o yı. stullu		
Location To AREA COEF Individual From To AREA COEF 1ndividual A C 2.78AC 2.78AC MHCB 5 MHCB 4 0.53 0.4 0.60 MHCB 3 0.41 0.4 0.60 MHCB 3 0.41 0.4 0.46 MHCB 7 DCBMH 6 22.4 0.3 18.68 MHCB 1.04 0.41 0.4 0.46 0.46 MHCB 7 DCBMH 6 1.04 0.4 0.46 MHB headwall 0.41 0.4 0.46 MH B headwall 1.04 0.4 0.46 MH B headwall 1.04 0.4 1.16 DICB (RT) DIMH C DIMH C 0.4 0.5 MH D MH A MH A MH A MH A MH D MH F MH A MH A MH A MH D MH F 0.5 0.5 0.35 <	(mm/hr) I =A/(B+ ⁻ 0.013	Tc)^c			= = = =	820.0 4.6 0.780			
From To AREA COEF Individual A C 2.78AC bia C 2.78AC MHCB5 MHCB4 0.54 0.4 0.60 MHCB3 MHCB3 0.63 0.4 0.56 MHCB3 MHCB3 0.41 0.4 0.56 MHCB7 DCBMH 6 22.4 0.3 18.68 MHCB7 DCBMH 6 22.4 0.3 18.68 MHCB7 DCBMH 6 22.4 0.3 18.68 MHCB MHB 1.04 0.4 0.56 MH B HB 1.04 0.3 11.66 DICB (RT) DIMH C 0.4 0.16 11.66 MH B HB 1.04 0.4 1.16 11.66 DICB (RT) DIMH C DICB (RT) DIMH C 0.4 0.3 13.68 MH A MH A MH A 0.4 0.3 14.66 14.66 DICB 10 MH B MH A	-			-		Sewer Data			
A C 2.78AC MHCB 5 MHCB 4 0.54 0.4 0.60 MHCB 3 0.41 0.4 0.60 MHCB 3 0.41 0.4 0.60 MHCB 3 0.41 0.4 0.66 MHCB 4 MHCB 3 0.41 0.46 MHCB 7 DCBMH 6 22.4 0.3 18.68 MHB headwall 0.41 0.4 0.46 MHB headwall 0.4 0.4 0.46 MH 10 MH 10 0.4 0.4 0.46 MH 2 MH 3 1.04 0.4 1.16 DICB (RT) DIMH C 0.4 0.4 1.16 MH 2 MH 3 MH 4 0.4 1.16 MH 10 MH 2 MH 3 0.4 0.55 0.35 DICB 10 DICB 69 2.4 0.5 0.5 0.35			ll Peak	Diameter	Slope	Length	Capacity	Velocity	Time of
MHCB 5 MHCB 4 MHCB 4 0.54 MHCB 3 MHCB 3 0.53 MHCB 3 MHCB 3 0.41 MHCB 7 MHCB 4 0.41 MHCB 7 DCBMH6 22.4 MHB 1.04 1.04 MHB headwall 1.04 MHB headwall 1.04 DICB (RT) DIMH C headwall PICB (RT) DIMH C headwall MH A MH A MH A MH A MH A MH A MH A MH A MH A MH B MH A MH A MH B MH F MH F MH B MH F DICB 10 (see note 5) DICB 70 DICB 69 2.4 DICB 69	BAC Concentration (mins)	tration Intensity is) (mm/hr)		(mm)	(%)	(m)	(l/s)	(m/s)	Flow (mins)
MHCB3 MHCB3 U.34 MHCB3 MHCB3 0.41 MHCB3 MHCB3 0.43 MHCB3 MHS 0.41 MHCB7 MHB 1.04 MHCB7 MHB 1.04 MHCB MHB 1.04 MHB headwall 1.04 DICB (RT) DIMH C headwall PICB (RT) DIMH C headwall PICB (RT) DIMH C headwall MH A MH A MH A MH D MH A MH A MH A MH A MH A MH A MH A MH A MH B MH F MH F MH B MH F MH F DICB 70 DICB 69 2.4 DICB 69 DICB 67 0.25	10.00	101 20	64	000	7 05	75.0	600	7 07	000
MHCB3 MHCB3 MHCB3 MHCB3 MHCB3 MHCB3 MHCB3 MHCB3 MHCB3 MHCB3 0.41 MHCB7 DCBMH6 22.4 0.41 0.41 0.41 MHCB7 DCBMH6 MHB 0.41 0.41 0.41 MHCB7 DCBMH6 MHB 1.04 0.42 DICB (RT) DIMHC headwall 1.04 DICB (RT) DIMHC headwall 0.41 POID DICB J (see note 5) 0.108 MH D MH A MH A MH A MH E MH E MH F MH F MH F DICB 50 0.25 DICB 50 DICB 69 DICB 67 0.25 0.25	-	_		000	7 81	0.07	202	3.0/	0.22 0.28
MHCB 7 DCBMH 6 22.4 MHCB 7 DCBMH 6 22.4 MH 8 headwall 1.04 MH 8 headwall 1.04 MH 8 headwall 1.04 DICB (RT) DIMH C 0.01 DIMH C headwall 0.01 DIMH C headwall 0.01 MH A MH A 0.01 MH D MH A 0.01 MH D MH F 0.025 DICB 70 DICB 69 2.4	-	_	+	000	008	22.50	202	2.01	0,40
MHCB 7 DCBMH 6 22.4 DCBMH 6 MH B 1.04 MH B headwall 1.04 MH B headwall 1.04 DICB (RT) DIMH C 1.04 DICB (RT) DIMH C 1.04 DICB (RT) DIMH C 1.04 PDICB (RT) DIMH C 1.04 PDICB (RT) DIMH C 1.04 PMH C hM A 1.04 MH D MH A 1.04 MH D MH F 1.04 DICB 70 DICB 69 2.4 DICB 69 DICB 67 0.25				200	00.0	2.17	2	0.0	2
DCBMH6 MH B 1.04 MH B headwall 1.04 MH B headwall 5 DICB (RT) DIMH C 5 DIMH C headwall 5 POID A DICB J (see note 5) MH A MH A 5 MH E MH F 5 DICB 70 DICB 69 2.4 DICB 69 DICB 69 2.4		(se		450	1.50	39.5	364	2.22	0.30
MH B headwall DICB (RT) DIMH C DICB (RT) DIMH C DICB (RT) DIMH C DICB (RT) DIMH C Particular DICB J Pond DICB J POLD DICB J MH A MH A MH D MH A MH D MH F MH E MH F DICB 70 DICB 69 DICB 69 DICB 67	16 10.30	30 99.73	123	450	1.50	38.0	364	2.22	0.29
DICB (RT) DIMH C DIMH C headwall DIMH C headwall Pond DICB J Pond DICB J Pond DICB J MH A MH A MH D MH E MH E MH F DICB 70 DICB 69 DICB 69 DICB 70	10.69	39 (see note 3)	e 3) 285	525	1.00	27.5	449	2.01	0.23
DIMH C headwall pond DICB J (see note 5) DICB J MH A MH A MH D MH B MH A MH D MH E MH E MH E MH F 2.4 DICB 70 DICB 69 2.4	11.70	0	142	375	1.00	10.0	183	1.60	0.10
pond DICB J (see note 5) DICB J MH A MH A MH D MH B MH D MH E MH E MH F DICB 70 DICB 69 DICB 69 DICB 67	11.70	70 (see note 4)	e 4) 283	450	1.00	12.8	297	1.81	0.12
DICB J MH A MH A MH D MH D MH E MH E MH F MH E MH F DICB 70 DICB 69 2.4 0.5 3.34 DICB 69 DICB 67 0.25 0.5 0.35	sport		233	350	0.71	4.5	128	1.29	0.06
MHA MHD MHD MHE MHE MHE MHE M1 MHE M1 MHE M1 MIE M1 MHE M1 MHE M1 MHE M1 MHE M1 MHE M1 MIE M1 MIE M1 M1 0.5 0.5 0.35	-		233	750	0.85	15.0	1071	2.35	0.11
With E With E With E Mill F Mill F<			233	09/	0.87	19.5	10/1	2.35	0.74
DICB 70 DICB 69 2.4 0.5 3.34 DICB 69 DICB 67 0.25 0.5 0.35	=		269	750	2.00	22.5	1643	3.60	0.10
DICB 69 DICB 67 0.25 0.5 0.35	34 10.00		_	525	5.60	78.0	1062	4.75	0.27
		27 99.85	368	525	5.79	73.0	1080	4.83	0.25
DICB 67 DCB 66 0.68 0.5 0.95				525	7.23	28.0	1207	5.40	0.09
New Diversion DCB 66 MH G (No further inflow)	ier inflow)		456	525	4.27	21.5	927	4.15	0.09
MHG MHH			456	525	1.25	53.5	502	2.25	0.40
MH H MHI			456	525	6.20	10.0	1117	5.00	0.03
MH I headwall			456	525	1.00	15.0	449	2.01	0.12

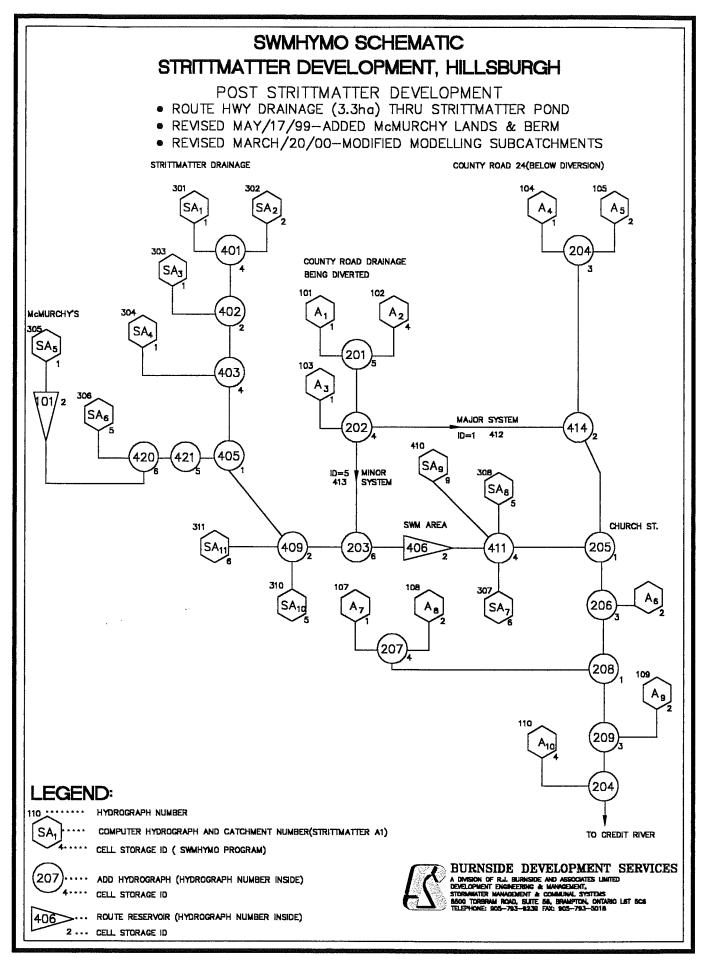
NOTES:
1) The peak flow of 8 *ls* for the storm sever from MHCB 7 to DCBMH 6 represents the 5 year routed flow from the undeveloped McMurchy ponding area.
2) The flow from DCBMH 6 to MH B was determined using a combined flow from MHCB 7 to DCBMH 6 (5 yr. SWMHYMO), and DCBMH 6 to MH B
2) The flow from DCBMH 6 to MH B was determined using a combined flow from MHCB 7 to DCBMH 6 (5 yr. SWMHYMO), and DCBMH 6 to MH B
3) The peak flow from DMH E to the headwall (in the pond) is the combined flow from Street C and Upper Canada Drive to MH B.
4) The peak flow from DIMH C to pond is the 100 year storm flows from comment SA4 as well as the carrovore flow from the upstream catchements (SA1, SA2, and SA3). This sever must have the capacity to convey all of the runoff from the 100 year event to the pond (see Catchbasin Design Sheet).
5 year outflow from Strittmatter pond (233 ls) spills partly through the high flow outlet

Sewsize1.wk4

	Location											Sewer Data			
Street Name	From	٩	AREA	COEF	Individual	Accumulated	Time of	Rainfall	Peak	Diameter	Slope	Length	Capacity	Velocity	Time of
			<	U	2.78AC	2.78AC	Concentration	Intensity	Flow			,	•	•	Flow
			ha				(mins)	(mm/hr)	(l/s)	(mm)	(%)	(m)	(I/s)	(m/s)	(mins)
	-														
Leader	MHCB 13	MH 12	0.24	0.4	0.27	0.27	10.00	101.30	27	300	6.75	39.0	262	3.59	0.18
Court	MH 12	MHCB 11				0.27	10.18		27	300	8.15	38.5	288	3.95	0.16
	MHCB 11	MHCB 10	0.39	0.4	0.43	0.70	10.34	99.48	70	300	7.9	75.0	284	3.89	0.32
	MHCB 10	MHCB 9	0.97	0.4	1.08	1.78	10.67	97.84	174	300	6.5	54.0	257	3.53	0.26
	MHCB 9	TIMHCB 8	0.63	0.4	0.70	2.48	10.92	96.59	240	375	2.9	42.0	312	2.73	0.26
Upper Canada	MHCB 19	MHCB 18	0.9	0.3	0.75	0.75									
Drive			0.58	0.4	0.64	1.40	10.00	101.30	141	300	3.85	62.0	198	2.71	0.38
	MHCB 18	MHCB 17	0.6	0.3	0.50	0.50									
			0.49	0.4	0.54	2.44	10.38	99.29	242	375	5.5	72.0	429	3.76	0.32
	MHCB 17	MH 16	0.52	0.4	0.58	3.02	10.70	97.67	295	375	4.7	34.5	397	3.48	0.17
	TIMHCB 20	MH 16								525	4.42	27.0	943	4.22	0.11
Easement	MH 16	MH 15		Re	fer to RJ Bu	Refer to RJ Burnside SWM Report	eport			525	8	21.0	1269	5.68	0.06
Lot 19/20	MH 15	MH 14				=				525	8	26.0	1269	5.68	0.08
	MH 14	TIMHCB 8				=				525	8	40.0	1269	5.68	0.12
	TIMHCB 8	Pond 2		Re	fer to RJ Bu	Refer to RJ Burnside SWM Report	eport		680	750	1.25	16.5	1299	2.85	0.10

Storm Sewers into pond 2 (corrections from page 2 of June 1990 sheet)

Sewsize1.wk4



01-Jun-00

Strittmatter Development, Village of Hillsburgh Town of Erin

Summary of Hydrologic Analysis for Post Strittmatter Development Conditions Drainage Area to County Road 24 Only

			5 Year Flu	5 Year Flows, m^3/s			100 Year F	100 Year Flows, m^3/s	
Catchment ID	Drainage Area	Local Runoff	Combined Runoff	Controlled Runoff	Storage Used	Local Runoff	Combined Runoff	Controlled Runoff	Storage Used
									(m^3)
				Strittmatte	Strittmatter Drainage				
SA1	0.54	0.046	0.046	0.046	-	0.105	0.105	0.105	,
SA2	0.53	0.045	0.091	0.091	1	0.103	0.209	0.209	ł
SA3	0.41	0.035	0.126	0.126	1	0.080	0.289	0.289	ł
SA4	0.41	0.035	0.161	0.161	1	0.080	0.369	0.369	ı
SA5 *	22.40	0.313	0.313	0.008	1818.00	1.028	1.028	0.013	6114.00
SA6	1.04	0.063	0.224	0.224	1	0.166	0.536	0.536	1
SA10	. 0.36	0.034	0.258	0.258	I	0.077	0.613	0.613	ı
SA11	0.35	0.092	0.350	0.350	,	0.154	0.767	0.767	
			County Road 24	County Road 24 Drainage Being Diverted (Data from Triton Study	erted (Data from	Triton Study (1998)	98)	1	
A1	2.40	0.312	0.312	0.312		0.604	0.604	0.604	•
A2	0.25	0.033	0.344	0.344	ł	0.064	0.668	0.668	1
A3	0.68	0.089	0.434	0.434	(minor system)	0.173	0.841	0.450	(minor system)
				- I I I I I I I I I I I I I I I I I I I	(major system)			0.391	(major system)
County R	County Road + Strittmatter Drainage	- Drainage	0.78	0.23	660.00		1.22	0.41	1620.00
Routed Th.	Routed Through Strittmatter SWM Area	SWM Area							
SA7	0.32	0.027	0.027	0.027	•	0.061	0.061	0.061	
SA8	0.46	0.038	0.038	0.038	1	0.087	0.087	0.087	,
SA9	0.08	0.021	0.269	0.269	1	0.035	0.495	0.495	1
A4	0.09	0.012	0.012	0.012	1	0.023	0.023	0.023	1
A5	0.28	0.037	0.049	0.049	I	0.072	0.095	0.095	
A6	0.31	0.048	0.348	0.348	I	0.088	0.991	0.991	
A7	0.24	0,041	0.041	0.041	1	0.075	0.075	0.075	ı
A8	0.30	0.054	0.443	0.443	•	0.096	1.162	1.162	ę
A9	0.32	0.053	0.495	0.495	1	0.091	1.253	1.253	•
A10	0.21	0.036	0.531	0.531	•	0.065	1.318	1.318	•
Total	31.98	Total Flow	Total Flows to Credit River	0.531				0.318	
						-			

* SA5 represents the McMurchy Property . Drainage from these lands is controlled on-site in temporary facility.

Strittmatter Development, Village of Hillsburgh Town of Erin

Stage-Storage-Discharge Relationship for Pond #1 (revised April 2000) Post Strittmatter Development

Low Flow Outlet :	Conc. Pipe, diameter (m):	0.45
	Orifice, diameter (m):	0.35
	Invert Elevation (m):	442.95
Major Flow Outlet:	Conc. Pipe, diameter (m):	0.2
	Opening Elevation (m):	443.8
Centre of Low Flow Ori	ifice, m	443.13
Centre of Low Flow Pip	pe, m	443.18
Elevation of Major Flow	v Pipe, m	443.80

Depth,m	Elevation, m	Low Flow Outlet	Major Flow Outlet	Total Flow, m^3/s	Total Storage, m ³
0.00	442.95	0.000	0.000	0.000	0.00
0.20	443.15	0.040	0.000	0.040	13.44
0.30	443.25	0.090	0.000	0.090	45.36
0.40	443.35	0.121	0.000	0.121	107.52
0.50	443.45	0.146	0.000	0.146	210.00
0.80	443.75	0.202	0.000	0.202	464.39
1.05	444.00	0.239	0.000	0.239	686.89
1.10	444.05	0.246	0.000	0.246	733.38
1.25	444.20	0.265	0.053	0.318	878.13
1.40	444.35	0.283	0.062	0.345	1032.38
1.60	444.55	0.305	0.072	0.378	1256.39
2.00	444.95	0.345	0.090	0.435	1786.41
2.10	445.05	0.355	0.093	0.448	1939.84
2.20	445.15	0.364	0.097	0.461	2103.02
2.30	445.25	0.373	0.101	0.473	2276.62

file: i:\Lorena\s-405\Pond_newps.wk4

Stage-Discharge Relationship for McMurchy Pond

Use 75mm Orifice as Control

Elev, m	Depth, m	Discharge, m^3/s	Storage, m^3
450.50	0.00	0.000	0.00
450.75	0.25	0.006	
451.00	0.50	0.008	1850.00
451.25	0.75	0.010	
451.50	1.00	0.012	4775.00
451.75	1.25	0.013	
452.00	1.50	0.014	8690.00
452.25	1.75	0.015	
452.40	1.90	0.582	12670.00

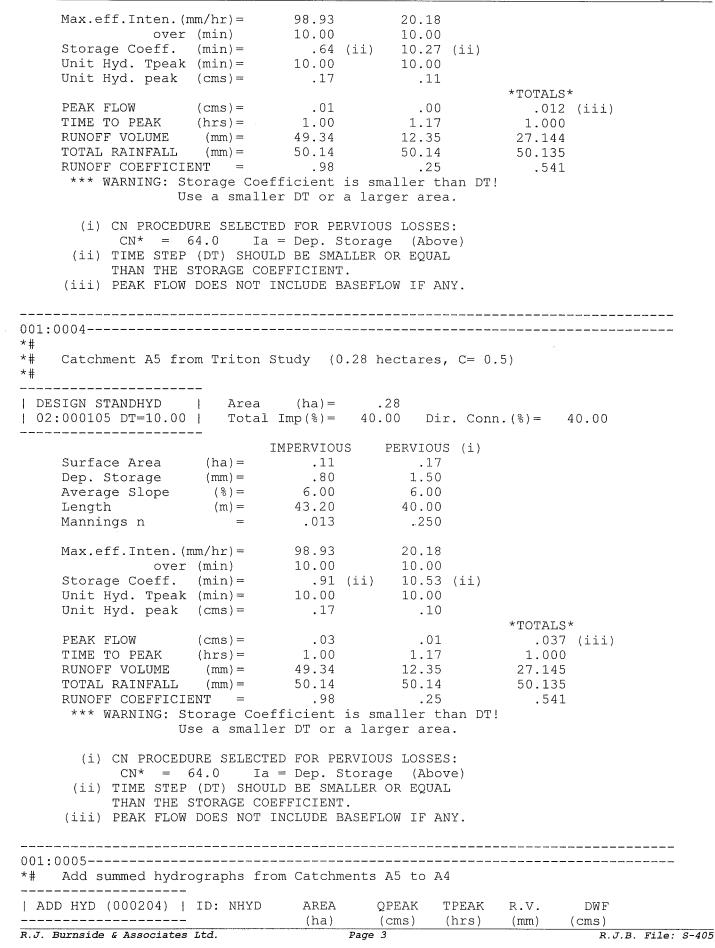
Post Strittmatter - 5 Year Output Flow

SSSSS WWMMHYYMOOO999555SWWMMMMHHYMMMMO995SSWWMMHHYMMMMO995SSWWMMHHYMMO9999555SSSSSWWMHHYMMOOO9StormWaterManagementHYdrologicModel999555	5 ======= 5 # 3877524

<pre>************************************</pre>	************** odel ****** ******* ******
****** Distributed by: J.F. Sabourin and Associates Inc. ****** Ottawa, Ontario: (613) 727-5199 ****** Gatineau, Quebec: (819) 243-6858 ****** E-Mail: swmhymo@jfsa.Com ************************************	* * * * * * * * * * * * * * * * * * * *
+++++++ Licensed user: R.J. Burnside & Associates Ltd. ++++++ Licensed user: R.J. Burnside & Associates Ltd. ++++++ Brampton SERIAL#:3877524 ++++++++	++++++ ++++++++
************************************	* * * * * * * * * * * * * * * * * * * *
<pre>************************************</pre>)1101 * *********************************
001:0001	**************************************

R.J.B. File: S-405

```
*#
   5 year storm event
*#
*# Data from County Rd. 24 Stormsewer Analysis (Triton) used
*# for Road Catchments. Strittmatter Development discharge
*# includes stormwater controls
*#
*# Made modifications to this file to route the road portion or upper canada SA
*# into the pond and let the external property SA8 flow uncontrolled. This fil
*# was run to obtain volume requirements for the pond to store & throttle the
*# 100 year flows of the Strittmatter Development. Lot 1 was made available
*# as pond area so SA10 decreased 0.32 ha and SA11 increased the same amount.
*#
*# File was further modified to let SA9 flow uncontrolled off site
*#
*# File was further modified to collect some of the drainage from SA8 at the
*# south end of Lot 1. SA8 area decreased to 0.46 ha and SA10 area increased
*# to 0.36 ha. Change in response to Triton comments May 19, 2000
*#
______
| START | Project dir.: I:\LORENA\S-405\CORREC~1\MAY00\
----- Rainfall dir.: I:\LORENA\S-405\CORREC~1\MAY00\
  TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
                           Ο
   NRUN = 001
   NSTORM= 0
001:0002------
*READ STORM STORM_FILENAME=["c:\S-405\swmhymo\hazel.stm"
| CHICAGO STORM | IDF curve parameters: A=1439.371
                                        B= 13.688
| Ptotal= 50.14 mm |
                                        C= .846
_____
                     used in: INTENSITY = A / (t + B)^{C}
                     Duration of storm = 3.00 hrs
                     Storm time step = 10.00 min
                     Time to peak ratio = .33
               TIME
                     RAIN | TIME RAIN | TIME RAIN | TIME RAIN
               hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
                1115100/1111115100/1111115100/1111115100/111.174.4661.0098.9291.838.9622.674.283.335.7471.1742.9902.007.3692.833.877.508.0481.3323.2322.176.2473.003.543.6713.2241.5015.4192.335.419100/112
                .83 32.890 | 1.67 11.382 | 2.50 4.784 |
001:0003------
*#
*#
    Catchment A4 from Triton Study (0.09 hectares, C= 0.5)
*#
| DESIGN STANDHYD | Area (ha)= .09
| 01:000104 DT=10.00 | Total Imp(%)= 40.00 Dir. Conn.(%)= 40.00
_____
                         IMPERVIOUS PERVIOUS (i)
    Surface Area(ha) =.04Dep. Storage(mm) =.80Average Slope(\%) =6.00Length(m) =24.49Mannings n=.013
                                      .05
                                        1.50
                                        6.00
                                       40.00
                                         .250
```



I:\LORENA\S-405\CORREC~1\MAY00\STRIT5.OU Post Strittmatter - 5 Year Output Flow ID1 01:000104.09.0121.0027.14+ID2 02:000105.28.0371.0027.14 .000 .000 _______________ SUM 03:000204 .37 .049 1.00 27.14 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. *# *# Proposed Strittmatter Development *# *# Catchment SA1 (Strittmatter A1, 0.54 hectares) *# ____ | DESIGN STANDHYD | Area (ha)= .54 | 01:000301 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 _____ IMPERVIOUS PERVIOUS (1) Surface Area (ha)= .16 .38 Dep. Storage (mm)= .80 1.50 Average Slope (%)= 3.00 3.00 Length (m)= 60.00 40.00 Mannings n = .013 .250 Max.eff.Inten.(mm/hr)= 98.93 25.97 over (min) 10.00 10.00 Storage Coeff. (min)= 1.36 (ii) 12.08 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .10 *TOTALS* PEAK FLOW (cms) = .03 .02 .046 TIME TO PEAK (hrs) = 1.00 1.17 1.000 RUNOFF VOLUME (mm) = 49.34 13.71 20.836 TOTAL RAINFALL (mm) = 50.14 50.14 50.135 RUNOFF COEFFICIENT = .98 .27 .416 .046 (iii) 1.000 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0007-----*# *# Catchment SA2 (Strittmatter A2, 0.53 hectares) *# _____ | DESIGN STANDHYD | Area (ha)= .53 | 02:000302 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area (ha) = .16 .37 Dep. Storage (mm) = .80 1.50 Average Slope (%) = 3.00 3.00 Length (m) = 59.44 40.00 Mannings n = .013 .250 Max.eff.Inten.(mm/hr)= 98.93 25.97

Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min) = (cms) =	1.35 (ii 10.00 .17) 12.07 (ii) 10.00 .10	*TOTALS*	
	(mm) = ENT =	50.14 .98 ficient is	50.14 .27 smaller than DT	.416	(iii)
(ii) TIME STEP THAN THE (iii) PEAK FLOW	54.0 Ia = (DT) SHOULI STORAGE COEN DOES NOT IN	= Dep. Stor D BE SMALLE FFICIENT. NCLUDE BASE	age (Above) R OR EQUAL FLOW IF ANY.		
001:0008 *# Add hydrographs				·	
ADD HYD (000401) 	01:000301 02:000302	(ha) .54 .53	(cms) (hrs) .046 1.00 .045 1.00	R.V. (mm) (4 20.84 20.84	cms) .000 .000
			.091 1.00		
001:0009 *# *# Catchment SA3 (*#	Strittmatte				
DESIGN STANDHYD 01:000303 DT=10.00	Area Total I	(ha)= [mp(%)= 3	.41 0.00 Dir. Con	nn.(%) = 2	0.00
0		APERVIOUS	PERVIOUS (i)		
Surface Area Dep. Storage Average Slope Length Mannings n	(ha) = (mm) = (%) = (m) = =	.12 .80 3.00 52.28 .013	.29 1.50 3.00 40.00 .250		
Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min) (min) = (min) =	98.93 10.00 1.25 (ii 10.00 .17	25.97 10.00) 11.97 (ii) 10.00 .10		
			.01 1.17 13.71 50.14 .27 smaller than DT arger area.	*TOTALS* .035 1.000 20.836 50.135 .416	

I:\LORENA\S-405\CORREC~1\MAY00\STRIT5.OU Post Strittmatter - 5 Year Output Flow (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. *# Add hydrographs from Strittmatter A3 to Strittmatter (A1+A2) _____ SUM 02:000402 1.48 .126 1.00 20.84 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. *# Catchment SA4 (Strittmatter A4, 0.41 hectares) *# *# | DESIGN STANDHYD | Area (ha)= .41 | 01:000304 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 IMPERVIOUSPERVIOUS (i)Surface Area(ha) =.12.29Dep. Storage(mm) =.801.50Average Slope(%) =3.003.00Length(m) =52.2840.00Mannings n=.013.250 Max.eff.Inten.(mm/hr)= 98.93 25.97 over (min) 10.00 10.00 Storage Coeff. (min)= 1.25 (ii) 11.97 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .10 PEAK FLOW (cms) = .02 .01 TIME TO PEAK (hrs) = 1.00 1.17 RUNOFF VOLUME (mm) = 49.34 13.71 TOTAL RAINFALL (mm) = 50.14 50.14 RUNOFF COEFFICIENT = .98 .27 *TOTALS* .035 (iii) 1.000 20.836 50.135 .416 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0012-----*# Add hydrographs from Strittmatter A4 to Strittmatter Upstream Drainage | ADD HYD (000403) | ID: NHYD AREA QPEAK TPEAK R.V. DWF ------ (ha) (cms) (hrs) (mm) (cms) ID1 01:000304 .41 .035 1.00 20.84 .000

	2 02:000402					
	1 04:000403					
NOTE: PEAK FLOWS	5 DO NOT INCLUI)E BASEF	LOWS IF	ANY.		
001:0013 *# *# Catchment SA5 *# agricultural dr *#	(Strittmatter A					
DESIGN NASHYD 01:000305 DT=15.00) Ia	(mm) =	1.500	Curve Num # of Lind	mber (C ear Res.(N) = 58.00 N) = 3.00
Unit Hyd Qpeak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms) = .3 (hrs) = 2.0 (mm) = 8.4 (mm) = 50.1	313 (i) 000 174 135				
<pre>(i) PEAK FLOW I 001:0014 ROUTE RESERVOIR IN>01:(000305) OUT<02:(000101)</pre>		d routin = OUTLF STORA (ha.m .0000E+ .1850E+	g time s OW STORA GE 1.) 00 00	step = 15 GE TABLE	.0 min. ======= STORAG (ha.m. .8700E+C .1270E+C	5E) 0 1
	(1 00305) 22 00101) 22	na) .40 .40 .00 REDUCTIC PEAK FLC	(cms) .313 .008 .000 M [Qout,	2.000 4.500 .000 /Qin](%)= (min)=	(mm 8.47 8.46 .00 2.510 150.00	n) 4 64 00
	 - AREA QPEAK	(ha) = (cms) = (hrs) =	22.400 .008 4.500			
TIME FLOW T hrs cms	7.50 .002	TIME hrs 175.00	FLOW cms	TIME hrs 262.50	cms	350.00 .000

	100 (00100	Cor (MATOO (2	11(110.00			103		iccer 5 fear	Output FIOW
1 (7	0001	00 17	0001	176 67	0.01.1	0.04 19	0001	251 66	0.00
1.6/	.0021	89.17 90.00	.0021	1/6.6/	.0011	264.17	.000	351.66 352.50	.000
2.50	.006		.002	177.50	.001	265.00	.000	352.50	.000
3.33	.007	90.83	.0021	178.33	.001	265.84	.000	353.33	.000
4.17	.008	91.67	.0021	179.17	.0011	266.67	.0001	354.16	.000
5.00								355.00	
	.008	93.33	.0021	180.83	.0011	268.34	.0001	355.83	.000
6.67	.0081	94.17	.002	181.67	.001	269.17	.000	356.66	.000
7.50	.008	95.00	.002	182.50	.000	270.00	.0001	357.50	.000
7.50 8.33	.0071	95.83	.0021	183.33	.0001	270.84	.0001	358.33	.000
9.17	.0071	96.67	.0021	184.17	. 0001	271.67	. 0001	356.66 357.50 358.33 359.16	.000
10.00	0071	97 50	0021	185 00	0001	272 50	.0001	360.00	.000
10.83	.0071	98.33	.0021	185.83	.0001	2/3.34	.0001	360.83	.000
11.67	.007	99.17	.002	186.67	.000	274.17	.000	361.66 362.50 363.33 364.16	.000
12.50 13.33 14.17	.007	100.00	.002	187.50	.000	275.00	.0001	362.50	.000
13.33	.0071	100.83	.0021	188.33	.0001	275.84	.0001	363.33	.000
14 17	0071	101 67	0021	189 17	0001	276 67	0001	364 16	.000
15.00	.0071	102.50	.0021	100.00	.0001	277.50	.0001	304.10 365 00	.000
15.00	.0071								
15.83						278.34			.000
16.67	.007	104.17	.002	191.67	.000	279.17	.000	366.66	.000
17.50	.006	105.00	.002	192.50	.0001	280.00	.0001	367.50	.000
17.50 18.33 19.17	.0061	105.83	.0021	193.33	. 000 i	280.00 280.83 281.67	. 0001	368.33	.000
10 17	0061	106 67	0021	10/ 17	0001	281 67	0001	369 16	.000
20.00	.0001	107 50	.0021	105 00	.0001	201.07	.0001	370.00	.000
20.00	.0061	107.50	.0021	195.00	.0001	202.50	.0001	370.00	.000
20.83								370.83	
21.67	.006	109.17	.002	196.67	.000	284.17	.000	371.66	.000
22.50	.0061	110.00	.002	197.50	.000	285.00	.000	372.50	.000
23.33	.0061	110.83	.0021	198.33	.0001	285.83	. 0001	373.33	.000
24 17	0061	111 67	0011	199.00	0001	286 67	0001	374 16	.000
23.33 24.17 25.00	.0001	110 50	.001	100.17	.0001	200.07	.0001	372.50 373.33 374.16 375.00	.000
25.00	.0061	112.50	.0011	200.00	.0001	287.50	.0001	3/5.00	.000
25.83						288.33			.000
26.67		114.17	.001	201.67	.000	289.17	.0001	376.66	.000
27.50	.0061	115.00	.0011	202.50	.0001	290.00	.0001	377.50	.000
28.33	0051	115 83	001	203.33	. 0001	290.83	0001	378.33 379.16 380.00 380.83	.000
20.00	0051	116 67	0011	204 17	0001	291 67	0001	379 16	.000
29.17 30.00 30.83	.0051	117 50	.001	204.17	.0001	202 507	.0001	200.00	.000
30.00	.0051	117.50	.001	205.00	.0001	292.30	.0001	380.00	.000
30.83	.005	118.33	.001	205.83	.000	293.33	.0001	380.83	.000
								381.66	
32.50	.005	120.00	.001	207.50	.0001	295.00	.0001	382.50	.000
33.33	.0051	120.83	.0011	208.33	.0001	295.83	.0001	383.33	.000
34 17	0051			209 17	0001	296 67	0001	384.16	
35.00		122.50		210.00		297.50	.0001		.000
35.83		123.33		210.84	.000		.000		.000
36.67		124.17		211.67	.000		.000		.000
37.50	.005	125.00	.001	212.50	.000	300.00	.000	387.50	.000
38.33	.005	125.83	.001	213.34	.000	300.83	.0001	388.33	.000
39.17	.005	126.67		214.17	.000	301.67	.0001	389.16	.000
40.00		127.50		215.00	.000		.000		.000
40.83		128.33		215.84	.000		.000		.000
41.67		129.17		216.67	.000			391.66	.000
42.50	.004	130.00	.001	217.50	.000	305.00	.000	392.49	.000
43.33	.004	130.83	.001	218.34	.000	305.83	.000	393.33	.000
44.17	.004	131.67	.001		.000	306.67	.0001	394.16	.000
45.00	.004			220.00		307.50		394.99	.000
					.000		.0001		.000
45.83	.004		.001						
46.67	.004		.001		.000		.000		.000
47.50	.004		.001		.000		.000	397.49	.000
48.33	.004	135.83	.001	223.34	.000	310.83	.000	398.33	.000
49.17	.004		.001		.0001		.000		.000
50.00	.004		.001		.0001		.000		.000
50.83		138.33	.001			313.33	.000		.000
51.67		139.17	.001			314.17	.000		.000
52.50	.004	140.00	.001		.000	315.00	.000	402.49	.000

I:\LORE	NA S-405 CORRI	EC~1\MAY00\S	TRIT5.OU			Post	Strittma	tter - 5 Y	ear Output Flo
53.3	33 00/1	140.83	0011	228.34	0001	315.83		403.33	.000
54.1		141.67		229.17		316.67		403.33	.000
55.0		142.50		230.00		317.50		404.99	.000
55.8		143.33		230.84		318.33		405.83	.000
56.6	,	144.17		231.67		319.17		405.03	.000
57.5		145.00		232.50		320.00		407.49	.000
58.3		145.83		232.30		320.83		407.49	.000
59.1	,	146.67		234.17		321.67		409.16	.000
60.0				235.00		322.50		409.99	.000
60.8	,	148.33		235.84		323.33		410.83	.000
61.6		149.17		236.67		324.17		411.66	.000
62.5		150.00		237.50		325.00	.0001	412.49	.000
63.3		150.83		238.34		325.83	.0001	413.33	.000
64.3		151.67		239.17		326.67		414.16	.000
65.0		152.50		240.00		327.50		414.99	.000
65.8	33 .003	153.33	.001	240.84	.000	328.33		415.83	.000
66.6		154.17	.001	241.67	.000	329.17	.0001	416.66	.000
67.5	50 .003	155.00	.001	242.50	.000	330.00	.0001	417.49	.000
68.3	33 .003	155.83	.001	243.34	.000	330.83	.0001	418.33	.000
69.1	17 .003	156.67	.001	244.17	.000	331.67	.000	419.16	.000
70.0	.003	157.50		245.00		332.50	.0001	419.99	.000
70.8				245.84		333.33		420.83	.000
71.0		159.17		246.67		334.17		421.66	.000
72.5		160.00		247.50		335.00		422.49	.000
73.3		160.83		248.34		335.83	.000	423.33	.000
74.2		161.67		249.17		336.66		424.16	.000
75.0		162.50		250.00		337.50		424.99	.000
75.8				250.84		338.33		425.83	.000
76.0				251.67	· · ·	339.16	.000		.000
77.5		165.00		252.50		340.00		427.49	.000
78.3		165.83		253.34		340.83		428.33	.000
79.3		166.67		254.17		341.66		429.16	.000
80.0		167.50		255.00		342.50		429.99	.000
80.8		168.33 169.17		255.84 256.67		343.33 344.16		430.83 431.66	.000 .000
81.9 82.5		170.00						431.66	.000
83.3		170.83	.0011	258 34	.0001	345.00 345.83 346.66	0001	433.33	.000
84.1		171.67	.0011	259 17	.0001	346 66	.0001	400.00	.000
85.0			0011	260.00	0001	347.50	.000		
	83 .002								
	67 .002								
001:00	016						. <u></u>		
*#									
*# (Catchment S	SA6 (Strit	tmatter	A6, 1.	04 hectar	es)			
*#									
			_	<i>(</i> 1)	1				
	IGN STANDHY		Area			Dia Gara	(0)	10 00	
	000306 DT=1		IULAL I	mp(s)—	20.00	DII, COIII.	1. (3) -	10.00	
			IM	PERVIOU	S PERV	IOUS (i)			
:	Surface Are	ea (ha		.21					
	Dep. Storad								
	Average Slo		5)=	3.00	3				
	-		n) =						
	Mannings n			.013		250			
	_								
]	Max.eff.Int		() =	98.93	25	.21			
		over (mir	1)	10.00	10	.00			
	Storage Coe			1.65		.50 (ii)			
	Unit Hyd. 5					.00			
	Unit Hyd. <u>P</u> urnside & Asso			.17	Rago (.09			TD #11 0 44
к.J. Bu	unside & Asso	clates Ltd.			Page 9			R	J.B. File: S-4(

RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICII *** WARNING: Si	(mm) = ENT =	49.34 50.14 .98 Sicient is	13.5 50.1 .2 smaller	55 4 27 than DT	1.00 17.12 50.13 .34	53 (iii) 00 26 55	
(ii) TIME STEP	64.0 Ia = (DT) SHOULI STORAGE COEE	Dep. Stor BE SMALLE FICIENT.	rage (Ab ER OR EQU	oove) JAL			
001:0017 # Add hydrographs					rty) to	A6	
ADD HYD (000420)	ID: NHYD	AREA	QPEAK	TPEAK	R.V.	DWF	
	05 000000	(ha)	(cms)	(hrs)	(mm)	(cms)	
ADD HYD (000420) ID1 +ID2	05:000306 02:000101	22.40	.063	4.50	8.46	.000	
	06:000420						
NOTE: PEAK FLOWS	DO NOT INCI	JUDE BASEFI	LOWS IF A	ANY.			
# Add OVERFLOW hyd	drograph fro	m McMurch	y Pond				
ADD HYD (000421)	ID: NHYD	AREA	QPEAK (Cms)	TPEAK (brs)	R.V.	DWF	
ID1	08:000150 06:000420	.00	.000	.00	.00	.000	**DRY**
	06:000420 						
	05.000421	23 44	063	1.00	8.85	.000	
SUM	05.000421	23.11					
	DO NOT INCI			ANY.			
	DO NOT INCI	JUDE BASEF	LOWS IF A				
NOTE: PEAK FLOWS	DO NOT INCI	JUDE BASEF	LOWS IF 2		R.V.	 DWF	
NOTE: PEAK FLOWS	DO NOT INCI	LUDE BASEFT AREA (ha)	LOWS IF A QPEAK (cms)	TPEAK (hrs)	(mm)	(cms)	
NOTE: PEAK FLOWS	DO NOT INCI ID: NHYD 05:000421	LUDE BASEF 	LOWS IF A QPEAK (cms) .063	TPEAK (hrs) 1.00	(mm) 8.85	(cms) .000	
NOTE: PEAK FLOWS	DO NOT INCI ID: NHYD 05:000421 04:000403	AREA (ha) 23.44 1.89	LOWS IF A QPEAK (cms) .063 .161	TPEAK (hrs) 1.00 1.00	(mm) 8.85 20.84	(cms) .000 .000	
NOTE: PEAK FLOWS	DO NOT INCI ID: NHYD 05:000421 04:000403 01:000405	AREA (ha) 23.44 1.89 25.33	QPEAK (cms) .063 .161 .224	TPEAK (hrs) 1.00 1.00 1.00	(mm) 8.85 20.84	(cms) .000 .000	
NOTE: PEAK FLOWS	DO NOT INCI ID: NHYD 05:000421 04:000403 01:000405	AREA (ha) 23.44 1.89 25.33	QPEAK (cms) .063 .161 .224	TPEAK (hrs) 1.00 1.00 1.00	(mm) 8.85 20.84	(cms) .000 .000	
NOTE: PEAK FLOWS 001:0019 ADD HYD (000405) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0020	DO NOT INCI ID: NHYD 05:000421 04:000403 01:000405 DO NOT INCI	AREA (ha) 23.44 1.89 25.33	QPEAK (cms) .063 .161 .224 LOWS IF 2	TPEAK (hrs) 1.00 1.00 1.00	(mm) 8.85 20.84	(cms) .000 .000	
NOTE: PEAK FLOWS 001:0019	DO NOT INCI ID: NHYD 05:000421 04:000403 01:000405 DO NOT INCI	AREA (ha) 23.44 1.89 25.33 LUDE BASEF	LOWS IF # QPEAK (cms) .063 .161 .224 LOWS IF #	TPEAK (hrs) 1.00 1.00 1.00 ANY.	(mm) 8.85 20.84	(cms) .000 .000	
NOTE: PEAK FLOWS 001:0019	DO NOT INCI ID: NHYD 05:000421 04:000403 01:000405 DO NOT INCI (Strittmatte reased May 2	AREA (ha) 23.44 1.89 25.33 LUDE BASEF	LOWS IF 7 QPEAK (cms) .063 .161 .224 LOWS IF 7 	TPEAK (hrs) 1.00 1.00 1.00 ANY.	(mm) 8.85 20.84	(cms) .000 .000	

```
IMPERVIOUS PERVIOUS (i)

      Surface Area
      (ha) =
      .11
      .25

      Dep. Storage
      (mm) =
      .80
      1.50

      Average Slope
      (%) =
      13.00
      13.00

      Length
      (m) =
      48.99
      40.00

      Mannings n
      =
      .013
      .250

        Max.eff.Inten.(mm/hr)= 98.93 25.97

over (min) 10.00 10.00

Storage Coeff. (min)= .77 (ii) 7.68 (ii)

Unit Hyd. Tpeak (min)= 10.00 10.00

Unit Hyd. peak (cms)= .17 .12
                                                                                                          *TOTALS*

      PEAK FLOW
      (cms) =
      .02
      .01
      .034

      TIME TO PEAK
      (hrs) =
      1.00
      1.000
      1.000

      RUNOFF VOLUME
      (mm) =
      49.34
      13.71
      20.836

      TOTAL RAINFALL
      (mm) =
      50.14
      50.14
      50.135

      RUNOFF COEFFICIENT
      =
      .98
      .27
      .416

                                                                                                         .034 (iii)
1.000
         *** WARNING: Storage Coefficient is smaller than DT!
                            Use a smaller DT or a larger area.
            (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
                     CN^* = 64.0 Ia = Dep. Storage (Above)
           (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
                   THAN THE STORAGE COEFFICIENT.
         (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
001:0021-----
*#
*#
        Catchment SA11 (Strittmatter A11, Pond Surface, 0.12 hecatares)
*#
 | DESIGN STANDHYD | Area (ha)= .35
| 06:000311 DT=10.00 | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00
IMPERVIOUS PERVIOUS (1)

      Surface Area
      (ha)=
      .35
      .00

      Dep. Storage
      (mm)=
      .80
      1.50

      Average Slope
      (%)=
      .10
      .10

      Length
      (m)=
      48.30
      40.00

      Mannings n
      =
      .013
      .250

        Max.eff.Inten.(mm/hr)= 98.93 67.48

over (min) 10.00 20.00

Storage Coeff. (min)= 3.31 (ii) 23.60 (ii)

Unit Hyd. Tpeak (min)= 10.00 20.00

Unit Hyd. peak (cms)= .16 .05
                                                                                                         *TOTALS*

      PEAK FLOW
      (cms) =
      .09
      .00
      .092

      TIME TO PEAK
      (hrs) =
      1.00
      1.17
      1.000

      RUNOFF VOLUME
      (mm) =
      49.34
      43.95
      49.281

      TOTAL RAINFALL
      (mm) =
      50.14
      50.14
      50.135

      RUNOFF COEFFICIENT
      =
      .98
      .88
      .983

                                                                                                         .092 (iii)
1.000
          *** WARNING: Storage Coefficient is smaller than DT!
                                Use a smaller DT or a larger area.
             (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
                     CN^* = 98.0 Ia = Dep. Storage (Above)
           (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
                    THAN THE STORAGE COEFFICIENT.
                                                                      Page 11
R.J. Burnside & Associates Ltd.
                                                                                                                               R.J.B. File: S-405
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(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

*# Add hydrograph from Strittmatter A10 and pond (A11) to hydrograph #405 *# ______ | ADD HYD (000409) | ID: NHYD AREA QPEAK TPEAK R.V. DWF (ha) (cms) (hrs) (mm) (cms) ID1 01:000405 25.33 .224 1.00 9.74 .000 +ID2 05:000310 .36 .034 1.00 20.84 .000 +ID3 06:000311 .35 .092 1.00 49.28 .000 SUM 02:000409 26.04 .350 1.00 10.43 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0023-----*# *# Add in Areas A1, A2 and A3 from the County Road *# and route total flow through proposed SWM area *# *# Catchment Al from Triton Study (2.4 hectares, C= 0.5) *# *# _____ | DESIGN STANDHYD | Area (ha)= 2.40 | 01:000101 DT=10.00 | Total Imp(%)= 40.00 Dir. Conn.(%)= 40.00 ____ IMPERVIOUSPERVIOUS (i)Surface Area(ha)=.961.44Dep. Storage(mm)=.801.50Average Slope(%)=5.005.00Length(m)=126.4940.00Mannings n=.013.250 Max.eff.Inten.(mm/hr)= 98.93 20.18 over (min) 10.00 10.00 Storage Coeff. (min)= 1.82 (ii) 11.99 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .10

 PEAK FLOW
 (cms) =
 .26
 .05

 TIME TO PEAK
 (hrs) =
 1.00
 1.17

 RUNOFF VOLUME
 (mm) =
 49.34
 12.35

 TOTAL RAINFALL
 (mm) =
 50.14
 50.14

 RUNOFF COEFFICIENT
 =
 .98
 .25

 TOTALS .312 (iii) 1.000 27.145 50.135 .541 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0024-----*# *# Catchment A2 from Triton Study (0.25 hectares, C= 0.5) *# R.J.B. File: S-405 R.J. Burnside & Associates Ltd. Page 12

DESIGN STANDHYD 04:000102 DT=10.00	Area Total	(ha)= Imp(%)=	.25 40.00 Dir	c. Conn	. (%)=	40.00	
		IMPERVIOUS	PERVIOUS	5 (i)			
Surface Area) (+)			
Dep. Storage	(mm) =	.80	1.50				
Average Slope	(응)=	5.00	5.00				
Average Slope Length	(m) =	40.82	40.00				
Length Mannings n	=	.013	.250				
Max.eff.Inten.(r	nm/hr)=	98.93	20.18				
over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min)	10.00	10.00				
Storage Coeff.	(min) =	.92 (.	ii) 11.10	(ii)			
Unit Hyd. Tpeak	$(\min) =$	10.00	10.00				
Unit Hyd. peak	(cms) =	.17	.10				
		0.0	0.1		*TOTAI		
PEAK FLOW						33 (iii)	
TIME TO PEAK	(nrs) =	T.00	1.17		1.00	JU	
RUNOFF VOLUME	(mm) =	49.34	12.35		2/.14	44	
TOTAL RAINFALL RUNOFF COEFFICIE	(mm) =	JU.14	50.14		50.10	50 4 1	
KUNOFF COEFFICIE		.98	.25		.54	ΨT	
*** WARNING: St							
Us	se a smail	er DT or a	larger area	i.			
	יישמו מסד בימו	יתיתה הראש הוש		۰.			
(i) CN PROCEDU							
(ii) TIME STEP			orage (Abov				
		EFFICIENT.	LEK OK EQUAI	L			
			CEETON TE AN	11/			
(iii) PEAK FLOW	DOEP NOT	INCTORE BA	SULTON IL AU	N Í .			
001:0025 *# Add hydrographs							
001:0025 *# Add hydrographs	from Catc	hments Al	and A2				
001:0025 *# Add hydrographs	from Catc	hments Al	and A2	PEAK	R V		
001:0025 *# Add hydrographs	from Catc	hments Al	and A2	PEAK	R V		
001:0025 *# Add hydrographs ADD HYD (000201) ID1	from Catc ID: NHYD 01:000101	hments Al AREA (ha) 2.40	and A2 QPEAK 7 (cms) .312	TPEAK (hrs) 1.00	R.V. (mm) 27.14	DWF (cms) .000	
001:0025 *# Add hydrographs ADD HYD (000201) ID1 +ID2	from Catc ID: NHYD 01:000101 04:000102	hments A1 AREA (ha) 2.40 .25	and A2	TPEAK (hrs) 1.00 1.00	R.V. (mm) 27.14 27.14	DWF (cms) .000 .000	
001:0025 *# Add hydrographs ADD HYD (000201) ID1 +ID2	from Catc ID: NHYD 01:000101 04:000102	hments A1 AREA (ha) 2.40 .25	and A2 QPEAK 7 (cms) .312 .033	TPEAK (hrs) 1.00 1.00	R.V. (mm) 27.14 27.14	DWF (cms) .000 .000	
001:0025 *# Add hydrographs ADD HYD (000201) ID1 +ID2	from Catc ID: NHYD 01:000101 04:000102 05:000201	hments A1 AREA (ha) 2.40 .25 2.65	and A2 QPEAK 7 (cms) .312 .033 .344	TPEAK (hrs) 1.00 1.00 1.00	R.V. (mm) 27.14 27.14	DWF (cms) .000 .000	
001:0025 *# Add hydrographs ADD HYD (000201) ID1 +ID2 SUM NOTE: PEAK FLOWS	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY	TPEAK (hrs) 1.00 1.00 1.00	R.V. (mm) 27.14 27.14 27.14	DWF (cms) .000 .000 .000	
001:0025	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY	TPEAK (hrs) 1.00 1.00 1.00	R.V. (mm) 27.14 27.14 27.14	DWF (cms) .000 .000 .000	
001:0025	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE	and A2 QPEAK 7 (cms) 7 .312 .033 .344 FLOWS IF ANY	TPEAK (hrs) 1.00 1.00 1.00	R.V. (mm) 27.14 27.14 27.14	DWF (cms) .000 .000 .000	
001:0025	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE	and A2 QPEAK 7 (cms) 7 .312 .033 .344 FLOWS IF ANY	TPEAK (hrs) 1.00 1.00 1.00	R.V. (mm) 27.14 27.14 27.14	DWF (cms) .000 .000 .000	
001:0025	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE	and A2 QPEAK 7 (cms) 7 .312 .033 .344 FLOWS IF ANY	TPEAK (hrs) 1.00 1.00 1.00	R.V. (mm) 27.14 27.14 27.14	DWF (cms) .000 .000 .000	
001:0025	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE Study (0.	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares,	TPEAK (hrs) 1.00 1.00 1.00	R.V. (mm) 27.14 27.14 27.14	DWF (cms) .000 .000 .000	
001:0025 *# Add hydrographs ADD HYD (000201) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0026 *# *# Catchment A3 fro *#	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE Study (0. (ha)=	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68	CPEAK (hrs) 1.00 1.00 1.00 7. C= 0.	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE Study (0. (ha)=	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68	CPEAK (hrs) 1.00 1.00 1.00 7. C= 0.	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025 *# Add hydrographs ADD HYD (000201) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0026 *# *# Catchment A3 fro *#	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE Study (0. (ha)= Imp(%)=	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68 40.00 Din	<pre>PEAK (hrs) 1.00 1.00 (C= 0</pre>	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN Triton	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE 	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68 40.00 Din PERVIOUS	<pre>PEAK (hrs) 1.00 1.00 (C= 0</pre>	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN Triton	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE 	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68 40.00 Din PERVIOUS	<pre>PEAK (hrs) 1.00 1.00 (C= 0</pre>	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN Triton	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE 	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68 40.00 Din PERVIOUS	<pre>PEAK (hrs) 1.00 1.00 (C= 0</pre>	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025	from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN Triton	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE 	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68 40.00 Din PERVIOUS	<pre>PEAK (hrs) 1.00 1.00 (C= 0</pre>	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025 *# Add hydrographs I ADD HYD (000201) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0026 *# *# Catchment A3 fro *# DESIGN STANDHYD 01:000103 DT=10.00 Surface Area Dep. Storage Average Slope Length	<pre>from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN Area Total (ha) = (%) = (m) = (m) =</pre>	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE Study (0. (ha) = Imp(%) = IMPERVIOUS .27 .80 6.00 67.33	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68 40.00 Din PERVIOUS .41 1.50 6.00 40.00	<pre>PEAK (hrs) 1.00 1.00 (C= 0</pre>	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025 *# Add hydrographs ADD HYD (000201) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0026 *# *# Catchment A3 fro *#	<pre>from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN Area Total (ha) = (%) = (m) = (m) =</pre>	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE Study (0. (ha) = Imp(%) = IMPERVIOUS .27 .80 6.00 67.33	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68 40.00 Din PERVIOUS .41 1.50 6.00 40.00	<pre>PEAK (hrs) 1.00 1.00 (C= 0</pre>	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025 *# Add hydrographs I ADD HYD (000201) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0026	<pre>from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN Internation Inte</pre>	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE Study (0. (ha) = Imp(%) = IMPERVIOUS .27 .80 6.00 67.33 .013	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY .68 40.00 Din PERVIOUS .41 1.50 6.00 40.00 .250	<pre>PEAK (hrs) 1.00 1.00 (C= 0</pre>	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025 *# Add hydrographs I ADD HYD (000201) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0026	<pre>from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN Internation Inte</pre>	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE Study (0. (ha) = Imp(%) = IMPERVIOUS .27 .80 6.00 67.33 .013 98 93	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68 40.00 Din PERVIOUS .41 1.50 6.00 40.00 .250 20 18	<pre>PEAK (hrs) 1.00 1.00 (C= 0</pre>	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	
001:0025 *# Add hydrographs ID1 +ID2 SUM NOTE: PEAK FLOWS 001:0026 *# *# Catchment A3 fro *# DESIGN STANDHYD 01:000103 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(r	<pre>from Catc ID: NHYD 01:000101 04:000102 05:000201 DO NOT IN DO NOT IN</pre>	hments A1 AREA (ha) 2.40 .25 2.65 CLUDE BASE Study (0. (ha) = Imp(%) = IMPERVIOUS .27 .80 6.00 67.33 .013 98.93 10.00	and A2 QPEAK T (cms) .312 .033 .344 FLOWS IF ANY 68 hectares, .68 40.00 Din PERVIOUS .41 1.50 6.00 40.00 .250 20 18	<pre>PEAK (hrs) 1.00 1.00 (C= 0</pre>	R.V. (mm) 27.14 27.14 27.14 27.14	DWF (cms) .000 .000	

Post Strittmatter - 5 Year Output Flow

Storage Coe Unit Hyd. 1 Unit Hyd. p	Tpeak (mi	n)=	10.00	10.0	0			
PEAK FLOW TIME TO PEA RUNOFF VOLU TOTAL RAINI RUNOFF COEA *** WARNIN	UME (mr FALL (mr FFICIENT NG: Storag	m)= m)= ge Coeff	49.34 50.14 .98 Sicient is	12.3 50.1 .2	5 4 5 than DT	27.14 50.13 .54	9 (iii) 0 5 5	
CN* (ii) TIME	= 64.0 STEP (DT) THE STOR	Ia =) SHOULD AGE COEF	= Dep. Sto) BE SMALI ?FICIENT.		ove) AL			
)1:0027								
# Add hydrog # representin #	raphs from	m Catchm	nents A3 t	o hydrogr	aph #203		ility	
ADD HYD (00020	02) ID: ID1 01: +ID2 05:	NHYD 000103 000201	AREA (ha) .68 2.65	QPEAK (cms) .089 .344	TPEAK (hrs) 1.00 1.00	R.V. (mm) 27.14 27.14	DWF (cms) .000 .000	
	1102 00.							
NOTE: PEAK I	SUM 04:0	000202	3.33	.434	1.00			
01:0028 # # Direct mind # COMPUTE DUALHY	SUM 04:0 FLOWS DO 1 or system YD	000202 NOT INCI 	3.33 JUDE BASEF	.434 FLOWS IF A ea, major	1.00 NY. system : [CINL]	27.14 27.14 stays on ET] =	.000 County .450	-
01:0028 # # Direct mind #	SUM 04:0 FLOWS DO 1 or system YD 00202	O00202 NOT INCI flows t Average Number Total m	3.33 JUDE BASEF JUDE BASEF JUDE BASEF JUDE BASEF JUDE BASEF JUDE BASEF JUDE BASEF JUDE BASEF JUDE BASEF JUDE BASEF	.434 FLOWS IF A 	1.00 NY. system [CINL] m [NINL]	27.14 27.14 stays on ET] = ET] = =	.000 	(cms)
01:0028 Direct mind COMPUTE DUALHY TotalHyd 04:00 TOTAL HYD.	SUM 04:0 FLOWS DO I Or system OO202 ID: NH ³ 04:000	<pre>======= 000202 NOT INCL </pre>	3.33 JUDE BASEE CO SWM Are of inlets ninor syst najor syst AREA (ha) 3.33	.434 FLOWS IF A ea, major apacities in system cem capaci cem storag QPEAK (cms) .434	1.00 NY. system s [CINL] m [NINL] ty e [TMJS] TPEA] (hrs 1.00	27.14 27.14 stays on ET] = ET] = TO] = K R. (m 0 27.1	.000 .000 .450 .450 0. V. m) 45	(cms) (cms) (cu.m.) DWF (cms) .000
01:0028 # Direct mind # COMPUTE DUALHY TotalHyd 04:00	SUM 04:0 FLOWS DO I FLOWS DO I or system OO202 ID: NH ¹ 04:000 01:000	======= 000202 NOT INCI flows t Average Number Total m Total m YD 202 =======	3.33 JUDE BASEE CO SWM Are of inlets ninor syst najor syst AREA (ha) 3.33	.434 FLOWS IF A ea, major apacities in system cem capaci cem storag QPEAK (cms) .434	1.00 NY. system s [CINL] m [NINL] ty e [TMJS] TPEA] (hrs 1.00	27.14 27.14 stays on ET] = ET] = TO] = K R. (m 0 27.1 0 .0	.000 .000 .450 .450 0. V. m) 45 .00	(cms) (cms) (cu.m.) DWF (cms) .000 ===== .000
01:0028 # Direct mind COMPUTE DUALHY TotalHyd 04:00 TOTAL HYD. ========== MAJOR SYST MINOR SYST NOTE: PEAH	SUM 04:0 FLOWS DO 1 FLOWS DO 1 or system Or system ID: NH ³ 04:000 01:000 05:000 K FLOWS DO	<pre></pre>	3.33 JUDE BASEF JUDE BASEF JUDE BASEF JUDE BASEF JUDE BASE AREA (ha) 3.33 JOUE BASE JUDE BASE	.434 FLOWS IF A ea, major apacities s in system cem capaci cem storag QPEAK (cms) .434 .000 .434 SEFLOWS IF	1.00 NY. system : [CINL] m [NINL] ty e [TMJS] (hrs 1.00 .00 1.00 ANY.	27.14 27.14 stays on ET] = ET] = TO] = K R. (m 0 27.1 0 .0 0 27.1	.000 County .450 1.450 0. V. m) 45 00 45	(cms) (cu.m.) DWF (cms) .000 .000 .000
01:0028 # Direct mind COMPUTE DUALHY TotalHyd 04:00 MAJOR SYST MINOR SYST NOTE: PEAH 01:0029 # Add minor h	SUM 04:0 FLOWS DO I FLOWS DO I or system DO202 ID: NH ³ 04:000 01:000 05:000 K FLOWS DO highway di	202 202 202 202 202 202 202 202 202 202	3.33 JUDE BASEF JUDE BASEF So SWM Are co SWM Are of inlet ca of inlets inor syst AREA (ha) 3.33 .00 3.33 NCLUDE BAS	.434 FLOWS IF A ea, major apacities s in system cem capaci cem storag QPEAK (cms) .434 .000 .434 SEFLOWS IF	1.00 NY. system s [CINL] m [NINL] ty e [TMJS] (hrs 1.000 1.000 ANY.	27.14 27.14 stays on ET] = ET] = TO] = K R.) (m 0 27.1 0 .0 0 27.1	.000 .County .450 1.450 0. V. m) 45 .000 45	(cms) (cu.m.) DWF (cms) .000 .000
01:0028 # Direct mind COMPUTE DUALHY TotalHyd 04:00 MAJOR SYST MINOR SYST NOTE: PEAP 01:0029	SUM 04:0 FLOWS DO I FLOWS DO I or system OT System ID: NH ¹ 04:000 01:000 05:000 K FLOWS DO highway di 03) ID:	======= 000202 NOT INCI 	3.33 JUDE BASEF JUDE BASEF JUDE BASEF JUDE BASEF So SWM Are co SWM Are	.434 FLOWS IF A ea, major apacities in system cem capaci cem storag QPEAK (cms) .434 .000 .434 SEFLOWS IF	1.00 NY. system : [CINL] m [NINL] ty e [TMJS' (hrs 1.00 1.00 ANY. 	27.14 27.14 stays on ET] = ET] = TO] = K R. (m 0 27.1 0 .0 0 27.1 0 .0 0 27.1 	.000 .County .450 1.450 0. V. m) 45 	(cms) (cu.m.) DWF (cms) .000 .000

		SUM	06:C	00203	29.37	.784	4 1.00	12.32	.000	
NOTE:	PEAK	FLOWS	DO N	OT INC	CLUDE BAS	EFLOWS I	F ANY.			
 1 • 0 0 3 0										
	ittmatt									
Ori	ginal R	ating	Curv	e (Feb	ruary 19	90) revis	sed July	1999 -	same sto	rage
r TOM	TTOM O	LILICE	e moa	lIled	Feb. 22,	2000 (fi	rom 150mm	to 225	mm)	
	liyeu ka	cing (Jurve	(Apri	.1 2000)	with pond	d redesig	n		
	RESERVO : (00020			Reques	sted rout	ing time	step = 1	0.0 min	•	
					OUT		דטאידי היאטד			
			-	OUTFLO	W STO	RAGE				
					;) (ha		(Cms)	(ha	.m.)	
					0.0000		.246	.73301	E-01	
					0 .2600 0 .4500		.318 .345			
					1 .1070		.378			
		,			6 .2100			.17861	E+00	
					2 .46401 9 .68701			.1940		
				.20	.00701	7-01	.467	.21881	5+00	
ROU	TING RE	SULTS			AREA	QPEAK	TPEAK	I	R.V.	
		• (000	2021		(ha) 29.37	(cms)	(hrs)		(mm)	
	FLOW<02				29.37 29.37	.784			.323	
	FLOW<05					.000	.000		. 000	
		ਹਰ	λV	ET OM						
				FLOW	REDUCT: F PEAK FI	ION [Qout	/Qin](%)=			
		TI	ME SI	HIFT O	REDUCT: F PEAK FI RAGE US	JOW		= 30.	. 00	
		T I MA	ME SI XIMUI	HIFT O M STO	F PEAK FI RAGE US	SED	(min)= (ha.m.)=	= 30. =.6597E-	. 00	
1:0031-		TI MA	ME SI XIMUI	HIFT O M STO	F PEAK FI	LOW SED	(min)= (ha.m.)=	= 30. =.6597E-	. 00	
91:0031- PRINT H		TI MA 	ME SI XIMUI	HIFT O 4 STO 	F PEAK FI RAGE US	LOW SED	(min)= (ha.m.)=	= 30. =.6597E-	. 00	
PRINT H ID=02	HYD (000406)	TI MA 	ME SI XIMUI ARI QPI	HIFT O 4 STO EA EAK	F PEAK FI RAGE US 	LOW SED 29.370 .233	(min)= (ha.m.)= 	= 30. =.6597E-	. 00	
1:0031- 		TI MA 	ME SI XIMUI ARI QPI TPI	HIFT O 4 STO EA EAK EAK	F PEAK FI RAGE US (ha) = (cms) = (hrs) =	LOW SED 29.370 .233 1.500	(min)= (ha.m.)= (i)	= 30. =.6597E-	. 00	
PRINT H ID=02 DT=10.(HYD (000406))0 PCYC=	TI MA = 5	ME SI XIMUI ARI QPI TPI VOJ	HIFT O M STO EA EA EAK EAK LUME	F PEAK FI RAGE US (ha) = (cms) = (hrs) = (mm) =	LOW SED 29.370 .233 1.500 12.323	(min)= (ha.m.)= (i)	= 30. =.6597E-	. 00	
1:0031- 	HYD (000406) 00 PCYC= PEAK 1	TI MA) = 5 	ME SI XIMUI ARI QPI TPI VOJ OES 1	HIFT O M STO EA EAK EAK LUME	F PEAK FI RAGE US (ha) = (cms) = (hrs) = (mm) = CLUDE BAS	LOW SED 29.370 .233 1.500 12.323 SEFLOW IF	(min) = (ha.m.) = 	= 30. =.6597E-	. 00	
01:0031- PRINT H ID=02 DT=10.((i) TIME	HYD (000406) 00 PCYC= PEAK I FLOW	TI MA) = 5 FLOW D TIM	ME SI XIMUI ARI QPI TPI VOJ OES I	HIFT O M STO EA EA EAK LUME NOT ING FLOW	F PEAK FI RAGE US (ha) = (cms) = (hrs) = (mm) = CLUDE BAS TIME	29.370 29.370 .233 1.500 12.323 EFLOW IF FLOW	(min) = (ha.m.) = 	= 30. =.6597E- 	.00 -01 	FLOW
1:0031- PRINT H ID=02 DT=10.(HYD (000406) 00 PCYC= PEAK 1	TI MA) = 5 FLOW D TIM hr	ME SI XIMUI ARI QPI TPI VOJ OES N E S	HIFT O M STO EA EA EAK LUME NOT ING FLOW cms	F PEAK FI RAGE US (ha) = (cms) = (hrs) = (mm) = CLUDE BAS TIME hrs	LOW SED 29.370 .233 1.500 12.323 EEFLOW IF FLOW FLOW cms	(min) = (ha.m.) = 	= 30. =.6597E- FLOW cms	.00 -01 TIME hrs	CMS
01:0031- PRINT H ID=02 DT=10.((i) TIME hrs .00 .83	HYD (000406) 00 PCYC= PEAK H FLOW cms .000 .106	TI MA) = 5 FLOW D TIM hr 87. 88.	ME SI XIMUI ARI QPH TPH VOI OES N E S 50 33	HIFT O A STO EA EAK EAK LUME NOT INC FLOW Cms .002 .002	F PEAK FI RAGE US (ha) = (cms) = (hrs) = (mm) = CLUDE BAS TIME hrs 175.00 175.83	LOW SED 29.370 .233 1.500 12.323 SEFLOW IF FLOW FLOW cms .001	(min) = (ha.m.) = 	= 30. =.6597E- FLOW cms .000	.00 -01 TIME hrs 350.00	cms .000
01:0031- PRINT H ID=02 DT=10.((i) TIME hrs .00 .83 1.67	HYD (000406) 00 PCYC= PEAK H FLOW cms .000 .106 .228	TI MA) = 5 FLOW D TIM hr 87. 88. 89.	ME SI XIMUI ARI QPI TPI VOI OES N E S 50 33 17	HIFT O A STO A STO EA EA EAK EAK LUME JOT INC FLOW Cms .002 .002 .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (mm) = CLUDE BAS I TIME hrs 175.00 175.83 176.67</pre>	LOW SED 29.370 .233 1.500 12.323 EFLOW IF FLOW IF FLOW cms .001 .001 .001	<pre>(min)= (ha.m.)= (i) (i) ANY. TIME hrs 262.50 263.34 264.17</pre>	= 30. =.6597E- Cms .000 .000 .000	TIME hrs 350.00 350.83 351.66	CMS
1:0031- PRINT H ID=02 DT=10.((i) TIME hrs .00 .83 1.67 2.50	HYD (000406) 00 PCYC= PEAK H FLOW cms .000 .106 .228 .169	TI MA = 5 = 5 TIM hr 87. 88. 89. 90.	ME SI XIMUI ARI QPI TPI VOI OES N E S 50 33 17 00	HIFT O A STO LA EA EA EAK LUME NOT INC FLOW Cms .002 .002 .002 .002 .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (mm) = CLUDE BAS TIME hrs 175.00 175.83 176.67 177.50</pre>	LOW SED 29.370 .233 1.500 12.323 EEFLOW IF FLOW I Cms .001 .001 .001 .001	<pre>(min)= (ha.m.)= (ha.m.)= (i) (i) ANY. TIME hrs 262.50 263.34 264.17 265.00</pre>	= 30. =.6597E- cms .000 .000 .000 .000	TIME hrs 350.00 351.66 352.50	cms .000 .000 .000 .000
01:0031- PRINT H ID=02 DT=10.((i) TIME hrs .00 .83 1.67	HYD (000406) 00 PCYC= PEAK H FLOW cms .000 .106 .228	TI MA = 5 FLOW D TIM hr 87. 88. 89. 90. 90.	ME SI XIMUI ARI QPH TPH VOI OES N E S 50 33 17 00 83	HIFT O A STO A STO EA EA EAK EAK LUME NOT INC FLOW Cms .002 .002 .002 .002 .002 .002 .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (mm) = CLUDE BAS TIME hrs 175.00 175.83 176.67 177.50 178.33</pre>	LOW SED 29.370 .233 1.500 12.323 EEFLOW IF FLOW Cms .001 .001 .001 .001 .001	<pre>(min)= (ha.m.)= (ha.m.)= (i) ANY. TIME hrs 262.50 263.34 264.17 265.00 265.84</pre>	= 30. =.6597E- cms .000 .000 .000 .000 .000 .000	TIME hrs 350.00 350.83 351.66 352.50 353.33	cms .000 .000 .000 .000 .000
1:0031- PRINT H ID=02 DT=10.0 (i) TIME hrs .00 .83 1.67 2.50 3.33 4.17 5.00	HYD (000406) 00 PCYC= PEAK H FLOW cms .000 .106 .228 .169 .088 .008 .008	TI MA = 5 FLOW D TIM hr 87. 88. 89. 90. 90. 90. 91. 92.	ME SI XIMUI ARI QPH TPH VOI OES N E S 50 33 17 00 83 67	HIFT O A STO LA EA EA EAK LUME NOT INC FLOW Cms .002 .002 .002 .002 .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (nm) = CLUDE BAS TIME hrs 175.00 175.83 176.67 177.50 178.33 179.17</pre>	LOW SED 29.370 .233 1.500 12.323 SEFLOW IF FLOW Cms .001 .001 .001 .001 .001 .001 .001 .001	<pre>(min)= (ha.m.)= (ha.m.)= (i) (i) ANY. TIME hrs 262.50 263.34 264.17 265.00 265.84 266.67</pre>	= 30. =.6597E- Cms .000 .000 .000 .000 .000 .000 .000 .000	TIME hrs 350.00 350.83 351.66 352.50 353.33 354.16	cms .000 .000 .000 .000 .000
D1:0031- PRINT H ID=02 DT=10.0 (i) TIME hrs .00 .83 1.67 2.50 3.33 4.17 5.00 5.83	HYD (000406) D0 PCYC= PEAK H FLOW cms .000 .106 .228 .169 .088 .008 .008 .008	TI MA 	ME SI XIMUI ARI QPI TPI VOJ OES N E S 50 33 17 00 83 67 50 33	HIFT 0 4 STO 4 STO 5 A EA EA EA EA EA EA CUME NOT IN Cms .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (hrs) = (mm) = CLUDE BAS TIME hrs 175.00 175.83 176.67 177.50 178.33 179.17 180.00 180.83</pre>	LOW SED 29.370 .233 1.500 12.323 SEFLOW IF FLOW Cms .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001	<pre>(min)= (ha.m.)= (ha.m.)= (i) (i) ANY. TIME hrs 262.50 263.34 264.17 265.00 265.84 266.67 267.50 268.34</pre>	= 30. =.6597E- cms .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000	TIME hrs 350.00 350.83 351.66 352.50 353.33 354.16 355.00 355.83	cms .000 .000 .000 .000 .000
D1:0031- PRINT H ID=02 DT=10.0 (i) TIME hrs .00 .83 1.67 2.50 3.33 4.17 5.00 5.83 6.67	HYD (000406) D0 PCYC= PEAK H FLOW cms .000 .106 .228 .169 .088 .008 .008 .008 .008	TI MA 	ME SI XIMUI ARI QPI TPI VOI OES N E S 50 33 17 00 83 67 50 33 17	HIFT 0 4 STO 4 STO 5 A EA EA EA EA EA EA CUME NOT IN Cms .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (hrs) = (mm) = CLUDE BAS TIME hrs ! 175.00 175.83 176.67 177.50 178.33 179.17 180.00 180.83 181.67</pre>	LOW SED 29.370 .233 1.500 12.323 SEFLOW IF FLOW Cms .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001	<pre>(min)= (ha.m.)= (ha.m.)= (i) (i) ANY. TIME hrs 262.50 263.34 264.17 265.00 265.84 266.67 267.50 268.34 269.17</pre>	= 30. =.6597E- cms .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000	TIME hrs 350.00 350.83 351.66 352.50 353.33 354.16 355.00 355.83 356.66	cms .000 .000 .000 .000 .000 .000 .000 .0
D1:0031- PRINT H ID=02 DT=10.((i) TIME hrs .00 .83 1.67 2.50 3.33 4.17 5.00 5.83 6.67 7.50	HYD (000406) D0 PCYC= PEAK F FLOW cms .000 .106 .228 .169 .088 .008 .008 .008 .008 .008 .008	TI MA = 5 TIM hr 87. 88. 89. 90. 90. 90. 91. 92. 93. 94. 95.	ME SI XIMUI ARI QPI TPI VOI 0ES N E S 50 33 17 00 83 67 50 33 17 00	HIFT 0 4 STO 5 A EA EA EA EA EA EA CUME NOT IN FLOW Cms .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (hrs) = (mm) = CLUDE BAS TIME hrs 175.00 175.83 176.67 177.50 178.33 179.17 180.00 180.83 181.67 182.50</pre>	LOW SED 29.370 .233 1.500 12.323 SEFLOW IF FLOW Cms .001	<pre>(min)= (ha.m.)= (ha.m.)= (i) (i) ANY. TIME hrs 262.50 263.34 264.17 265.00 265.84 266.67 267.50 268.34 269.17 270.00</pre>	= 30. =.6597E- cms .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000	TIME hrs 350.00 350.83 351.66 352.50 353.33 354.16 355.00 355.83 356.66 357.50	cms .000 .000 .000 .000 .000 .000 .000 .0
D1:0031- PRINT H ID=02 DT=10.0 (i) TIME hrs .00 .83 1.67 2.50 3.33 4.17 5.00 5.83 6.67	HYD (000406) D0 PCYC= PEAK H FLOW cms .000 .106 .228 .169 .088 .008 .008 .008 .008	TI MA 	ME SI XIMUI ARI QPI TPI VOI OES N E S 50 33 17 00 83 67 50 33 17 00 83 67 50 83 67 50 83 67 50 83 67 50 83	HIFT 0 4 STO 4 STO 5 A EA EA EA EA EA EA CUME NOT IN Cms .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (hrs) = (mm) = CLUDE BAS TIME hrs ! 175.00 175.83 176.67 177.50 178.33 179.17 180.00 180.83 181.67 182.50 183.33</pre>	LOW SED 29.370 .233 1.500 12.323 SEFLOW IF FLOW Cms .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .000 .000	<pre>(min)= (ha.m.)= (ha.m.)= (i) (i) ANY. TIME hrs 262.50 263.34 264.17 265.00 265.84 266.67 267.50 268.34 269.17 270.00 270.84</pre>	= 30. =.6597E- FLOW Cms .000 .00	.00 -01 	cms .000 .000 .000 .000 .000 .000 .000 .0
1:0031- PRINT H ID=02 DT=10.((i) TIME hrs .00 .83 1.67 2.50 3.33 4.17 5.00 5.83 6.67 7.50 8.33 9.17 10.00	HYD (000406) D0 PCYC= PEAK H FLOW cms .000 .106 .228 .169 .088 .008 .008 .008 .008 .008 .008 .00	TI MA = 5 = 5 TIM br 1 Nr 87. 88. 89. 90. 90. 90. 90. 91. 92. 93. 94. 95. 95. 95. 95. 97.	ME SI XIMUI ARI QPI TPI VOI 0ES N E S 50 33 17 00 83 67 50 33 17 00 83 67 50 33	HIFT 0 A STO A STO EA EAK EAK LUME NOT INC FLOW Cms .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (hrs) = (mm) = CLUDE BAS I TIME I hrs I 175.00 I 175.83 I 176.67 I 177.50 I 178.33 I 179.17 I 180.00 I 180.83 I 181.67 I 182.50 I 183.33 I 184.17 I 185.00</pre>	LOW SED 29.370 .233 1.500 12.323 SEFLOW IF FLOW Cms .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .000 .000 .000	<pre>(min)= (ha.m.)= (ha.m.)= (i) (i) ANY. TIME hrs 262.50 263.34 264.17 265.00 265.84 266.67 267.50 268.34 269.17 270.00</pre>	= 30. =.6597E- FLOW Cms .000	.00 -01 	cms .000 .000 .000 .000 .000 .000 .000 .0
1:0031- PRINT H ID=02 DT=10.((i) TIME hrs .00 .83 1.67 2.50 3.33 4.17 5.00 5.83 6.67 7.50 8.33 9.17 10.00 10.83	HYD (000406) D0 PCYC= PEAK H FLOW cms .000 .106 .228 .169 .088 .008 .008 .008 .008 .008 .008 .00	TI MA = 5 = 5 = 5 = 5 = 5 = 5 = 5 	ME SI XIMUI ARI QPI TPI VOJ OES N E S 50 33 17 00 83 67 50 33 17 00 83 67 50 33 33	HIFT 0 A STO A STO EA EAK EAK LUME NOT INC FLOW Cms .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (hrs) = (mm) = CLUDE BAS I TIME I hrs I 175.00 I 175.83 I 176.67 I 177.50 I 178.33 I 179.17 I 180.00 I 180.83 I 181.67 I 182.50 I 183.33 I 184.17 I 185.00 I 185.83</pre>	LOW SED 29.370 .233 1.500 12.323 SEFLOW IF FLOW Cms .001 .000	<pre>(min)= (ha.m.)= (ha.m.)= (i) ANY. TIME hrs 262.50 263.34 264.17 265.00 265.84 266.67 267.50 268.34 269.17 270.00 270.84 271.67 272.50 273.34</pre>	= 30. =.6597E- FLOW Cms .000	.00 -01 	cms .000 .000 .000 .000 .000 .000 .000 .0
1:0031- PRINT H ID=02 DT=10.0 (i) TIME hrs .00 .83 1.67 2.50 3.33 4.17 5.00 5.83 6.67 7.50 8.33 9.17 10.00	HYD (000406) D0 PCYC= PEAK H FLOW cms .000 .106 .228 .169 .088 .008 .008 .008 .008 .008 .008 .00	TI MA = 5 = 5 = 5 = 5 = 5 = 5 = 5 	ME SI XIMUI ARI QPI TPI VOI 0ES N E S 50 33 17 00 83 67 50 33 17 00 83 67 50 33 17 00 83 67 50 33 17	HIFT O M STO A STO EA EA EAK LUME NOT INC FLOW Cms .002	<pre>F PEAK FI RAGE US (ha) = (cms) = (hrs) = (hrs) = (mm) = CLUDE BAS I TIME I hrs I 175.00 I 175.83 I 176.67 I 177.50 I 178.33 I 179.17 I 180.00 I 180.83 I 181.67 I 182.50 I 183.33 I 184.17 I 185.00</pre>	LOW SED 29.370 .233 1.500 12.323 SEFLOW IF FLOW Cms .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .001 .000	<pre>(min)= (ha.m.)= (ha.m.)= (i) ANY. TIME hrs 262.50 263.34 264.17 265.00 265.84 266.67 267.50 268.34 269.17 270.00 270.84 271.67 272.50</pre>	= 30. =.6597E- FLOW Cms .000 .00	.00 -01 	cms .000 .000 .000 .000 .000 .000 .000 .0

							*
10 00	0071	100 00	000	100 00			
13.33		100.83		188.33	.000 275.84	•	
14.17	.007	101.67	.002	189.17	.000 276.67	.000 364.16	.000
15.00	.0071	102.50	.002	190.00	.000 277.50	.000 365.00	.000
15.83		103.33		190.83	.000 278.34	.000 365.83	
							.000
16.67		104.17		191.67	.000 279.17	.000 366.66	.000
17.50	.006]	105.00	.002	192.50	.000 280.00	.000 367.50	.000
18.33	0061	105.83	0021	193.33	.000 280.83	.000 368.33	.000
19.17		106.67					
				194.17	.000 281.67	.000 369.16	.000
20.00		107.50		195.00	.000 282.50	.000 370.00	.000
20.83	.0061	108.33	.0021	195.83	.000 283.33	.000 370.83	.000
21.67		109.17	0021	196.67	.000 284.17	.000 371.66	.000
22.50		110.00		197.50	.000 285.00	.000 372.50	.000
23.33		110.83	.002	198.33	.000 285.83	.000 373.33	.000
24.17	.0061	111.67	.001	199.17	.000 286.67	.000 374.16	.000
25.00		112.50		200.00	.000 287.50	.000 375.00	.000
25.83		113.33					
			.001		.000 288.33	.000 375.83	.000
26.67		114.17		201.67	.000 289.17	.000 376.66	.000
27.50	.0061	115.00	.001	202.50	.000 290.00	.000 377.50	.000
28.33		115.83		203.33	.000 290.83	.000 378.33	.000
29.17							
		116.67		204.17	.000 291.67	.000 379.16	.000
30.00		117.50		205.00	.000 292.50	.000 380.00	.000
30.83	.005	118.33	.001	205.83	.000 293.33	.000 380.83	.000
31.67	.0051	119.17	.001	206.67	.000 294.17	.000 381.66	.000
32.50		120.00		207.50	.000 295.00	.000 382.50	.000
33.33		120.83		208.33	.000 295.83	.000 383.33	
							.000
34.17		121.67		209.17	.000 296.67	.000 384.16	.000
35.00		122.50	.001	210.00	.000 297.50	.000 385.00	.000
35.83	.0051	123.33	.001	210.84	.000 298.33	.000 385.83	.000
36.67		124.17	.001		.000 299.17	.000 386.66	.000
37.50		125.00		212.50	.000 300.00		
						.000 387.50	.000
38.33		125.83		213.34	.000 300.83	.000 388.33	.000
39.17	.005	126.67	.001	214.17	.000 301.67	.000 389.16	.000
40.00	.0051	127.50	.0011	215,00	.000 302.50	.000 389.99	.000
40.83		128.33		215.84	.000 303.33	.000 390.83	.000
41.67		129.17					
				216.67	.000 304.17	.000 391.66	.000
42.50		130.00	.001		.000 305.00	.000 392.49	.000
43.33	.004	130.83	.001	218.34	.000 305.83	.000 393.33	.000
44.17	.0041	131.67	.0011	219.17	.000 306.67	.000 394.16	.000
45.00		132.50		220.00	.000 307.50	.000 394.99	.000
		133.33			.000 308.33		.000
46.67		134.17		221.67	.000 309.17	.000 396.66	.000
47.50	.004	135.00	.001	222.50	.000 310.00	.000 397.49	.000
48.33	.0041	135.83	.001	223.34	.000 310.83	.000 398.33	.000
49.17		136.67		224.17	.000 311.67	.000 399.16	.000
50.00		137.50		225.00		-	
					.000 312.50	.000 399.99	.000
50.83		138.33		225.84	.000 313.33	.000 400.83	.000
51.67	.004	139.17	.001	226.67	.000 314.17	.000 401.66	.000
52.50	,0041	140.00	.001	227.50	.000 315.00	.000 402.49	.000
53.33		140.83		228.34	.000 315.83	.000 403.33	.000
				229.17			
54.17		141.67			.000 316.67	.000 404.16	.000
55.00		142.50		230.00	.000 317.50	.000 404.99	.000
55.83	.004	143.33	.001	230.84	.000 318.33	.000 405.83	.000
56.67	.0041	144.17	.001	231.67	.000 319.17	.000 406.66	.000
57.50		145.00		232.50	.000 320.00	.000 407.49	.000
58.33		145.83		233.34	.000 320.83		
						.000 408.33	.000
59.17		146.67		234.17	.000 321.67	.000 409.16	.000
60.00		147.50		235.00	.000 322.50	.000 409.99	.000
60.83	.003	148.33	.001	235.84	.000 323.33	.000 410.83	.000
61.67		149.17		236.67	.000 324.17	.000 411.66	.000
62.50	,	150.00		237.50	.000 325.00	.000 412.49	.000
		150.83		238.34			
63.33					.000 325.83	.000 413.33	.000
64.17	.003	151.67	.001	239.17	.000 326.67	.000 414.16	.000

R.J. Burnside & Associates Ltd.

Post Strittmatter - 5 Year Output Flow

	0.0	0021	150 50	0.01 1	040 00	000		0.0.0.1	41.4.95	
65. 65.			152.50 153.33		240.00 240.84		327.50 328.33		414.99 415.83	.000 .000
66.			154.17		240.04		329.17		415.83	
67.			155.00	.0011	242.50	.0001	330.00		417.49	.000
68.			155.83	.001	243.34	.0001	330.83		418.33	.000
69.			156.67	.001	243.34 244.17 245.00	.0001	331.67		419.16	.000
70.	00	.003	157.50	.001	245.00	.0001	332.50	.0001	419.99	.000
70.			158.33	.001	245.84	.000	333.33		420.83	.000
71.			159.17		246.67		334.17		421.66	.000
72.			160.00	.001	247.50	.000	335.00		422.49	.000
73.			160.83	.001	248.34	.0001	335.83		423.33	.000
74.			161.67	.001	249.17 250.00	.0001	336.66 337.50	.000	424.16	.000
75.			162.50	.001	250.00	.0001		.0001	424.99	.000
75. 76			163.33	.0011	250.84	.0001	338.33	.0001	425.83	.000
76. 77.			164.17 165.00		251.67 252.50		339.16 340.00		426.66	
78.			165.83	.0011	252.50	.0001	340.00		427.49 428.33	
79.			166.67	.0011	252.54	,000,	341.66		420.33 429.16	
80.			167.50	.0011	254.17 255.00 255.84		342 50	0001	129 99	000
80.			168.33	.0011	255.84	.0001	342.50 343.33	0001	430.83	.000
81.			169.17	.0011	256.67	.0001	344.16	.0001	431.66	.000
82.			170.00	.001	257.50	.0001	345.00	.0001	432.49	
83.	33	.0021	170.83	.0011	258.34	.0001	345.83		433.33	
84.	17	.002	171.67	.001	259.17	.000	346.66			
85.	00	.002	171.67 172.50 173.33 174.17	.001	260.00	.000	347.50	.000		
85.	83	.002	173.33	.001	260.84	.000	348.33 349.16	.000		
86.	67	.002	174.17	.001	261.67	.000	349.16	.000		
DES 06:	IGN ST. 000307	ANDHY: DT=1	D 2 0.00 1	Area Fotal I	(ha)= mp(%)=	.32 30.00	Dir. Cor	nn.(%)=	20.00	
				тм		S PERV				
	Surfac	e Are	a (ha							
						1				
	Averag				2.00		.00			
	Length		(m) =	46.19	40	.00			
	Mannin	gs n		<u></u>	.013	•	250			
	Max ef	f Int	en.(mm/hr) =	98.93	25	.97			
			over (min		10.00		.00			
	Storag		ff. (min		1.31		.41 (ii)			
			peak (min		10.00		.00			
			eak (cms		.17		.09			
		-						*TOTA	LS*	
	PEAK F		(cms		.02		.01		27 (iii)	
	TIME T	O PEA	K (hrs		1.00		.17	1.0		
	RUNOFF				49.34		.71	20.8		
	TOTAL				50.14	50	0.14	50.1		
				= a Coaff		is smalle	.27 Sr than Dr	.4	10	
	W	ערוז דון				a larger		- +		
	(;)	מס מית	OCEDIIRE S	ዊፒ.ፑሮጥፑፐ	ים מטא ו	RVIOUS LC				
	(1)	CN PR				storage (
	(ii)					LLER OR E				
			THE STORA							
		& Assoc	iates Ltd.		· · · · · ·	Page 17			R.J.	B. File: S-4

(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0033------*# *# Catchment SA8 (Strittmatter A8, 0.46 hectares) *# NOT ROUTED INTO POND>>>> FLOWS UNCONTROLLED DOWN ROAD *# --- Area decreased May 2000 *# _____ | DESIGN STANDHYD | Area (ha)= .46 | 05:000308 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 IMPERVIOUS PERVIOUS (1)

 Surface Area
 (ha) =
 .14
 .32

 Dep. Storage
 (mm) =
 .80
 1.50

 Average Slope
 (%) =
 2.00
 2.00

 Length
 (m) =
 55.38
 40.00

 Mannings n
 =
 .013
 .250

 Max.eff.Inten.(mm/hr)= 98.93 25.97 over (min) 10.00 10.00 Storage Coeff. (min)= 1.46 (ii) 13.57 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .09 *TOTALS*

 PEAK FLOW
 (cms) =
 .03
 .01

 TIME TO PEAK
 (hrs) =
 1.00
 1.17

 RUNOFF VOLUME
 (mm) =
 49.34
 13.71

 TOTAL RAINFALL
 (mm) =
 50.14
 50.14

 RUNOFF COEFFICIENT
 =
 .98
 .27

 .038 (iii) 1.000 20.836 50.135 .416 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ 001:0034-----*# *# Catchment SA9 - Strittmatter road drainage d/s of SWM area *# NOT ROUTED INTO POND>>>> FLOWS UNCONTROLLED DOWN ROAD * # (Strittmatter A9, 0.08 hectares, C= 0.95) *# ______ | DESIGN STANDHYD | Area (ha)= .08 | 09:000410 DT=10.00 | Total Imp(%)= 95.00 Dir. Conn.(%)= 95.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.08Dep. Storage(mm) =.80Average Slope(%) =2.00Length(m) =23.09Mannings n=.013 .00 1.50 2.00 40.00 .250 Max.eff.Inten.(mm/hr)= 98.93 20.18 over (min) 10.00 10.00 Storage Coeff. (min)= .86 (ii) 14.25 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00

R.J. Burnside & Associates Ltd.

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:\LORENA\S-405\CORREC~1\MAI	100 (011110.00						
Unit Hyd. peak	(cms) =	.17	. C)9		/	
					*TOTA		
PEAK FLOW TIME TO PEAK	(cms) =	.02	.0	0	.0	21 (iii)	
TIME TO PEAK	(hrs) =	1.00	1.1	.7	1.0	00	
RUNOFF VOLUME							
TOTAL RAINFALL							
RUNOFF COEFFICIE						47	
*** WARNING: St					1		
US	e a smaller	r DT or a	larger ar	rea.			
(i) CN PROCEDU							
UN* = 6 (ii) TIME STEP	4.0 Ia = (DT) SHOULD						
THAN THE S							
(iii) PEAK FLOW	DOES NOT IN	NCLUDE BAS	EFLOW IF	ANY.			
01:0035							
<pre># Add hydrograph # Strittmatter de</pre>						outflow	from
ADD HYD (000411)	ID: NHYD	AREA	QPEAK	TPEAK	R.V.	DWF	
	02:000406	(ha)	(cms)	(hrs)	(mm)	(cms)	
TD1	02:000406	29.37	.233	1.50	12.32	.000	
+TD2	06:000307	32	.027	1.00	20.84	.000	
	05:000308	. 54	.027 N38	1 00	20 84	.000	
		.40				.000	
SUM NOTE: PEAK FLOWS	04:000411 DO NOT INCI	30.23 LUDE BASEF	.269 Lows if A	1.17 ANY.	12.64	.000	
SUM NOTE: PEAK FLOWS 01:0036 # # Add major system # below diversion	04:000411 DO NOT INCI	30.23 LUDE BASEF	.269 Lows if A	1.17 ANY.	12.64 	.000	
SUM NOTE: PEAK FLOWS 01:0036 # # Add major system # below diversion #	04:000411 DO NOT INC overflow : (Areas A4 a	30.23 LUDE BASEF	.269 Lows if A	1.17 ANY. County R	12.64 oad dra	.000	
SUM NOTE: PEAK FLOWS 001:0036 # # Add major system # below diversion	04:000411 DO NOT INC overflow : (Areas A4 a	30.23 LUDE BASEF from diver and A5) AREA	.269 LOWS IF A Sion to C QPEAK	1.17 ANY. County R TPEAK	12.64 oad dra R.V.	.000 inage DWF	
SUM NOTE: PEAK FLOWS 01:0036 # # Add major system # below diversion # ADD HYD (000414)	04:000411 DO NOT INC overflow : (Areas A4 a ID: NHYD	30.23 LUDE BASEF from diver and A5) AREA (ha)	.269 LOWS IF A sion to (QPEAK (cms)	1.17 ANY. County R TPEAK (hrs)	12.64 oad dra R.V. (mm)	.000 inage DWF (cms)	
SUM NOTE: PEAK FLOWS 01:0036 # # Add major system # below diversion # ADD HYD (000414) ID1	04:000411 DO NOT INC overflow : (Areas A4 a	30.23 LUDE BASEF from diver and A5) AREA	.269 LOWS IF A Sion to C QPEAK	1.17 ANY. County R TPEAK	12.64 oad dra R.V. (mm) .00	.000 inage DWF (cms)	**DRY**
SUM NOTE: PEAK FLOWS 01:0036 # # Add major system # below diversion # ADD HYD (000414) ID1 +ID2 ====	04:000411 DO NOT INC overflow (Areas A4 ID: NHYD 01:000412 03:000204	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37	.269 LOWS IF A sion to C QPEAK (cms) .000 .049	1.17 ANY. County R TPEAK (hrs) .00 1.00	12.64 	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS 01:0036 # # Add major system # below diversion # ADD HYD (000414) ID1 +ID2 ====	04:000411 DO NOT INC overflow (Areas A4 ID: NHYD 01:000412 03:000204	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37	.269 LOWS IF A sion to (QPEAK (cms) .000 .049	1.17 ANY. County R TPEAK (hrs) .00 1.00	12.64 oad dra R.V. (mm) .00 27.14	.000 inage CWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS 001:0036 # Add major system # below diversion # ADD HYD (000414) ID1 +ID2 ====	04:000411 DO NOT INC overflow (Areas A4 ID: NHYD 01:000412 03:000204 02:000414	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37	.269 LOWS IF A sion to C QPEAK (cms) .000 .049 .049	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00	12.64 	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS	04:000411 DO NOT INC overflow (Areas A4 ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF	.269 LOWS IF A sion to C QPEAK (cms) .000 .049 .049 LOWS IF A	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY.	12.64 	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS	04:000411 DO NOT INC overflow (Areas A4 ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF	.269 LOWS IF A sion to C QPEAK (cms) .000 .049 .049 LOWS IF A	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY.	12.64 	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS	04:000411 DO NOT INC overflow (Areas A4 ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF	.269 LOWS IF A sion to C QPEAK (cms) .000 .049 .049 LOWS IF A	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY.	12.64 	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS	04:000411 DO NOT INC overflow (Areas A4 ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF	.269 PLOWS IF A Sion to C QPEAK (cms) .000 .049 .049 PLOWS IF A	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY.	12.64 	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS 001:0036 # Add major system below diversion # below diversion # ADD HYD (000414) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0037	04:000411 DO NOT INC: overflow : (Areas A4 a ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC: htersection Erom Stritter	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF	.269 LOWS IF A Sion to C QPEAK (cms) .000 .049 LOWS IF A .049	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY.	12.64 	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS 01:0036 # # Add major system # below diversion # ADD HYD (000414) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0037	04:000411 DO NOT INC overflow (Areas A4 ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC ntersection	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF	.269 LOWS IF A Sion to C QPEAK (cms) .000 .049 LOWS IF A .049	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY.	12.64 	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS 01:0036 # # Add major system # below diversion # ADD HYD (000414) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0037	04:000411 DO NOT INC overflow (Areas A4 ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC ntersection	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF	.269 LOWS IF A Sion to C QPEAK (cms) .000 .049 LOWS IF A .049	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY.	12.64 	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS 001:0036 # Add major system below diversion # ADD HYD (000414) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0037	04:000411 DO NOT INC: overflow : (Areas A4 a ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC: ntersection From Stritt: 24 Drainage	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF 	.269 LOWS IF A Sion to C QPEAK (cms) .000 .049 LOWS IF A Deperty (hyperty)	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY.	12.64	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS	04:000411 DO NOT INC: overflow : (Areas A4 a ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC: ntersection From Stritt: 24 Drainage	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF 	.269 LOWS IF A Sion to C QPEAK (cms) .000 .049 LOWS IF A Deperty (hy Street QPEAK	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY. yd #411) TPEAK	12.64	.000 inage DWF (cms) .000 .000	
SUM NOTE: PEAK FLOWS 001:0036 # Add major system # below diversion # ADD HYD (000414) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0037	04:000411 DO NOT INCI overflow : (Areas A4 a ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC: htersection from Stritt: 24 Drainage ID: NHYD	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF 	.269 LOWS IF A Sion to C QPEAK (cms) .000 .049 LOWS IF A Deperty (hy Street QPEAK (cms)	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY. yd #411) TPEAK (hrs)	12.64	.000 inage DWF (cms) .000 .000 .000	
SUM NOTE: PEAK FLOWS 001:0036 # Add major system # below diversion # ADD HYD (000414) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0037	04:000411 DO NOT INCI overflow : (Areas A4 a ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC: htersection from Stritt: 24 Drainage ID: NHYD 02:000414	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF 	.269 LOWS IF A Sion to C QPEAK (cms) .000 .049 LOWS IF A Deperty (hy Street QPEAK (cms) .049	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY. yd #411) TPEAK (hrs) 1.00	12.64	.000 inage DWF (cms) .000 .000 .000	
SUM NOTE: PEAK FLOWS	04:000411 DO NOT INC: overflow : (Areas A4 a ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC: atersection from Stritt: 24 Drainage ID: NHYD 02:000414 04:000411	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF 	.269 PLOWS IF A Sion to C QPEAK (cms) .000 .049 PLOWS IF A OPEAK (cms) .049 PLOWS IF A OPEAK (cms) .049 .269	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY. yd #411) TPEAK (hrs) 1.00 1.17	12.64	.000 inage DWF (cms) .000 .000 .000 .000	
SUM NOTE: PEAK FLOWS 001:0036 # Add major system # below diversion # ADD HYD (000414) ID1 +ID2 ==== SUM NOTE: PEAK FLOWS 001:0037	04:000411 DO NOT INCI overflow : (Areas A4 a ID: NHYD 01:000412 03:000204 02:000414 DO NOT INC: htersection from Stritt: 24 Drainage ID: NHYD 02:000414	30.23 LUDE BASEF from diver and A5) AREA (ha) .00 .37 .37 LUDE BASEF 	.269 PLOWS IF A Sion to C QPEAK (cms) .000 .049 PLOWS IF A OPEAK (cms) .049 PLOWS IF A OPEAK (cms) .049 .269	1.17 ANY. County R TPEAK (hrs) .00 1.00 1.00 ANY. yd #411) TPEAK (hrs) 1.00 1.17	12.64	.000 inage DWF (cms) .000 .000 .000	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0038-----*# Catchment A6 from Triton Study (0.31 hectares, C= 0.6) *# _____ | DESIGN STANDHYD | Area (ha)= .31 | 02:000106 DT=10.00 | Total Imp(%)= 50.00 Dir. Conn.(%)= 50.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =Dep. Storage(mm) =Average Slope(%) =Length(m) = .16 .16 .80 1.50 4.00 4.00 45.46 40.00 Mannings n .013 .250 = max.eff.Inten.(mm/hr)=98.9320.18over (min)10.0010.00Storage Coeff. (min)=1.05 (ii)11.93 (ii)Unit Hyd. Tpeak (min)=10.0010.00Unit Hyd. peak (cms)=.1710 *TOTALS* .01 1.17 12.35 PEAK FLOW(cms) =.04TIME TO PEAK(hrs) =1.00RUNOFF VOLUME(mm) =49.34 .048 (iii) 1.000 30.843 TOTAL RAINFALL (mm) =50.1450.14RUNOFF COEFFICIENT =.98.25 50.135 .615 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0039-----*# Add hydrograph from Catchments A6 to Upstream Hydrograph ______

 O6) | ID: NHYD
 AREA
 QPEAK
 TPEAK
 R.V.

 --- (ha)
 (cms)
 (hrs)
 (mm)

 ID1
 01:000205
 30.60
 .301
 1.00
 12.81

 +ID2
 02:000106
 .31
 .048
 1.00
 30.84

 | ADD HYD (000206) | ID: NHYD DWF (CMS) .000 .000 SUM 03:000206 30.91 .348 1.00 12.99 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0040-----*# *# Catchment A7 from Triton Study (0.24 hectares, C= 0.7) *# ________________ | DESIGN STANDHYD | Area (ha)= .24 | 01:000107 DT=10.00 | Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area (ha)= .14 .10 R.J. Burnside & Associates Ltd. Page 20 R.J.B. File: S-405

Dep. Storage(mm) =.801.50Average Slope(%) =2.002.00Length(m) =40.0040.00Mannings n=.013.250 Max.eff.Inten.(mm/hr)= 98.93 16.78 over (min) 10.00 20.00 Storage Coeff. (min)= 1.20 (ii) 15.62 (ii) Unit Hyd. Tpeak (min)= 10.00 20.00 Unit Hyd. peak (cms)= .17 .06 *TOTALS* .041 (iii) 1.000 34.542 50.135 .689 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (111) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0041-----*# *# Catchment A8 from Triton Study (0.30 hectares, C= 0.7) *# _____ | DESIGN STANDHYD | Area (ha)= .30 | 02:000108 DT=10.00 | Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00
 IMPERVIOUS
 PERVIOUS (i)

 Surface Area
 (ha)=
 .18
 .12

 Dep. Storage
 (mm)=
 .80
 1.50

 Average Slope
 (%)=
 4.00
 4.00

 Length
 (m)=
 44.72
 40.00

 Mannings n
 =
 .013
 .250
 Max.eff.Inten.(mm/hr)= 98.93 20.18 over (min) 10.00 10.00 Storage Coeff. (min)= 1.04 (ii) 11.92 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .10 *TOTALS*

 PEAK FLOW (cms) =
 .05
 .00
 .054

 TIME TO PEAK (hrs) =
 1.00
 1.17
 1.000

 RUNOFF VOLUME (mm) =
 49.34
 12.35
 34.541

 TOTAL RAINFALL (mm) =
 50.14
 50.14
 50.135

 RUNOFF COEFFICIENT =
 .98
 .25
 .689

 .054 (iii) 1.000 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

# Add hydrographs	from Catchr	ments A7 a	and A8			
ADD HYD (000207)		(ha)	(cms)	(hrs)	(mm)	(cms)
+ID2	02:000108	.24	.041	1.00	34.54	.000
	04:000207					
NOTE: PEAK FLOWS						
01:0043 # Add summed hydr						
ADD HYD (000208)		AREA	QPEAK	TPEAK	R.V.	DWF
+ID2	03:000206 04:000207	30.91 .54	.094	1.00 1.00	12.99 34.54	.000 .000
	01:000208					
NOTE: PEAK FLOWS	DO NOT INCI	LUDE BASE	FLOWS IF 2	ANY		
# Catchment A9 fr # DESIGN STANDHYD 02:000109 DT=10.00	 Area Total]	(ha)=	.32			60.00
Catchment A9 fr definition Catchment A9 fr definition DESIGN STANDHYD O2:000109 DT=10.00 Surface Area Dep. Storage Average Slope Length	Area Total 1 Total 1 In (ha) = (mm) = (%) = (m) =	(ha) = Imp(%) = MPERVIOUS .19 .80 .20 46.19	.32 60.00 PERVIC 1.2 40.0	Dir. Con OUS (i) 13 50 20 00		60.00
<pre>*# DESIGN STANDHYD 02:000109 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n</pre>	<pre>i Area i Total : i (ha) = (%) = (m) = (m) = = </pre>	(ha) = Imp(%) = MPERVIOUS .19 .80 .20 46.19 .013	.32 60.00 PERVIC 1.3 40.0	Dir. Con OUS (i) 13 50 20 00 50		60.00
<pre>*# Catchment A9 fr *# DESIGN STANDHYD 02:000109 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.00</pre>	<pre>i Area i Total : i (ha) = (mm) = (%) = (m) = = imm/hr) = i (min) (min) = i (min) = i (min) = </pre>	<pre>(ha) = Imp(%) = MPERVIOUS .19 .80 .20 46.19 .013 98.93 10.00 2.62 (: 10.00</pre>	.32 60.00 PERVIC 1.3 40.0 .22 13.9 30.0 ii) 33.0 30.0	Dir. Con OUS (i) 13 50 20 00 50 92 00 60 (ii)	n.(%)=	
<pre>*# Catchment A9 fr *# DESIGN STANDHYD 02:000109 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten. 0ver Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICT *** WARNING: S</pre>	<pre>i Area i Total : i (ha) = (mm) = (%) = (m) = (%) = (m) = (min) (min) = (min) = (cms) = (cms) = (cms) = (hrs) = (mm) = (mm) = (mm) = cmm) = cmm =</pre>	<pre>(ha) = Imp (%) = Imp (%) = MPERVIOUS .19 .80 .20 46.19 .013 98.93 10.00 2.62 (: 10.00 .17 .05 1.00 49.34 50.14 .98 ficient is</pre>	.32 60.00 PERVIC 1.3 40.0 .2 13.9 30.0 13.9 30.0 .1 12.5 50.5 s smaller	Dir. Con OUS (i) 13 50 20 00 50 92 00 60 (ii) 00 03 00 50 35 14 25 than DT	<pre>n.(%) = *TOTAI .0% 1.0% 34.54 50.1% .6%</pre>	LS* 53 (iii) 00 42 35

001:0045------*# Add hydrograph from Catchments A9 to upstream drainage *# **# THIS IS THE FLOW AT MH 56 WHICH IS THE LIMITING CONSTRAINT.... *# 5 year - 0.68 cms 100 year - 1.29 cms *# *# _____
 | ADD HYD (000209) | ID: NHYD
 AREA
 QPEAK
 TPEAK
 R.V.
 DWF

 ----- (ha)
 (cms)
 (hrs)
 (mm)
 (cms)

 ID1 01:000208
 31.45
 .443
 1.00
 13.36
 .000

 +ID2 02:000109
 .32
 .053
 1.00
 34.54
 .000
 SUM 03:000209 31.77 .495 1.00 13.57 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0046-----*# *# Catchment A10 from Triton Study (0.21 hectares, C= 0.7) *# _____ | DESIGN STANDHYD | Area (ha)= .21 | 04:000110 DT=10.00 | Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00 IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha)=
 .13
 .08

 Dep. Storage
 (mm)=
 .80
 1.50

 Average Slope
 (%)=
 1.00
 1.00

 Length
 (m)=
 37.42
 40.00

 Mannings n
 =
 .013
 .250

 .08 Max.eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= 38.93 16.78 20.00 19.17 (ii) 10.00 20.00 10.00 20.00 20.00 10.00 20. *TOTALS*

 PEAK FLOW
 (cms) =
 .03
 .00

 TIME TO PEAK
 (hrs) =
 1.00
 1.33

 RUNOFF VOLUME
 (mm) =
 49.34
 12.35

 TOTAL RAINFALL
 (mm) =
 50.14
 50.14

 RUNOFF COEFFICIENT
 =
 .98
 .25

 .036 (iii) 1.000 34.542 50.135 .689 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0047-----*# Add hydrograph from Catchment A10 to Upstream Hydrograph *# represents total catchment flow to Credit River _____________

 | ADD HYD (000204) | ID: NHYD
 AREA
 QPEAK
 TPEAK
 R.V.
 DWF

 ----- (ha)
 (cms)
 (hrs)
 (mm)
 (cms)

 ID1 03:000209
 31.77
 .495
 1.00
 13.57
 .000

 +ID2 04:000110
 .21
 .036
 1.00
 34.54
 .000

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					8.531			
NOT	TE: PEAK	FLOWS	DO NOT 3	INCLUDE BA	SEFLOWS IF .	ANY.		
01:00	FINISH							
 * * * * * *	****	 * * * * * *	*******	*******	 ****	 * * * * * * * * *		
	WARNINGS /							
	DESIGN ST.							
	*** WARNI				is smaller		C !	
0004	DESIGN ST.			Ller DT or	a larger a	rea.		
		NG: S	torage Co		is smaller		C !	
0006	DESIGN ST.			ller DT or	a larger a	rea.		
0000			—	pefficient	is smaller	than D1	C !	
		U	se a smal		a larger a			
0007	DESIGN ST. *** WARNT			officient	is smaller	than Di	r 1	
	WE SIGN E				a larger a		L .	
0009	DESIGN ST.					. 1 5	- (
	*** WARNI				is smaller a larger a		[']	
0011	DESIGN ST.	ANDHY	D		_			
	*** WARNI				is smaller		Γ!	
0016	DESIGN ST			LIEF DI OF	a larger a	rea.		
	*** WARNI				is smaller		г!	
0020	DESIGN ST			ller DT or	a larger a	rea.		
0020				pefficient	is smaller	than D	Г!	
				ller DT or	a larger a	rea.		
0021	DESIGN ST. *** WARNT			hefficient	is smaller	than D	ר ו	
	*** ** ** ** **		-		a larger a		- •	
0023	DESIGN ST				·		m ł	
	AAA WARNI				is smaller a larger a		ľ¦	
0024	DESIGN ST	ANDHY	D		-			
	*** WARNI				is smaller		Г!	
0026	DESIGN ST			Lier Dr or	a larger a	rea.		
		NG: S	torage C		is smaller		г!	
0022	DECICN CO			ller DT or	a larger a	rea.		
0032	DESIGN ST *** WARNI			pefficient	is smaller	than D	г!	
		U	se a sma		a larger a			
0033	DESIGN ST			oofficiont	is smaller	than D'	TP 1	1
	WARNI				a larger a		1:	
0034	DESIGN ST	ANDHY	D		-			
	*** WARNI				: is smaller : a larger a		Г !	
0038	DESIGN ST				a raryer a			
	*** WARNI				is smaller		Γ!	
0040	DESIGN ST			tter D'l' or	a larger a	rea.		
5510				oefficient	: is smaller	than D'	т!	
.J. Bi	ırnside & Ass				Page 24			R.J.B. File

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	Use a smaller DT or a larger area.
0041	DESIGN STANDHYD
	*** WARNING: Storage Coefficient is smaller than DT!
	Use a smaller DT or a larger area.
0044	DESIGN STANDHYD
	*** WARNING: Storage Coefficient is smaller than DT!
	Use a smaller DT or a larger area.
0046	DESIGN STANDHYD
	*** WARNING: Storage Coefficient is smaller than DT!
	Use a smaller DT or a larger area.
Sir	mulation ended on 2000-06-01 at 10:47:55

Н Ү Ү М М SSSSS W W M мн 000 999 55555 ======== 995 ΥΥ S WWW MMMM H Η MM MM 0 0 _____ SSSSS WWW MMM ННННН Y МММ 0 0 ## 9 9 5 Ver. 3.1 9999 5555 Oct. 1997 S WW М мн Н Y М M O O SSSSS TAT TAT М м н Н Υ М M 000 9 5 ======== 5 # 3877524 q 9 StormWater Management HYdrologic Model 999 5555 ======== ****** A single event and continuous hydrologic simulation model ****** ****** based on the principles of HYMO and its successors ****** ****** OTTHYMO-83 and OTTHYMO-89. * * * * * * * ****** Distributed by: J.F. Sabourin and Associates Inc. Ottawa, Ontario: (613) 727-5199 ****** ****** Gatineau, Quebec: (819) 243-6858 ****** ****** E-Mail: swmhymo@jfsa.Com ****** ++++++ Licensed user: R.J. Burnside & Associates Ltd. **++++++**+ Brampton SERIAL#:3877524 ****** +++++ PROGRAM ARRAY DIMENSIONS ++++++ ****** ****** Maximum value for ID numbers : 10 ****** * * * * * * * Max. number of rainfall points: 5000 ****** ****** Max. number of flow points : 5000 ****** DATE: 2000-06-01 TIME: 10:48:22 RUN COUNTER: 001104 * Input filename: I:\LORENA\S-405\CORREC~1\MAY00\STRIT100.DAT * * Output filename: I:\LORENA\S-405\CORREC~1\MAY00\STRIT100.out * Summary filename: I:\LORENA\S-405\CORREC~1\MAY00\STRIT100.sum * User comments: * 1: * 2: * 3: . بد 001:0001-----*# Project Name: [Strittmatter Development, Hillsburgh] Project Number: [S-405 *# Date : 04-18-2000 *# Modeller ; [LD] *# Company : R. J. Burnside & Associates Ltd. *# License # : 3877524 *# Hydrologic analysis of County Road 24 stormsewer system combined with *# Strittmatter Development at the north end of the village of Hillsburgh. *# *# McMurchy Berm added May '99 *#

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R.J. Burnside & Associates Ltd.
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```
*#
   100 year storm event
*#
*# Data from County Rd. 24 Stormsewer Analysis (Triton) used
*# for Road Catchments. Strittmatter Development discharge
*#
  includes stormwater controls
*#
*# Made modifications to this file to route the road portion or upper canada SA
*# into the pond and let the external property SA8 flow uncontrolled. This fil
*# was run to obtain volume requirements for the pond to store & throttle the
*# 100 year flows of the Strittmatter Development. Lot 1 was made available
*# as pond area so SA10 decreased 0.32 ha and SA11 increased the same amount.
*#
*# File was further modified to let SA9 flow uncontrolled off site
*#
*# File was further modified to collect some of the drainage from SA8 at the
*# south end of Lot 1. SA8 area decreased to 0.46 ha and SA10 area increased
*# to 0.36 ha. Change in response to Triton comments May 19, 2000
*#
_____
| START | Project dir.: I:\LORENA\S-405\CORREC~1\MAY00\
----- Rainfall dir.: I:\LORENA\S-405\CORREC~1\MAY00\
   TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
   NRUN = 001
   NSTORM= 0
001:0002-----
*READ STORM STORM FILENAME=["c:\S-405\swmhymo\hazel.stm"
| CHICAGO STORM | IDF curve parameters: A=3113.230
| Ptotal= 98.95 mm |
                                      B= 21.416
                                       C= .857
_____
                    used in: INTENSITY = A / (t + B)^{C}
                    Duration of storm = 3.00 hrs
                    Storm time step = 10.00 min
                    Time to peak ratio = .33
              TIME
                    RAIN | TIME
                                  RAIN | TIME RAIN | TIME
                                                             RAIN
               hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
               .17 9.785 | 1.00 162.238 | 1.83 20.114 | 2.67 9.361
               .33 12.748 | 1.17 85.475 | 2.00 16.483 | 2.83 8.425
               .50 18.030 | 1.33 50.208 | 2.17 13.904 | 3.00 7.655
               .67 29.523 | 1.50 34.281 | 2.33 11.990 |
.83 67.430 | 1.67 25.529 | 2.50 10.521 |
     001:0003-----
*#
*#
    Catchment A4 from Triton Study (0.09 hectares, C= 0.5)
*#
| DESIGN STANDHYD | Area (ha)= .09
| 01:000104 DT=10.00 | Total Imp(%)= 40.00 Dir. Conn.(%)= 40.00
  ____
                       IMPERVIOUS PERVIOUS (i)
    Surface Area(ha) =.04Dep. Storage(mm) =.80Average Slope(%) =6.00Length(m) =24.49Mannings n=.013
                        .04
                                    .05
                                       1.50
                                       6.00
                                      40.00
                                       .250
```

Max.eff.Inten.(mm/hr)= 162.24 56.88 over (min) 10.00 10.00 Storage Coeff. (min)= .53 (ii) 6.89 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .13 *TOTALS*

 PEAK FLOW
 (cms) =
 .02
 .01

 TIME TO PEAK
 (hrs) =
 1.00
 1.00

 RUNOFF VOLUME
 (mm) =
 98.15
 39.52

 TOTAL PAINEALL
 (mm) =
 .02
 .01

 .023 (iii) 1.000 62.969 TOTAL RAINFALL(mm) =98.95RUNOFF COEFFICIENT=.99 98.95 .40 98.950 .636 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0004-----*# *# Catchment A5 from Triton Study (0.28 hectares, C= 0.5) *# ______ | DESIGN STANDHYD | Area (ha) = .28 | 02:000105 DT=10.00 | Total Imp(%)= 40.00 Dir. Conn.(%)= 40.00 IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.11Dep. Storage(mm) =.80Average Slope(%) =6.00Length(m) =43.20Mannings n=.013 .17 1.50 6.00 40.00 .250 Max.eff.Inten.(mm/hr)= 162.24 56.88 over (min) 10.00 10.00 Storage Coeff. (min)= .74 (ii) 7.10 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .13 *TOTALS* PEAK FLOW(cms) =.05.02.072TIME TO PEAK(hrs) =1.001.0001.000RUNOFF VOLUME(mm) =98.1539.5262.969TOTAL RAINFALL(mm) =98.9598.9598.950RUNOFF COEFFICIENT=.99.40.636 .072 (iii) 1.000 .636 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0005-----*# Add summed hydrographs from Catchments A5 to A4 _____ | ADD HYD (000204) | ID: NHYD AREA ----- (ha) DWF QPEAK TPEAK R.V. (cms) (hrs) (mm) (cms) R.J. Burnside & Associates Ltd. Page 3 R.J.B. File: S-405

	TOURC -T IMA	AY00\STRIT100	0		Post S	Strittmatter	- 100 Year Output 1
				.023 .072			
				.095			
NOTE: PEAK	FLOWS	DO NOT IN	ICLUDE BASE	EFLOWS IF A	NY.		
 01:0006							
# 	Q + ¹ + +	and the set Dec	. 1				
# Proposed #	Strittm	natter Dev	velopment				
	: SA1 (S	Strittmatt	er A1, 0.5	54 hectares)		
DESIGN STAND)HYD	Area	(ha)=	.54			
01:000301 DT			L Imp(%)=	30.00 D	ir. Con	n.(%)=	20.00
			IMPERVIOUS	5 PERVIO	US (i)		
Surface A	irea	(ha)=	.16	.3 1.5 3.0 40.0	8		
Dep. Stor	age	(mm) =	.80	1.5	0		
Average S	lope	(%)=	3.00	3.0	0		
Length		(m) =	60.00	40.0	U		
Mannings	n		.013	.25	U		
Max.eff.I	Inten.(m	nm/hr)=	162.24	71.6	1		
	over	(min)	10.00	(ii) 10.0 (ii) 8.2 10.0	0		
Storage C	ceff.	(min) =	1.11	(11) 8.2	6 (ii)		
Unit Hyd.	Треак	(min) = (ama) =	10.00	.1	0		
UNIC HYA.	реак	(CIIIS) -	. ⊥ /	• ⊥	Ζ	*TOTALS	*
PEAK FLOW	J	(cms) =	.05	.0	6		
TIME TO P	PEAK	(hrs) =	1.00	1.0	0	1.000	()
RUNOFF VC	LUME	(mm) =	98.15	42.8	2	1.000 53.883	
TOTAL RAI	INFALL	(mm) =	98.95	98.9	5	98.950	
	DEFFICIE	ENT =	.99	1.0 42.8 98.9 .4	3	.545	
RUNOFF CC	NING: St	torage Coe	efficient :	is smaller a larger ar	than DT	!	
RUNOFF CC *** WARN	Τī		LCT DI OT (i idiyei di			1
*** WARN							
*** WARN (i) CN	PROCEDU	URE SELECI		RVIOUS LOSS			2.5
*** WARN (i) CN CN	PROCEDU	URE SELECI 64.0 Ia	a = Dep. S ⁻	torage (Ab	ove)		2000 - 100 -
*** WARN (i) CN CN (ii) TIN	PROCEDU N* = (ME STEP	URE SELECT 64.0 Ia (DT) SHOU	a = Dep. S ⁻ JLD BE SMA	torage (Ab LLER OR EQU	ove)		7+
*** WARN (i) CN CN (ii) TIN THZ	PROCEDU N* = (ME STEP AN THE S	URE SELECT 64.0 Ia (DT) SHOU STORAGE CO	a = Dep. S ⁻ JLD BE SMAI DEFFICIENT	torage (Ab LLER OR EQU •	ove) AL		7 · ·
*** WARN (i) CN CN (ii) TIN THZ (iii) PEZ	PROCEDU V* = (ME STEP AN THE S AK FLOW	URE SELECT 64.0 Ia (DT) SHOU STORAGE CO DOES NOT	a = Dep. S [.] JLD BE SMA: DEFFICIENT INCLUDE BA	torage (Ab LLER OR EQU	ove) AL ANY.		×-
*** WARN (i) CN (ii) TIN THZ (iii) PEZ	PROCEDU N* = (ME STEP AN THE S AK FLOW	URE SELECT 64.0 Ia (DT) SHOU STORAGE CO DOES NOT	a = Dep. S JLD BE SMA DEFFICIENT INCLUDE BA	torage (Ab LLER OR EQU ASEFLOW IF	ove) AL ANY.		×-
*** WARN (i) CN (ii) TIN THZ (iii) PEZ 001:0007	PROCEDU 1* = (4E STEP AN THE S AK FLOW	URE SELECT 64.0 Ia (DT) SHOU STORAGE CO DOES NOT	a = Dep. S ⁻ JLD BE SMA DEFFICIENT INCLUDE BA	torage (Ab LLER OR EQU ASEFLOW IF	ove) AL ANY. 		x.
*** WARN (i) CN (ii) TIN THZ (iii) PEZ 001:0007	PROCEDU N* = (4E STEP AN THE S AK FLOW	URE SELECT 64.0 Ia (DT) SHOU STORAGE CO DOES NOT	a = Dep. S ⁻ JLD BE SMA DEFFICIENT INCLUDE BA	torage (Ab LLER OR EQU ASEFLOW IF	ove) AL ANY. 		×-
*** WARN (i) CN (ii) TIN THZ (iii) PEZ 01:0007 # # Catchment #	PROCEDU 1* = (4E STEP AN THE S AK FLOW 	URE SELECT 64.0 Ia (DT) SHOU STORAGE CC DOES NOT 	a = Dep. S JLD BE SMA DEFFICIENT INCLUDE BA Ler A2, 0.	torage (Ab LLER OR EQU ASEFLOW IF 53 hectares	ove) AL ANY. 		×-
*** WARN (i) CN (ii) TIN (iii) TIN (iii) PE7 01:0007 # Catchment # DESIGN STANI	PROCEDU 1* = (4E STEP AN THE S AK FLOW 	URE SELECT 64.0 Ia (DT) SHOU STORAGE CC DOES NOT 	a = Dep. S JLD BE SMA DEFFICIENT INCLUDE BA Ler A2, 0. (ha)=	torage (Ab LLER OR EQU ASEFLOW IF 53 hectares .53	ove) AL ANY. 		
*** WARN (i) CN (ii) TIN (iii) THZ (iii) PEZ 01:0007 # # Catchment # DESIGN STANI	PROCEDU 1* = (4E STEP AN THE S AK FLOW 	URE SELECT 64.0 Ia (DT) SHOU STORAGE CC DOES NOT 	a = Dep. S JLD BE SMA DEFFICIENT INCLUDE BA ter A2, 0. (ha)= l Imp(%)=	torage (Ab LLER OR EQU ASEFLOW IF 53 hectares .53 30.00 D	ove) AL ANY.) ir. Con		
*** WARN (i) CN (ii) TIN THZ (iii) PEZ 01:0007 # # Catchment # DESIGN STANI 02:000302 DT	PROCEDU N* = (ME STEP AN THE S AK FLOW 	URE SELECT 64.0 Ia (DT) SHOU STORAGE CC DOES NOT 	a = Dep. S JLD BE SMA DEFFICIENT INCLUDE BA ter A2, 0. (ha)= 1 Imp(%)=	torage (Ab LLER OR EQU ASEFLOW IF 53 hectares .53 30.00 D S PERVIC	ove) AL ANY.) ir. Con US (i)		
*** WARN (i) CN (ii) TIN (iii) TIA (iii) PEA 01:0007 # # Catchment # DESIGN STANN 02:000302 D 	PROCEDU 14 = (14 STEP AN THE S AK FLOW 	URE SELECT 64.0 Ia (DT) SHOU STORAGE CC DOES NOT 	a = Dep. S JLD BE SMA DEFFICIENT INCLUDE BA ter A2, 0. (ha)= 1 Imp(%)= IMPERVIOU .16	torage (Ab LLER OR EQU ASEFLOW IF 53 hectares .53 30.00 D S PERVIC .3	ove) AL ANY.) ir. Con US (i) 7		
<pre>*** WARN (i) CN CP (ii) TIN TH (iii) PE 01:0007 # Catchment # DESIGN STANI 02:000302 D Surface # Dep. Stop</pre>	PROCEDU $V^* = 0$ AE STEP AN THE S $AK FLOWC SA2 (SC SA2 (S)C S$	URE SELECT 64.0 Ia (DT) SHOU STORAGE CO DOES NOT 	a = Dep. S JLD BE SMA DEFFICIENT INCLUDE BA ter A2, 0. (ha)= 1 Imp(%)= IMPERVIOU .16 .80	torage (Ab LLER OR EQU ASEFLOW IF 53 hectares .53 30.00 D S PERVIC .3 1.5	ove) AL ANY.) ir. Con US (i) 7 0		
<pre>*** WARN (i) CN CP (ii) TIN THZ (iii) PEZ 01:0007 # Catchment # DESIGN STANI 02:000302 DT Surface Z Dep. Stop Average S</pre>	PROCEDU $V^* = 0$ AE STEP AN THE S $AK FLOWC SA2 (SC SA2 (S)C S$	URE SELECT 64.0 Ia (DT) SHOU STORAGE CO DOES NOT 	a = Dep. S- JLD BE SMA DEFFICIENT INCLUDE BA ter A2, 0.4 (ha)= 1 Imp(%)= IMPERVIOU .16 .80 3.00	torage (Ab LLER OR EQU ASEFLOW IF 53 hectares .53 30.00 D S PERVIC .3 1.5 3.0	ove) AL ANY.) ir. Con US (i) 7 0 0		
<pre>*** WARN (i) CN CP (ii) TIN THZ (iii) PEZ 001:0007 # Catchment # DESIGN STANI 02:000302 DT Surface Z Dep. Stop Average S Length</pre>	PROCEDU N* = (ME STEP AN THE S AK FLOW 	URE SELECT 64.0 Ia (DT) SHOU STORAGE CO DOES NOT 	a = Dep. S- JLD BE SMA DEFFICIENT INCLUDE BA ter A2, 0.4 (ha)= 1 Imp(%)= IMPERVIOU .16 .80 3.00 59.44	torage (Ab LLER OR EQU ASEFLOW IF 53 hectares .53 30.00 D S PERVIC .3 1.5 3.0 40.0	ove) AL ANY.) ir. Con US (i) 7 0 0 0 0		
<pre>*** WARN (i) CN CI (ii) TIN THZ (iii) PEZ 01:0007 # # Catchment # DESIGN STANI 02:000302 DT Surface Z Dep. Ston Average S</pre>	PROCEDU N* = (ME STEP AN THE S AK FLOW 	URE SELECT 64.0 Ia (DT) SHOU STORAGE CO DOES NOT 	a = Dep. S- JLD BE SMA DEFFICIENT INCLUDE BA ter A2, 0.4 (ha)= 1 Imp(%)= IMPERVIOU .16 .80 3.00 59.44	torage (Ab LLER OR EQU ASEFLOW IF 53 hectares .53 30.00 E S PERVIC .3 1.5 3.0 40.0	ove) AL ANY.) ir. Con US (i) 7 0 0 0 0		

Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(cms)=	1.11 (ii) 10.00 .17	8.25 (ii) 10.00 .12	*TOTALS* .103 (iii) 1.000 53.883
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S ⁻ U	ENT =	.99 icient is s	.43 maller than DT	.545
(ii) TIME STEP THAN THE (iii) PEAK FLOW	64.0 Ia = (DT) SHOULD STORAGE COEF DOES NOT IN	Dep. Stora BE SMALLER FICIENT. CLUDE BASEF	ge (Above) OR EQUAL LOW IF ANY.	
001:0008 *# Add hydrographs				
ADD HYD (000401) ID1 +ID2	01:000301 02:000302	(ha) .54 .53	(cms) (hrs) .105 1.00 .103 1.00	
SUM NOTE: PEAK FLOWS	04:000401 DO NOT INCI	1.07 UDE BASEFLO	.209 1.00 WS IF ANY.	53.88 .000
*# *# Catchment SA3 (*#	Strittmatter	A3, 0.41 h	ectares)	
DESIGN STANDHYD 01:000303 DT=10.00	Area Total I 	(ha)= mp(%)= 30	.41 .00 Dir. Con	n.(%)= 20.00
Surface Area Dep. Storage Average Slope Length Mannings n	IM (ha) = (mm) = (%) = (m) = =	IPERVIOUS .12 .80 3.00 52.28 .013	PERVIOUS (i) .29 1.50 3.00 40.00 .250	
Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min) (min) = (min) =	162.24 10.00 1.03 (ii) 10.00 .17	71.61 10.00 8.17 (ii) 10.00 .12	*TOTALS*
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S U				.080 (iii) 1.000 53.883 98.950 .545

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(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ 001:0010------*# Add hydrographs from Strittmatter A3 to Strittmatter (A1+A2) _____ QPEAK TPEAK R.V. | ADD HYD (000402) | ID: NHYD AREA DWF (ha) _____ (mm) (cms) (cms) (hrs) ID1 01:000303 .41 .080 1.00 53.88 .000 +ID2 04:000401 1.07 .209 1.00 53.88 .000 SUM 02:000402 1.48 .289 1.00 53.88 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0011------*# *# Catchment SA4 (Strittmatter A4, 0.41 hectares) *# _____ | DESIGN STANDHYD | Area (ha)= .41 | 01:000304 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 .12

 Dep. Storage
 (mm) =
 .80

 Average Slope
 (%) =
 3.00

 Length
 (m) =
 52.28

 Mannings n
 =
 .013

 .29 1.50 3.00 40.00 .250 Max.eff.Inten.(mm/hr)= 162.24 71.61 over (min) 10.00 10.00 Storage Coeff. (min)= 1.03 (ii) 8.17 Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .12 8.17 (ii) *TOTALS*

 PEAK FLOW
 (cms) =
 .04
 .04

 TIME TO PEAK
 (hrs) =
 1.00
 1.00

 RUNOFF VOLUME
 (mm) =
 98.15
 42.82

 TOTAL RAINFALL
 (mm) =
 98.95
 98.95

 RUNOFF COEFFICIENT
 =
 .99
 .43

 .080 (iii) 1.000 53.883 98.950 .545 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. *# Add hydrographs from Strittmatter A4 to Strittmatter Upstream Drainage | ADD HYD (000403) | ID: NHYD AREA QPEAK TPEAK R.V. DWF (ha) (cms) (hrs) (mm) (cms) .41 .080 1.00 53.88 .000 ID1 01:000304 R.J. Burnside & Associates Ltd. Page 6 R.J.B. File: S-405 $I: \ STRIT100.$ Post Strittmatter - 100 Year Output Flow +ID2 02:000402 1.48 .289 1.00 53.88 .000 ___________________________________ SUM 04:000403 1.89 .369 1.00 53.88 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0013-----*# *# Catchment SA5 (Strittmatter A5, 22.4 hectares of upstream *# agricultural drainage) *# _____ | DESIGN NASHYD | Area (ha)= 22.40 Curve Number (CN)=58.00 | 01:000305 DT=15.00 | Ia (mm)= 1.500 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= .750 1.141 Unit Hyd Qpeak (cms)= PEAK FLOW (cms) = 1.028 (i) TIME TO PEAK (hrs) = 2.000 RUNOFF VOLUME (mm) = 28.013 TOTAL RAINFALL (mm) = 98.950 RUNOFF COEFFICIENT = .283 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0014-----_____ | ROUTE RESERVOIR | Requested routing time step = 15.0 min. | IN>01:(000305) | | OUT<02:(000101) | ======= OUTLFOW STORAGE TABLE =========
 OUTFLOW
 STORAGE
 OUTFLOW
 STORAGE

 (cms)
 (ha.m.)
 (cms)
 (ha.m.)

 .000
 .0000E+00
 .014
 .8700E+00

 .008
 .1850E+00
 .016
 .1270E+01

 .012
 .4800E+00
 2.000
 .1300E+01
 _____ ROUTING RESULTSAREAQPEAKTPEAKR.V.-------(ha)(cms)(hrs)(mm)INFLOW >01:(000305)22.401.0282.00028.013OUTFLOW<02:</td>(000101)22.40.0134.83328.003OVERFLOW<08:</td>(000150).00.000.000.000 PEAKFLOWREDUCTION[Qout/Qin](%) =1.233TIMESHIFT OF PEAKFLOW(min) =170.00MAXIMUMSTORAGEUSED(ha.m.) = .6114E+00 001:0015------_____ | PRINT HYD | AREA (ha) = 22.400 | ID=02 (000101) | QPEAK (cms) = .013 (i) | DT=10.00 PCYC= 5 | TPEAK (hrs) = 4.833 ----- VOLUME (mm) = 28.003 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. TIME FLOW | TIME FLOW | TIME FLOW | TIME FLOW | TIME FLOW nrscmshrscmshrscmshrscms.00.000110.00.008220.00.002330.00.000439.99.000.83.000110.83.008220.84.002330.83.000440.83.000 hrs R.J. Burnside & Associates Ltd. Page 7 R.J.B. File: S-405

Post Strittmatter - 100 Year Output Flow

1 (7	0061	111 (7	0001	001 67	0001	221 67	0001	A A 1 C C	0.00
1.67		111.67			.002		,	441.66	
2.50		112.50		222.50		332.50		442.49	.000
3.33		113.33		223.34		333.33	.000	443.33	.000
4.17	.013	114.17	.008	224.17	.0021	334.17	.000	444.16	.000
5.00	.013	115.00	.0081	225.00	.0021	335.00	.0001	444.99	.000
5.83		115.83		225.84		335.83		445.82	.000
6.67		116.67		226.67		336.66		446.66	.000
7.50		117.50		227.50		337.50		447.49	.000
8.33	,	118.33		228.34		338.33		448.32	.000
9.17		119.17		229.17		339.16		449.16	.000
10.00		120.00		230.00		340.00	.000	449.99	.000
10.83	.013	120.83	.008	230.84	.001	340.83	.0001	450.82	.000
11.67	.0131	121.67	.0081	231.67	.0011	341.66	.0001	451.66	.000
12.50		122.50		232.50		342.50		452.49	.000
13.33		123.33			.001			453.32	.000
14.17		123.33		234.17		344.16			.000
								454.16	
15.00		125.00		235.00		345.00		454.99	.000
15.83		125.83		235.84		345.83		455.82	.000
16.67		126.67		236.67		346.66		456.66	.000
17.50	.012	127.50	.007	237.50	.001	347.50	.000	457.49	.000
18.33	.0121	128.33	.0071	238.34	.0011	348.33	.0001	458.32	.000
19.17					.001			459.16	.000
20.00		130.00	,	240.00		350.00		459.99	.000
20.83		130.83		240.84		350.83	'	460.82	.000
			'						
21.67		131.67		241.67		351.66		461.66	.000
22.50		132.50		242.50		352.50		462.49	.000
23.33		133.33		243.34		353.33		463.32	.000
24.17	.012	134.17	.006	244.17	.001	354.16	.000	464.16	.000
25.00	.012	135.00	.006	245.00	.001	355.00	.000	464.99	.000
25.83	.0121	135.83	.0061	245.84	.001	355.83	.0001	465.82	.000
26.67		136.67		246.67		356.66		466.66	.000
27.50		137.50		247.50		357.50		467.49	.000
28.33		138.33		248.34		358.33		468.32	.000
29.17		139.17		249.17	•	359.16	.0001	469.16	.000
30.00		140.00		250.00		360.00		469.99	
30.83		140.83		250.84		360.83		470.82	.000
31.67	.012	141.67	.006	251,67	.001	361.66	.000	471.66	.000
32.50	.012	142.50	.005	252.50	.001	362.50	.000	472.49	.000
33.33	.012	143.33	.0051	253.34	.0011	363.33	.0001	473.32	.000
34.17		144.17		254.17		364.16		474.16	
35.00		145.00		255.00		365.00		474.99	.000
								475.82	
35.83		145.83		255.84		365.83			.000
36.67		146.67		256.67	,	366.66		476.66	.000
37.50	.012	147.50		257.50		367.50		477.49	.000
38.33		148.33	•	258.34	,	368.33	.000	478.32	.000
39.17	.012	149.17	.005	259.17	.001	369.16	.000	479.16	.000
40.00	.012	150.00	.0051	260.00	.001	370.00	.000	479.99	.000
40.83		150.83	.005	260.84	.0011	370.83	.0001	480.82	.000
41.67		151.67	.005			371.66		481.66	.000
42.50		152.50	.005		.001	372.50		482.49	.000
43.33		153.33				373.33		483.32	
			.005		.001				.000
44.17		154.17	.005			374.16		484.16	.000
45.00		155.00		265.00		375.00		484.99	.000
45.83		155.83		265.84				485.82	.000
46.67	.011	156.67	.004	266.67	.001	376.66		486.66	.000
47.50	.011	157.50	.004	267.50	.001	377.50	.000	487.49	.000
48.33		158.33		268.34	.001	378.33		488.32	.000
49.17		159.17		269.17		379.16		489.16	.000
50.00		160.00		270.00		380.00		489.99	.000
		160.83		270.84		380.83			
50.83								490.82	.000
51,67		161.67		271.67		381.66		491.66	.000
52.50		162.50	.004	272.50		382.50	.000[492.49	.000
R.J. Burnside	Asson	mates Itd			Page 8			P .	7.B. File: S-40

R.J. Burnside & Associates Ltd.

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Post Strittmatter - 100 Year Output Flow

53.33	.0111	163.33	.0041	273.34	.0011	383.33	.0001	493.32	.000
54.17				274.17		384.16			.000
55.00	.011	165.00		275.00		385.00		494.99	.000
55.83	.011	165.83	.004	275.84		385.83	.000	495.82	.000
56.67		166.67	.004	276.67		386.66		496.66	.000
57.50		167.50	.004	277.50	.001	387.50	.000	497.49	.000
58.33	.011	168.33	.004	278.34	.001	388.33		498.32	.000
59.17	.011			279.17	.001	389.16	.000	499.15	.000
60.00		170.00	.004	280.00		389.99		499.99	.000
60.83		170.83	.004	280.83		390.83		500.82	.000
61.67		171.67	.003	280.83 281.67 282.50 283.33	.001	391.66 392.49 393 33	.000	501.65	.000
62.50		172.50	.003	282.50	.001	392.49	.000	502.49	.000
63.33		113.33	.0001	203.33	• 0 0 I I	000.00	.0001	503.32	.000
64.17				284.17		394.16		504.15	.000
65.00		175.00		285.00		394.99		504.99	.000
65.83		175.83		285.83		395.83		505.82	.000
66.67		176.67		286.67		396.66		506.65	.000
67.50		177.50	.0031	287.50		397.49		507.49	.000
68.33		178.33	.0031	288.33	.001	398.33	.0001	508.32	.000
69.17		179.17 180.00	.0031	289.17		399.16 399.99		509.15 509.99	.000 .000
70.00 70.83	•	180.00		290.00		399.99 400.83		510.82	.000
70.83		181.67		290.83		400.83 401.66		511.65	.000
72.50		182.50		292.50	.001	401.00	.0001	512.49	.000
73.33		182.30		292.30	.001	402.49 403.33	.0001	513.32	.000
74.17		184.17	0031	294.17	.001	404.16	.0001	514.15	.000
75.00		185.00	.0031	295.00	001	404.99	.0001	514.99	.000
75.83		185.83		295.83		405.83		515.82	.000
76.67		186.67		296.67		406.66		516.65	.000
77.50		187.50		297.50	.0001	407.49	.0001	517.49	.000
78,33		188.33		298.33	.0001	407.49 408.33	.000	518 32	.000
79.17	.010	189.17		299.17	.000]	409.16	.000	519.16	.000
80.00	.010	190.00	.003	300.00	.000	409.99	.000	519.99	.000
80.83	.010	190.83	.0031	300.83		410.83		520.82	.000
81.67		191.67		301.67	.000	411.66	.000	521.66	.000
82.50		192.50		302.50	.000	412.49	.0001	522.49	.000
83.33		193.33	.002	303.33 304.17 305.00	.000	413.33 414.16	.000	523.32	.000
84.17		194.17	.002	304.17	.000	414.16	.000	524.16	.000
85.00					.0001	414.99	.000	524.99	.000
		195.83	.002	305.83					.000
86.67		196.67		306.67		416.66		526.66	.000
87.50				307.50		417.49		527.49	.000
88.33		198.33		308.33		418.33		528.32	.000
89.17 90.00		199.17 200.00		309.17 310.00		419.16 419.99		529.16 529.99	.000 .000
90.00		200.00		310.83		419.99		530.82	.000
91.67	.009			311.67		421.66		531.66	.000
92.50	.009			312.50		422.49		532.49	.000
93.33		203.33		313.33		423.33		533.32	.000
94.17		204.17		314.17		424.16		534.16	.000
95.00		205.00		315.00		424.99		534.99	.000
95.83		205.83	,	315.83		425.83		535.82	.000
96.67		206.67		316.67		426.66		536.66	.000
97.50	.009			317.50		427.49		537.49	.000
98.33	.009			318.33		428.33		538.32	.000
99.17	.009	209.17		319.17		429.16		539.16	.000
100.00		210.00		320.00	.000	429.99		539.99	.000
100.83		210.84		320.83		430.83		540.82	.000
101.67		211.67		321.67		431.66		541.66	.000
102.50		212.50		322.50		432.49		542.49	.000
103.33		213.34		323.33		433.33		543.32	.000
<u>104.17</u>		214.17	.002	324.17		434.16	.000	544.16	.000
R.J. Burnsid	e & ASSO	ciates Ltd.		· I	Page 9			K.J.B.	File: S-4(

I:\LORENA\S-405\CORREC~1\MAY00\STRIT100. Post Strittmatter - 100 Year Output Flow 105.00.009| 215.00.002| 325.00.000| 434.99.000| 544.99105.83.008| 215.84.002| 325.83.000| 435.83.000| 545.82106.67.008| 216.67.002| 326.67.000| 436.66.000| 546.66107.50.008| 217.50.002| 327.50.000| 437.49.000|108.33.008| 218.34.002| 328.33.000| 438.33.000|109.17.008| 219.17.002| 329.17.000| 439.16.000| .000 .000 .000 001:0016-----*# *# Catchment SA6 (Strittmatter A6, 1.04 hectares) *# ____ | DESIGN STANDHYD | Area (ha) = 1.04 | 05:000306 DT=10.00 | Total Imp(%)= 20.00 Dir. Conn.(%)= 10.00 IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.21.83Dep. Storage(mm) =.801.50Average Slope(%) =3.003.00Length(m) =83.2740.00Mannings n=.013.250 Max.eff.Inten.(mm/hr)= 162.24 69.71 over (min) 10.00 10.00 Storage Coeff. (min)= 1.36 (ii) 8.58 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .12 *TOTALS*

 PEAK FLOW
 (cms) =
 .05
 .12

 TIME TO PEAK
 (hrs) =
 1.00
 1.00

 RUNOFF VOLUME
 (mm) =
 98.15
 42.42

 TOTAL RAINFALL
 (mm) =
 98.95
 98.95

 RUNOFF COEFFICIENT
 =
 .99
 .43

 .166 (iii) 1.000 47.996 98.950 .485 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0017-----*# Add hydrographs from Strittmatter A5 (McMurchy Property) to A6 ______ | ADD HYD (000420) | ID: NHYD AREA QPEAK TPEAK R.V. DWF (ha) (cms) (hrs) (mm) (cms) ID1 05:000306 1.04 .166 1.00 48.00 .000 +ID2 02:000101 22.40 .013 4.83 28.00 .000 SUM 06:000420 23.44 .167 1.00 28.89 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0018-----*# Add OVERFLOW hydrograph from McMurchy Pond
 AREA
 QPEAK
 TPEAK
 R.V.
 DWF

 (ha)
 (cms)
 (hrs)
 (mm)
 (cms)

 .00
 .000
 .00
 .000
 .000
 ADD HYD (000421) | ID: NHYD AREA _____ ID1 08:000150 .000 **DRY** Page 10 R.J. Burnside & Associates Ltd. R.J.B. File: S-405

I:\LORENA\S-405\CORREC~1\MAY00\STRIT100. Post Strittmatter - 100 Year Output Flow +ID2 06:000420 23.44 .167 1.00 28.89 .000 SUM 05:000421 23.44 .167 1.00 28.89 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0019-----| ADD HYD (000405) | ID: NHYD AREA QPEAK TPEAK R.V. DWF (ha) (cms) (hrs) (mm) (cms) ID1 05:000421 23.44 .167 1.00 28.89 .000 +ID2 04:000403 1.89 .369 1.00 53.88 .000 _________ SUM 01:000405 25.33 .536 1.00 30.75 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0020------*# *# Catchment SA10 (Strittmatter A10, 0.36 hectares) *# --- Area Increased May 2000 *# _____ | DESIGN STANDHYD | Area (ha) = .36 | 05:000310 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.11.25Dep. Storage(mm) =.801.50Average Slope(%) =13.0013.00Length(m) =48.9940.00 .25 Mannings n .013 = .250 Max.eff.Inten.(mm/hr)=162.2471.61over (min)10.0010.00Storage Coeff. (min)=.64 (ii)5.24Unit Hyd. Tpeak (min)=10.0010.00Unit Hyd. peak (cms)=.17.14 5.24 (ii) *TOTALS* .04 1.00 42.82

 PEAK FLOW
 (cms) =
 .03
 .04

 TIME TO PEAK
 (hrs) =
 1.00
 1.00

 RUNOFF VOLUME
 (mm) =
 98.15
 42.82

 TOTAL RAINFALL
 (mm) =
 98.95
 98.95

 RUNOFF COEFFICIENT
 =
 .99
 .43

 .077 (iii) 1.000 53.883 98.950 .545 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0021-----*# *# Catchment SA11 (Strittmatter A11, Pond Surface, 0.12 hecatares) *#

R J Burnside & Associates Ltd	Page 11
DESIGN STANDHYD Area	(ha) = 35

06:000311 DT=	10 00	1	T	00 00		(0)	
	10.00	Total -	1mp(%)=	99.00	Dir. Cor	ın.(%)=	99.00
_		-	IMPERVIOUS	PERVI	OUS (i)		
Surface Ar Dep. Stora Average Sl Length	ea	(ha) =	.35	•	00		
Dep. Stora	ge	(mm) =	.80	1.	50		
Average SI	ope	(종)≡ (m)=	.10	•	10		
Mannings n		(111) =	.013	40.	50		
			.010	• 2	00		
Max.eff.In	ten.(m	m/hr)=	162.24	122.	01		
	over	(min)	10.00	20.	00		
Storage Co	eff.	(min) =	2.71 (ii) 18.	73 (ii)		
Storage Co Unit Hyd. Unit Hyd.	треак розк	(min) =	10.00	20.	00		
onite nya.	pear	(Cills) –	• 1 /	•	00	*TOTAI	.s*
PEAK FLOW		(cms) =	.15		00		54 (iii)
TIME TO PE.	AK	(hrs) =	1.00	1.	17	1.00	
RUNOFF VOL	UME	(mm) =	98.15	92.	53	98.09	94
RUNOFF VOL TOTAL RAIN RUNOFF COE	FALL	(mm) =	98.95	98.	95	98.95	50
KUNOE'F COE	FFICIE	NT =	.99		94 +han 55	.99	
WARNI			fficient i er DT or a				
	0.01	c a smarr		LULYCI d	LCU.		
(i) CN P	ROCEDU	RE SELECT	ED FOR PER	VIOUS LOS	SES:		
CN*	= 9	8.0 Ia	= Dep. St	orage (A	bove)		
			LD BE SMAL	ler or eq	UAL		
			EFFICIENT.				
(iii) PEAK	F.TOM 1	DOES NOT .	INCLUDE BA	SEFLOW IF	ANY.		
ADD HYD (0004	09)	ID: NHYD	AREA	QPEAK	TPEAK	R.V.	DWF
			(ha)	(cms)	(hrs)	(mm)	(Cms)
	ID1	01:000405	25.33	.536	1.00	30.75	.000
	+1D2 ·	05:000310	.36 .35	.0//	1.00	53.88	.000
			.33				.000
	SUM	02:000409	26.04	.767	1.00	31.98	.000
NOTE: PEAK	FLOWS	DO NOT INC	CLUDE BASE	FLOWS IF	ANY.		
01:0023							
01:0023 #							
01:0023 # # Add in Are	as A1,	A2 and A	3 from the	County R			
01:0023 # # Add in Are # and route	as A1,	A2 and A	3 from the	County R			
01:0023 # # Add in Are # and route #	as A1,	A2 and A	3 from the	County R			
01:0023 # # Add in Are # and route # #	as A1, total	A2 and A flow thro	3 from the ugh propos	County R ed SWM ar	oad ea		
01:0023 # # Add in Are # and route # # # Catchment	as A1, total	A2 and A flow thro	3 from the ugh propos	County R ed SWM ar	oad ea		
01:0023 # # Add in Are # and route # # Catchment #	as A1, total A1 from	A2 and A flow thro m Triton a	3 from the ugh propos Study (2.	County R ed SWM ar 4 hectare	oad ea		
01:0023 # # Add in Are # and route # # Catchment # DESIGN STANDH	as A1, total A1 from	A2 and A flow thro m Triton a - Area	3 from the ugh propos Study (2. (ha)=	County R ed SWM ar 4 hectare 2.40	oad ea s, C= 0.	5)	
01:0023 # # Add in Are # and route # #	as A1, total A1 from	A2 and A flow thro m Triton a - Area	3 from the ugh propos Study (2.	County R ed SWM ar 4 hectare 2.40	oad ea s, C= 0.		
01:0023 # # Add in Are # and route # # Catchment # DESIGN STANDH	as A1, total A1 from	A2 and A flow thro m Triton a - Area Total	3 from the ugh propos Study (2. (ha)=	County R ed SWM ar 4 hectare 2.40 40.00	oad ea s, C= 0.	5)	
01:0023 # # Add in Are # and route # # Catchment # DESIGN STANDH 01:000101 DT= 	as A1, total A1 from YD 10.00	A2 and A flow thro m Triton Area Area Total - (ha)=	3 from the ugh propos Study (2. (ha)= Imp(%)= IMPERVIOUS .96	County R ed SWM ar 4 hectare 2.40 40.00 PERVI 1.	oad ea s, C= 0. Dir. Cor OUS (i) 44	5)	
01:0023 # # Add in Are # and route # # Catchment # DESIGN STANDH 01:000101 DT= Surface Ar Dep. Stora	as A1, total A1 from 10.00 	A2 and A flow thro m Triton Area M Total (ha) = (mm) =	3 from the ugh propos Study (2. (ha)= Imp(%)= IMPERVIOUS .96 .80	County R ed SWM ar 4 hectare 2.40 40.00 PERVI 1. 1.	 ea s, C= 0. Dir. Cor OUS (i) 44 50	5)	
01:0023 # # Add in Are # and route # # Catchment # DESIGN STANDH 01:000101 DT= Surface Ar	as A1, total A1 from 10.00 	A2 and A flow thro m Triton a - Area Total - (ha) = (mm) = (%) =	3 from the ugh propos Study (2. (ha)= Imp(%)= IMPERVIOUS .96	County R ed SWM ar 4 hectare 2.40 40.00 PERVI 1. 1.	 oad ea s, C= 0. Dir. Cor OUS (i) 44 50 00	5)	

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Mannings n	=	.013	.250		
Max.eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	<pre>m/hr) = (min) (min) = (min) = (cms) =</pre>	162.24 10.00 1.50 (ii) 10.00 .17	56.88 10.00 8.21 (ii) 10.00 .12	*TOTALS*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE *** WARNING: St US	(hrs) = (mm) = (mm) = NT = orage Coe	1.00 98.15 98.95 .99	1.00 39.52 98.95 .40 smaller than D	.604 (iii) 1.000 62.969 98.950 .636	
(ii) TIME STEP THAN THE S (iii) PEAK FLOW	4.0 Ia (DT) SHOU TORAGE CO DOES NOT	a = Dep. Stora JLD BE SMALLEF DEFFICIENT. INCLUDE BASEF	age (Above) R OR EQUAL FLOW IF ANY.		
001:0024 *# *# Catchment A2 fro *#	m Triton				
DESIGN STANDHYD 04:000102 DT=10.00	Area Tota]			nn.(%)= 40.00	
(i) CN PROCEDU CN* = 6 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	<pre>(ha) = (mm) = (mm) = (m) = (min) (min) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = corage Code se a small URE SELECT 54.0 Id (DT) SHOU STORAGE CO DOES NOT</pre>	.10 .80 5.00 40.82 .013 162.24 10.00 .76 (ii) 10.00 .17 .05 1.00 98.15 98.95 .99 efficient is s ler DT or a la FED FOR PERVIC a = Dep. Stora JLD BE SMALLEN DEFFICIENT. INCLUDE BASEN	1.50 5.00 40.00 .250 56.88 10.00 7.48 (ii) 10.00 .13 .02 1.00 39.52 98.95 .40 smaller than D' arger area. DUS LOSSES: age (Above) R OR EQUAL FLOW IF ANY.	98.950 .636	
001:0025 *# Add hydrographs					
R.J. Burnside & Associates	Ltd.	Page	13	R.J.B.	File: S-405

LORENA\S-405\CORREC~		איד די די <u>א</u>	0.017.77			er - 100 Year Out
ADD HYD (000201)	I TD: NHAD	AREA (ba)	QPEAK	TPEAK	K.V.	DWF (cmg)
-- T	D1 01:000101	2.40	. 604	1.00	(1101) 62.97	.000
+ I	D1 01:000101 D2 04:000102	.25	.064	1.00	62.97	.000
_						
	UM 05:000201				62.97	.000
NOTE: PEAK FLO	WS DO NOT INC					
)1:0026						
Catchment A3		udy (0.6	8 hectare	es, C= 0	.5)	
DESIGN STANDHYD 01:000103 DT=10.		(ha)= [mp(%)=	.68 40.00 I	Dir. Con	n.(%)=	40.00
	II	IPERVIOUS	PERVIC	DUS (i)		
Surface Area	(ha) =	.27	• 4	41		
Dep. Storage	(mm) = (8) =	.80	1.5	5U 10		
Length	(5) - (m) =	67.33	6.(40.(20		
Average Slope Length Mannings n	(***) =	.013	.25			
Max.eff.Inten	.(mm/hr)=	162.24	56.8			
OV	er (min)	10.00	10.0	00		
Storage Coeff	$(\min) =$.97 (i	i) 7.3	33 (ii)		
Unit Hyd. pea	(min)= ak (min)= k (cms)=	.17	10.0	13	*TOTAI	· C *
PEAK FLOW	(cms) =	.12	. (05	.17	73 (iii)
TIME TO PEAK	(hrs)=	1.00	1.0	0 C	1.00	00
RUNOFF VOLUME	(mm) =	98.15	39.	52	62.96	59
TOTAL RAINFAL	L (mm) = CIENT =	98.95	98.	95 40	98.95	36
*** WARNING:	Storage Coef: Use a smalle	ficient is	smaller	than DT	'!	
(i) CN PROC	EDURE SELECTE	D FOR PERV	IOUS LOS:	SES:		
	= 64.0 Ia					
	EP (DT) SHOUL E STORAGE COE		ER OR EQ	JAL		
	OW DOES NOT I		SEFLOW IF	ANY.		
01:0027 # Add hvdrograg	ohs from Catch					
	total highway					cility
ADD HYD (000202)		AREA (ha)				
]	D1 01:000103	. 68	.173	1.00	62.97	.000
	D1 01:000103 D2 05:000201					
=	SUM 04:000202					
NOTE: PEAK FLO	DWS DO NOT INC	LUDE BASEB	FLOWS IF .	ANY.		
01:0028						

Post Strittmatter - 100 Year Output Flow

I:\LORENA\S-405\CORREC~1\MAY00\STRIT100.

*# *# Direct minor system flows to SWM Area, major system stays on County Road *# ____ | COMPUTE DUALHYD | Average inlet capacities [CINLET] = .450 (cms) | TotalHyd 04:000202 | Number of inlets in system [NINLET] = 1 ____ Total minor system capacity = .450 (cms) Total major system storage [TMJSTO] = 0.(cu.m.) QPEAK ID: NHYD TPEAK R.V. AREA DWF (ha)(cms)(hrs)(mm)(cms)TOTAL HYD.04:0002023.33.8411.00062.969.000 .000 MAJOR SYST01:000412.47.3911.00062.969MINOR SYST05:0004132.86.4501.00062.969 .000 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0029------*# Add minor highway drainage (hyd #202) to Strittmatter drainage (hyd #409) ------| ADD HYD (000203) | ID: NHYD AREA QPEAK TPEAK R.V. ------ (ha) (cms) (hrs) (mm) ID1 05:000413 2.86 .450 1.00 62.97 +ID2 02:000409 26.04 .767 1.00 31.98 DWF (cms) .000 .000 SUM 06:000203 28.90 1.217 1.00 35.05 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0030-----*# Strittmatter SWM Area *# Original Rating Curve (February 1990) revised July 1999 - same storage *# Low flow orifice modified Feb. 22, 2000 (from 150mm to 225mm) *# Changed Rating Curve (April 2000) with pond redesign *# ______ | ROUTE RESERVOIR | Requested routing time step = 10.0 min. IN>06:(000203) | OUT<02:(000406) | ====== OUTLFOW STORAGE TABLE =======
 ======
 OUTLFOW
 STORAGE
 TABLE
 =======

 OUTFLOW
 STORAGE
 OUTFLOW
 STORAGE

 (cms)
 (ha.m.)
 (cms)
 (ha.m.)

 .000
 .0000E+00
 .246
 .7330E-01

 .040
 .2600E-02
 .318
 .8780E-01

 .090
 .4500E-02
 .345
 .1032E+00

 .121
 .1070E-01
 .378
 .1256E+00

 .146
 .2100E-01
 .428
 .1786E+00

 .202
 .4640E-01
 .448
 .1940E+00
 .239 .6870E-01 | .467 .2188E+00 PEAK FLOW REDUCTION [Qout/Qin] (%) = 33.864 TIME SHIFT OF PEAK FLOW (min) = 40.00

R.J. Burnside & Associates Ltd.

(ha.m.)=.1620E+00

MAXIMUM STORAGE USED

I:\LORENA\S-405\CORREC~1\MAY00\STRIT100. Post Strittmatter - 100 Year Output Flow

à.

PRINT	HYD	A	REA	(ha) =	28.904				
ID=02	(000406)	A Q = 5 T	PEAK	(cms) =	.412	(i)			
DT=10.	00 PCYC=	= 5 T	PEAK	(hrs) =	1.667				
		V	OLUME	(mm) =	35.050				
(=)	י אגיים			ידונהם הסני		7) 1) 1)			
(i) TIME	FLOW	FLOW DOES TIME	FLOW		FLOW IF		FLOW	TIME	FT.OW
hrs	Cms	hrs	cms 1	hrs		hrs	cms	hrs	CMS
.00	.000	hrs 110.00	.0081	220.00	.002	330.00	.0001	439.99	.000
.83	.153	110.83	.0081	220.84	.0021	330.83	.000	440.83	.000
1.67	.412	111.67	.008	221.67	.002	331.67	.000	441.66	.000
		112.50					.0001	442.49	.000
3.33	.226	113.33	.008	223.34	.002	333.33	.000	443.33	.000
4.17	.126	114.17	.008	224.17	.002	334.17	.0001	444.16	.000
5.00	.014	115.00	.008	225.00	.002	335.00	.000	444.99	.000
5.83	.013	115.83	.008	225.84	.001	335.83	.000	445.82	.000
6.67	.013	114.17 115.00 115.83 116.67	.008	226.67	.001	336.66	.000	446.66	.000
7.50	.013	117.50	.008	227.50	.001	337.50	.000	447.49	.000
8.33	.013	118.33	.0081	228.34	.001	338.33	.000	448.32	.000
9.17	.013	119.17 120.00 120.83 121.67	.008	229.17	.001	339.16	.000	449.16	.000
10.00	.013		.008	230.00	.001	340.00	.000	449.99	.000
11.03	.013	120.83	.0081	230.84	.0011	340.83	.0001	450.82	.000
12.6/	.013	121.67	.008	231.67	.0011	341.66	.0001	451.66	.000
12.50		122.50							
14.17	.012	124.17	.0071	235 00	.001	344.10	.0001	454.10	.000
15.00	.012	125.00	.0071	235.00	.0011	345.00	.0001	454.99	.000
16 67	.012	125.05	.0071	236 67	0011	346 66	.0001	456 66	.000
17.50	.012	125.00 125.83 126.67 127.50	.0071	237.50	.0011	347.50	.0001	457.49	.000
18.33	.012	128.33	.0071	238.34	.0011	348.33	.0001	458.32	.000
19.17	.012	129.17	.0071	239.17	.0011	349.16	.0001	459.16	.000
20.00	.012	130.00	.0071	240.00	.001	350.00	.0001	459.99	.000
20.83	.012	130.00 130.83 131.67 132.50	.007	240.84	.001	350.83	.000	460.82	.000
21.67	.012	131.67	.006	241.67	.001	351.66	.000	461.66	.000
22.50	.012	132.50	.006	242.50	.001	352.50	.000	462.49	.000
23.33	.012	133.33	.006	243.34	.001	353.33	.000	463.32	.000
24.17	.012	134.17	.006						.000
25.00		•	.006			355.00			.000
25.83		135.83	.006	245.84	.001	355.83	.000	465.82	.000
26.67		136.67	,	246.67		356.66		466.66	.000
27.50		137.50		247.50	•	357.50		467.49	.000
28.33		138.33		248.34		358.33		468.32	.000
29.17		139.17		249.17		359.16		469.16	.000
30.00		140.00		250.00		360.00		469.99	.000
30.83		140.83		250.84		360.83		470.82	.000
31.67		141.67 142.50		251.67 252.50		361.66 362.50		471.66 472.49	.000
32.50		142.50	0051	252.50	.001	362.30		472.49	.000
34.17		143.33		253.34	.001	364 16		473.32	.000
35.00		144.17		255.00		365.00		474.10	
35.83		145.83			.001			475.82	.000
36.67		146.67		256.67		366.66		476.66	.000
37.50		147.50		257.50		367.50		477.49	.000
38.33		148.33		258.34		368.33		478.32	.000
39.17		149.17		259.17		369.16		479.16	.000
40.00		150.00			.001			479.99	.000
40.83		150.83			.001			480.82	.000
41.67		151.67		261.67		371.66		481.66	.000

Post Strittmatter - 100 Year Output Flow

1: \LORENA\S-40	5 \CORRE	C~1\MAYUU\ST	RITIOU.			Post 1	Strittmatt	er – 100 Year	Output Flow
40 50	0101	1 - 0 - 0	0051	0.00 50	004				
42.50	.0121	152.50	.005	262.50	.0011	372.50	.000[482.49	.000
43.33	.012	153.33	.005	263.34	.001	373.33	.000	483.32	.000
44.17	.011	154.17	.005	264.17	.001	374.16	.0001	484.16	.000
45.00	.0111	155.00	.0051	265.00	.0011	375.00	.0001	484.99	.000
45 83	0111	155 83	0041	263.34 264.17 265.00 265.84	0011	375 83		185 82	.000
45.05	0111	155.05	.0041	266.67	.0011	375.05	.0001	405.02	.000
47.50	.011	157.50	.004	267.50	.001	377.50	.000	487.49	.000
48.33	.011	158.33	.004	268.34	.001	378.33	.000	488.32	.000
49.17	.011	159.17	.004	267.30 268.34 269.17 270.00 270.84 271.67 272.50	.001	379.16	.0001	489.16	.000
50 00	0111	160 00	0041	270 00	0011	380 00	0001	489 99	000
50.00	0111	160.00	.001	270.00	0011	200.00	.0001	100.00	.000
50.05	.0111	100.05	.004	270.04	.0011	300.03	.0001	490.02	.000
51.6/	.0111	161.67	.004	2/1.6/	.0011	381.66	.0001	491.66	.000
52.50	.011	162.50	.004	272.50	.001	382.50	.000	492.49	.000
53.33	.011	163.33	.004	273.34	.001	383.33	.000	493.32	.000
54.17	.0111	164.17	.0041	274.17	.0011	384.16	.0001	494.16	.000
55 00	0111	165 00	0041	273.34 274.17 275.00 275.84 276.67 277.50	0011	385 00	0001	191 99	000
55.00	.0111	105.00	.0041	275.00	.0011	205.00	.0001	494.99	.000
55.83	.0111	105.83	.0041	2/5.84	.0011	385.83	.0001	495.82	.000
56.67	.011	166.67	.004	276.67	.001	386.66	.000	496.66	.000
57.50	.011	167.50	.004	277.50	.001	387.50	.0001	497.49	.000
58 33	11111		$\Omega \Omega Z I$	7 / 8 3 /	11(1)[1]				111111
59 17	0111	169 17	0041	279 17	0011	389 16	0001	499 15	000
60.00	0111	170.00	.001	200 00	0011	200.00	.0001	400.00	.000
60.00	.0111	170.00	.0041	280.00	.0011	309.99	.0001	499.99	.000
60.83	.0111	170.83	.004	280.83	.001	390.83	.0001	500.82	.000
61.67	.011	171.67	.003	279.17 280.00 280.83 281.67 282.50 283.33	.001	391.66	.000	501.65	.000
62.50	.010	172.50	.0031	282.50	.001	392.49	.000	502.49	.000
63 33	0101	173.33	.0031	283.33	.0011	393.33	. 0001	503.32	.000
64 17	0101	174 17	0031	284 17	0011	394 16	0001	504 15	000
04.17	.0101	175.00	.0031	283.33 284.17 285.00 285.83 286.67 287.50 288.33	.0011	204 00	.0001	504.15	.000
65.00	.0101	1/5.00	.0031	285.00	.0011	394.99	.0001	504.99	.000
65.83	.010	175.83	.003	285.83	.001	395.83	.000	505.82	.000
66.67	.010	176.67	.003	286.67	.001	396.66	.000	506.65	.000
67.50	.0101	177.50	.003	287.50	.001	397.49	.0001	507.49	.000
68.33	.0101	178.33	. 0031	288.33	.001i	398.33	. 0001	508.32	.000
60 17	I I I I I I	1/0 1/	(103)		117111	3444 16	[]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]	500 15	111111
09.17	.0101	100 00	.0031	209.17	.001	200.00	.0001	509.15	.000
70.00	.0101	180.00	.0031	290.00	.001	399.99	.0001	509.99	.000
70.83	.010	180.83	.003	290.83	.001	400.83	.000	510.82	.000
71.67	.010	181.67	.0031	291.67	.001	401.66	.000	511.65	.000
72.50	.0101	182,50	.0031	290.00 290.83 291.67 292.50 293.33 294.17	.001	402.49	.000	512.49	.000
73 33	0101	183.33	. 0031	293.33	.0011	403.33	.0001	513.32	.000
70.00	0101	18/ 17	0031	290.00	0011	404 16	0001	51/ 15	000
	.0101	104.17	.0031	205.17	.001	404.10	.0001	514.10	.000
75.00	.010			295.00		404.99		514.99	.000
75.83	.010		,	295.83		405.83		515.82	.000
76.67	.010	186.67	.003	296.67	.000	406.66	.000	516.65	.000
77.50	.010	187.50	.003	297.50	.000	407.49	.000	517.49	.000
78.33	.010			298.33		408.33	.000		.000
79.17	.010			299.17		409.16	.000		.000
80.00	.010			300.00		409.99	.000		.000
80.83		190.83		300.83		410.83	.000		.000
81.67	.010	191.67		301.67		411.66		521.66	.000
82.50	.010	192.50	.003	302.50	.000	412.49	.000	522.49	.000
83.33	.0091	193.33	.0021	303.33	.0001	413.33	.000	523.32	.000
84.17		194.17		304.17		414.16	.000		.000
85.00		195.00		305.00		414.99	.0001		.000
85.83		195.83		305.83		415.83	.000		.000
86.67		196.67		306.67		416.66	.000		.000
87.50	.009	197.50	.002	307.50	.000	417.49	.000	527.49	.000
88.33	.0091	198.33		308.33	.0001	418.33	.0001	528.32	.000
89.17		199.17		309.17		419.16	.000		.000
90.00		200.00		310.00	.000		.000		.000
90.83		200.83		310.83	.000		.000		.000
91.67	.009			311.67	.0001		.000	531.66	.000
92.50		202.50		312.50		422.49		532.49	.000
93.33	.0091	203.33	.002	313.33	.000	423.33	.000	533.32	.000
R.J. Burnside				Page	17	· · · ·		R.J.B.	File: S-405

Post Strittmatter - 100 Year Output Flow

	$RENA \ S-405 \ CORF$									
0.4	.17 .009	1 204 1	7	0001	21/ 17	.000	101 10	0001 5	201 10	000
94. 95.		1 205 0	. / .		315 00	.0001	424.10	.000 5	534.16	.000 .000
95.	83 009	1 205.0	13		315 83	.0001	424.99	.000 5	535 93	.000
96.						.0001			536.66	
97.	50 009	200.0	57 • ·		317.50	.0001	427.49	.000		
98.	.30 .009	1 207.0	, vo	0021	210 22	.0001	427.49	,000 5	537.49	
99.	17 009	1 200.0	, , , , , , , , , , , , , , , , , , ,	0021	210.33	.0001	420.33	.0001	538.32	.000
99. 100.	.17 .009	208.3 209.1 210.0			318.33 319.17 320.00	.0001	428.33 429.16 429.99	.0001 5	539.16 539.99	.000
100.	.83 .009	210.0	ло. Л		220.00	.0001	429.99	.0001		
							430.83			.000
101.									541.66	
102.							432.49		542.49	
103.	.33 .009	213.3		0021	323.33	.0001	433.33	.0001 3	543.32	.000
104. 105	.17 .009	214.1	. / .		324.17	.0001	434.16	.0001 5	544.16	.000
105. 105	.17 .009 .00 .009 .83 .008	215.0		0021	325.00	.0001	434.99	.0001 3	544.99	.000
105. 106	.83 .008	215.8		0021	325.83	.0001	435.83	.0001 3	545.82	.000
106. 107	.67 .008	216.6		0021	326.67	.0001	436.66	.0001 :	546.66	.000
107.	.50 .008	217.5	. 0	002	327.50	.000	437.49	.0001		
108.	.33 .008 .17 .008	218.3	34.	002	328.33	.0001	438.33	.000		
109.	.17 .008	219.1	.7 ·	002	329.17	.000	439.16	.000		
# #	Catchment (Strittmat	ter A7,	0.32			drainage	d∖s of S	WM area -	uncontr	olled
DES 06:	SIGN STANDH :000307 DT=	YD 10.00	Are Tot	a al Tr	(ha)=	.32 30.00	Dir. Co	nn.(%)=	20.00	
			-	IMI	PERVIOU	S PERV	/IOUS (i)			
	Surface Ar Dep. Stora Average Sl Length Mannings n	ea ge	- (ha)= (mm)=	IMI	PERVIOU .10 .80	IS PERV	/IOUS (i) .22 L.50			
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In	ea ge ope ten.(mm	(ha) = (mm) = (%) = (m) = = n/hr) =	IM	PERVIOU .10 .80 2.00 46.19 .013 162.24	7S PERV 1 2 4 (- 7 1	/IOUS (i) .22 1.50 2.00 0.00 .250			
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In	ea ge ope ten.(mm	(ha) = (mm) = (%) = (m) = = n/hr) =	IM	PERVIOU .10 .80 2.00 46.19 .013 162.24	7S PERV 1 2 4 (- 7 1	/IOUS (i) .22 1.50 2.00 0.00 .250			
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co	ea ge ope ten.(mm over (eeff. (<pre>(ha) = (mm) = (%) = (m) = = n/hr) = (min) (min) =</pre>	IM	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08	VS PERV 1 2 40	/IOUS (i) .22 1.50 2.00 0.00 .250 1.61 0.00 ∂.14 (ii)			
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd.	ea ge ope ten.(mm over (eff. (Tpeak (<pre>(ha) = (mm) = (%) = (m) = = n/hr) = (min) (min) = (min) =</pre>	IM	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00	VS PERV 1 2 40	VIOUS (i) .22 1.50 2.00 0.00 .250 1.61 0.00 9.14 (ii) 0.00			
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co	ea ge ope ten.(mm over (eff. (Tpeak (<pre>(ha) = (mm) = (%) = (m) = = n/hr) = (min) (min) = (min) =</pre>	IM	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08	VS PERV 1 2 40	/IOUS (i) .22 1.50 2.00 0.00 .250 1.61 0.00 ∂.14 (ii)			
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	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW	ea ge ope ten.(mm over (eeff. (Tpeak (peak (<pre>(ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) = (cms) = (cms) =</pre>	IMI	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03	VS PERV 1 2 40	VIOUS (i) .22 1.50 2.00 0.00 .250 1.61 0.00 9.14 (ii) 0.00 .11 .03	*TOTAL	S* 1 (iii)	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE	ea ope ope ten.(mm over (peff. (Tpeak (peak (cak	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) = (cms) = (cms) = (hrs) =</pre>	IMI	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00	VS PERV 1 2 40	<pre>/IOUS (i) .22 1.50 2.00 2.00 .250 1.61 0.00 9.14 (ii) 0.00 .11 .03 1.00</pre>	*TOTAL .06 1.00	S* 1 (iii) 0	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL	ea ope tten.(mm over (peff. (Tpeak (peak (CAK (JUME	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) = (cms) = (cms) = (hrs) = (mm) =</pre>	IMI	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15	VS PERV 1 2 40	<pre>/IOUS (i) .22 1.50 2.00 2.00 .250 1.61 0.00 9.14 (ii) 0.00 .11 .03 1.00 2.82</pre>	*TOTAL .06 1.00 53.88	S* 1 (iii) 0 3	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN	eea ope ten.(mm over (peff. (Tpeak (peak (CAK (UME FALL	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (</pre>	IMI	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95	VS PERV 1 2 40	<pre>/IOUS (i) .22 1.50 2.00 2.00 .250 1.61 0.00 9.14 (ii) 0.00 .11 .03 1.00 2.82 8.95</pre>	*TOTAL .06 1.00 53.88 98.95	S* 1 (iii) 0 3 0	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE	ea ope ten.(mm over (eeff. (Tpeak (peak (CAK (UME FFICIEN	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = yT =</pre>	IMI	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99	VS PERV 1 2 40	<pre>/IOUS (i) .22 1.50 2.00 2.00 .250 1.61 0.00 9.14 (ii) 0.00 .11 .03 1.00 2.82 8.95 .43</pre>	*TOTAL: .06 1.00 53.88 98.95 .54	S* 1 (iii) 0 3 0	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN	ea ge ope ten.(mm over(peak(peak(CAK(UME IFALL FFICIEN NG: Sto	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) (min) = (cms) = (cms) = (hrs) = (hrs) = (mm) = VT = Drage C</pre>	IM	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient	VS PERV 1 2 40 71 10 (ii) 9 10 10 10 10 10 10 10 10 10 10	<pre>/IOUS (i) .22 1.50 2.00 0.00 .250 1.61 0.00 9.14 (ii) 0.00 .11 .03 1.00 2.82 8.95 .43 er than D</pre>	*TOTAL: .06 1.00 53.88 98.95 .54	S* 1 (iii) 0 3 0	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE	ea ge ope ten.(mm over(peak(peak(CAK(UME IFALL FFICIEN NG: Sto	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) (min) = (cms) = (cms) = (hrs) = (hrs) = (mm) = VT = Drage C</pre>	IM	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient	VS PERV 1 2 40	<pre>/IOUS (i) .22 1.50 2.00 0.00 .250 1.61 0.00 9.14 (ii) 0.00 .11 .03 1.00 2.82 8.95 .43 er than D</pre>	*TOTAL: .06 1.00 53.88 98.95 .54	S* 1 (iii) 0 3 0	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE *** WARNI	ea ope ope ten.(mm over (peak (peak (EAK (UME FFICIEN NG: Sto USE PROCEDUE	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = VT = Drage C a sma RE SELE</pre>	IM) oeff ller CTED	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient DT or FOR PE	VS PERV 1 2 4 4 (ii) 1 1 1 42 98 is smalle a larger CRVIOUS LO	<pre>/IOUS (i) .22 1.50 2.00 0.00 .250 1.61 0.00 0.14 (ii) 0.00 .11 .03 1.00 2.82 8.95 .43 er than D area. DSSES:</pre>	*TOTAL: .06 1.00 53.88 98.95 .54	S* 1 (iii) 0 3 0	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE *** WARNI	ea ope ope ten.(mm over (peak (peak (peak (EAK (UME FFICIEN NG: Sto USE PROCEDUE = 64	<pre>(ha) = (mm) = (mm) = (%) = (m) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = VT = Drage C a sma RE SELE 4.0</pre>	IM oeff ller CTED Ia =	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient DT or FOR PE Dep. S	VS PERV 1 2 4 4 (ii) 1 (ii) 1 42 98 is smalle a larger CRVIOUS LO Storage	<pre>/IOUS (i) .22 1.50 2.00 0.00 .250 1.61 0.00 0.14 (ii) 0.00 .11 .03 1.00 2.82 8.95 .43 er than D area. OSSES: (Above)</pre>	*TOTAL: .06 1.00 53.88 98.95 .54	S* 1 (iii) 0 3 0	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE *** WARNI (i) CN P CN* (ii) TIME	ea ge ope ten.(mm over(eff.(Tpeak(peak(CAK UME FFICIEN NG: Sto USE PROCEDUE = 64 STEP	<pre>(ha) = (mm) = (%) = (%) = (m) = (m) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = VT = VT = VT = VT = VT = Crage C a sma RE SELE 4.0 (DT) SH</pre>	Oeff ller CTED Ia = OULD	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient DT or FOR PE Dep. S BE SMA	IS PERV 1 2 4 4 7 7 1 ((ii) 9 1 4 2 98 is smalle a larger CRVIOUS LO Storage ALLER OR H	<pre>/IOUS (i) .22 1.50 2.00 0.00 .250 1.61 0.00 0.14 (ii) 0.00 .11 .03 1.00 2.82 8.95 .43 er than D area. OSSES: (Above)</pre>	*TOTAL: .06 1.00 53.88 98.95 .54	S* 1 (iii) 0 3 0	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE *** WARNI (i) CN P CN* (ii) TIME THAN	ea ge ope ten.(mm over(eff.(Tpeak(peak(CAK FFICIEN NG:Sto USE PROCEDUE = 64 STEP THE ST	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (nrs) = (nrs) = (mm) = VT = VT = VT = VT = VT = VT = VT = VT</pre>	IM oeff ller CTED Ia = OULD COEF	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient DT or FOR PE Dep. S BE SMA FICIENT	IS PERV 1 2 4 4 7 1 (ii) 1 4 2 98 is smalle a larger CRVIOUS LO Storage ALLER OR H	<pre>/IOUS (i) .22 .50 2.00 .250 .250 .250 .1.61 .00 .11 (ii) .00 .11 .03 1.00 2.82 3.95 .43 er than D area. OSSES: (Above) EQUAL</pre>	*TOTAL: .06 1.00 53.88 98.95 .54	S* 1 (iii) 0 3 0	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE *** WARNI (i) CN P CN* (ii) TIME	ea ge ope ten.(mm over(eff.(Tpeak(peak(CAK FFICIEN NG:Sto USE PROCEDUE = 64 STEP THE ST	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (nrs) = (nrs) = (mm) = VT = VT = VT = VT = VT = VT = VT = VT</pre>	IM oeff ller CTED Ia = OULD COEF	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient DT or FOR PE Dep. S BE SMA FICIENT	IS PERV 1 2 4 4 7 1 (ii) 1 4 2 98 is smalle a larger CRVIOUS LO Storage ALLER OR H	<pre>/IOUS (i) .22 .50 2.00 .250 .250 .250 .1.61 .00 .11 (ii) .00 .11 .03 1.00 2.82 3.95 .43 er than D area. OSSES: (Above) EQUAL</pre>	*TOTAL: .06 1.00 53.88 98.95 .54	S* 1 (iii) 0 3 0	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE *** WARNI (i) CN P CN* (ii) TIME THAN (iii) PEAK	ea ge ope ten.(mm over (eff. (Tpeak (peak (FFICIEN FFICIEN NG: Sto USE PROCEDUE STEP THE ST K FLOW I	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = VT = Drage C a sma RE SELE 4.0 (DT) SH FORAGE DOES NO</pre>	IM oeff ller CTED Ia = OULD COEF T IN	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient DT or FOR PE Dep. S BE SMA FICIENT CLUDE E	IS PERV 1 2 4 4 4 7 1 1 (ii) 9 1 4 2 98 is smalled a larger ERVIOUS LO Storage ALLER OR H 3 BASEFLOW 1	<pre>/IOUS (i) .22 .50 2.00 .250 1.61 0.00 9.14 (ii) 0.00 .11 .03 1.00 2.82 8.95 .43 er than D area. OSSES: (Above) EQUAL IF ANY.</pre>	*TOTAL .06 1.00 53.88 98.95 .54 T!	S* 1 (iii) 0 3 0 5	
	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE *** WARNI (i) CN P CN* (ii) TIME THAN (iii) PEAK	ea ge ope ten.(mm over (eff. (Tpeak (peak (FFICIEN IFALL FFICIEN ING: Sto USE PROCEDUE STEP THE ST C FLOW I	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = VT = Drage C a sma RE SELE 4.0 (DT) SH FORAGE DOES NO</pre>	IM oeff ller CTED Ia = OULD COEF T IN	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient DT or FOR PE Dep. S BE SMA FICIENT CLUDE E	IS PERV 1 2 4 4 7 1 (ii) 9 (ii) 9 1 (ii) 9 1 4 2 98 is smalle a larger ERVIOUS LO Storage ALLER OR H 3 BASEFLOW 1	<pre>/IOUS (i) .22 .50 2.00 .250 .250 </pre>	*TOTAL .06 1.00 53.88 98.95 .54 T!	S* 1 (iii) 0 3 0 5	
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01: #	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE *** WARNI (i) CN P CN* (ii) TIME THAN (iii) PEAK	ea ope ope ten.(mm over (peak (peak (peak (CAK (C	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = VT = Drage C e a sma RE SELE 4.0 (DT) SH FORAGE DOES NO</pre>	IM oeff ller CTED Ia = OULD COEF T IN	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient DT or FOR PE Dep. S BE SMA FICIENT CLUDE E	IS PERV 1 2 4 4 7 1 1 (ii) 5 1 4 2 98 is smalled a larger CRVIOUS LO Storage ALLER OR H 3 BASEFLOW 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<pre>/IOUS (i) .22 .50 2.00 2.00 .250 1.61 0.00 9.14 (ii) 0.00 .11 .03 1.00 2.82 8.95 .43 er than D area. 0SSES: (Above) EQUAL IF ANY.</pre>	*TOTAL .06 1.00 53.88 98.95 .54 T!	S* 1 (iii) 0 3 0 5	
 01:' #	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE *** WARNI (i) CN P CN* (ii) TIME THAN (iii) PEAK	ea ope ope ten.(mm over (peak (peak (peak (CAK (C	<pre>(ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = VT = VT = VT = VT = VT = VT = VT = VT</pre>	IM oeff ller CTED Ia = OULD COEF T IN T IN	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient DT or FOR PE Dep. S BE SMA FICIENT CLUDE E A8, 0.	IS PERV 1 2 4 4 7 1 1 ((ii) 5 1 ((ii) 5 1 4 2 98 is smalled a larger CRVIOUS LO Storage ALLER OR H 3 ASEFLOW 1 	<pre>/IOUS (i) .22 .50 2.00 2.00 2.250 1.61 0.00 9.14 (ii) 0.00 .11 .03 1.00 2.82 8.95 .43 er than D area. 0SSES: (Above) EQUAL IF ANY. </pre>	*TOTAL .06 1.00 53.88 98.95 .54 T!	S* 1 (iii) 0 3 0 5	
01: #	Surface Ar Dep. Stora Average Sl Length Mannings n Max.eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOL TOTAL RAIN RUNOFF COE *** WARNI (i) CN P CN* (ii) TIME THAN (iii) PEAK	eea ope ope ten.(mm over (peak (peak (peak (CAK (<pre>(ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = NT = Drage C a sma RE SELE 4.0 (DT) SH FORAGE DOES NO</pre>	IM oeff ller CTED Ia = OULD COEF T IN COEF T IN COEF T IN COEF T IN COEF	PERVIOU .10 .80 2.00 46.19 .013 162.24 10.00 1.08 10.00 .17 .03 1.00 98.15 98.95 .99 icient DT or FOR PE Dep. S BE SMA FICIENT CLUDE E A8, 0. OWS UNC	IS PERV 1 2 4 4 7 1 1 ((ii) 5 1 ((ii) 5 1 4 2 98 is smalled a larger CRVIOUS LO Storage ALLER OR H 3 ASEFLOW 1 	<pre>/IOUS (i) .22 .50 2.00 2.00 2.250 1.61 0.00 9.14 (ii) 0.00 .11 .03 1.00 2.82 8.95 .43 er than D area. 0SSES: (Above) EQUAL IF ANY. </pre>	*TOTAL .06 1.00 53.88 98.95 .54 T!	S* 1 (iii) 0 3 0 5	

DE								
05	SIGN STANDHYD 5:000308 DT=10.00	Area Total	(ha)= Imp(%)=	.46 30.00	Dir.	Conn.	(%)=	20.00
			IMPERVIOU			(i)		
	Surface Area	(ha)=	.14		.32			
	Dep. Storage	(mm) =	.80		1.50			
	Average Slope	(%) = (m) =	2.00	Л	2.00			
	Length Mannings n	(10) =	013	4	250			
	Max.eff.Inten.(m							
	over Storage Coeff	(min) (min)=	1 20	1	.U.UU 9.27 (4 4)		
	Storage Coeff. Unit Hyd. Tpeak	(min) =	10 00	(1)	9.27 (±±)		
	Unit Hyd. peak	(cms) =	.17	-	.11			
						-	*TOTALS	
	PEAK FLOW	(cms) =	.04		.05		.087	7 (iii)
	TIME TO PEAK							
	RUNOFF VOLUME							
	TOTAL RAINFALL RUNOFF COEFFICIE	(IIIII) =	90.95	2	.43		.545	5
	*** WARNING: St						, 0 1 0	-
		se a small						
	(i) CN PROCEDU	JRE SELECT	ED FOR PE	RVIOUS I	LOSSES:			
	$CN^* = 6$)		
	(ii) TIME STEP				EQUAL			
	THAN THE S (iii) PEAK FLOW							
	:0034							
# # #	Catchment SA9 -	Strittmat POND>>>>	ter road FLOWS UNC	drainage CONTROLLE	e d/s o	of SWM	area	
# # # # #	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9	Strittmat POND>>> 9, 0.08 he	ter road FLOWS UNC ctares, C	drainage CONTROLLE C= 0.95)	e d/s o	of SWM	area	
# # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD	Strittmat POND>>>> 9, 0.08 he Area	ter road FLOWS UNC ctares, ((ha)=	drainage CONTROLLE C= 0.95) .08	e d/s o ED DOWN	of SWM . ROAD		95.00
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9	Strittmat POND>>>> 9, 0.08 he Area	<pre>ter road FLOWS UNC cctares, C (ha)= Imp(%)=</pre>	drainage CONTROLLE C= 0.95) .08 95.00	e d/s o ED DOWN Dir.	f SWM ROAD Conn.		95.00
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00	Strittmat POND>>>> , 0.08 he Area Total	<pre>ter road FLOWS UNC ctares, C (ha)= Imp(%)= IMPERVIOU</pre>	drainage CONTROLLE C= 0.95) .08 95.00	e d/s o ED DOWN Dir. RVIOUS	f SWM ROAD Conn.		95.00
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00 Surface Area	Strittmat POND>>>> , 0.08 he 	<pre>ter road FLOWS UNC ctares, C (ha)= Imp(%)= IMPERVIOU .08</pre>	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF	e d/s o ED DOWN Dir. RVIOUS .00	f SWM ROAD Conn.		95.00
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage	Strittmat POND>>>> , 0.08 he Area Total (ha) = (mm) =	ter road FLOWS UNC ctares, ((ha)= Imp(%)= IMPERVIOU .08 .80	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF	e d/s o ED DOWN Dir. RVIOUS .00 1.50	f SWM ROAD Conn.		95.00
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage Average Slope	Strittmat POND>>>> , 0.08 he Area Total (ha)= (mm)= (%)=	ter road FLOWS UNC ctares, C (ha)= Imp(%)= IMPERVIOU .08 .80 2.00	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF	e d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00	f SWM ROAD Conn.		95.00
# # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage	Strittmat POND>>>> , 0.08 he Area Total (ha) = (mm) =	ter road FLOWS UNC ctares, ((ha)= Imp(%)= IMPERVIOU .08 .80	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF	e d/s o ED DOWN Dir. RVIOUS .00 1.50	f SWM ROAD Conn.		95.00
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n	Strittmat POND>>>> , 0.08 he Area Total (ha) = (mm) = (%) = (m) = =	ter road FLOWS UNC ctares, ((ha)= Imp(%)= IMPERVIOU .08 .80 2.00 23.09 .013	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF	e d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00 40.00 .250	f SWM ROAD Conn.		95.00
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(r	Strittmat POND>>>> , 0.08 he Area Total (ha) = (mm) = (%) = (m) = =	ter road FLOWS UNC ctares, C (ha)= Imp(%)= IMPERVIOU .08 .80 2.00 23.09	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF	d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00 40.00	f SWM ROAD Conn.		95.00
# # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(n over Storage Coeff.	<pre>Strittmat POND>>>> 9, 0.08 he Area Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) =</pre>	ter road FLOWS UNC ctares, C (ha)= Imp(%)= IMPERVIOU .08 .80 2.00 23.09 .013 162.24 10.00 .71	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF 4 (ii)	e d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00 40.00 .250 56.88 10.00 9.55 (Conn.		95.00
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(r over Storage Coeff. Unit Hyd. Tpeak	<pre>Strittmat POND>>>> 0, 0.08 he Area Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) =</pre>	ter road FLOWS UNC ctares, C (ha) = Imp(%) = IMPERVIOU .08 .80 2.00 23.09 .013 162.24 10.00 .71 10.00	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF 4 (ii)	e d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00 40.00 .250 56.88 10.00 9.55 (10.00	Conn.		95.00
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(n over Storage Coeff.	<pre>Strittmat POND>>>> 0, 0.08 he Area Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) =</pre>	ter road FLOWS UNC ctares, C (ha)= Imp(%)= IMPERVIOU .08 .80 2.00 23.09 .013 162.24 10.00 .71	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF 4 (ii)	e d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00 40.00 .250 56.88 10.00 9.55 (f SWM ROAD Conn. (i)	(%) =	
# # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD D:000410 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	<pre>Strittmat POND>>>> 0, 0.08 he Area Total (ha) = (mm) = (%) = (m) = (min) (min) = (min) = (min) = (cms) =</pre>	ter road FLOWS UNC ctares, C (ha) = Imp(%) = IMPERVIOU .08 .80 2.00 23.09 .013 162.24 10.00 .71 10.00 .17	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF 4 (ii) 1	e d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00 40.00 .250 56.88 10.00 9.55 (10.00 .11	f SWM ROAD Conn. (i)	(%) = *TOTALS	S*
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW	<pre>Strittmat POND>>>> 0, 0.08 he Area Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) = (cms) = (cms) =</pre>	ter road FLOWS UNC ctares, C (ha) = Imp(%) = IMPERVIOU .08 .80 2.00 23.09 .013 162.24 10.00 .71 10.00 .17 .03	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF (ii)	e d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00 40.00 .250 56.88 10.00 9.55 (10.00	f SWM ROAD Conn. (i)	(%) = *TOTALS	S* 5 (iii)
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter A9 ESIGN STANDHYD D:000410 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	<pre>Strittmat POND>>>> 0, 0.08 he Area Total (ha) = (mm) = (%) = (m) = (min) (min) = (min) = (cms) = (cms) = (hrs) =</pre>	ter road FLOWS UNC ctares, C (ha) = Imp(%) = IMPERVIOU .08 .80 2.00 23.09 .013 162.24 10.00 .71 10.00 .17	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF (ii)	e d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00 40.00 .250 56.88 10.00 9.55 (10.00 .11 .00 1.17 39.49	f SWM ROAD Conn. (i)	(%) = *TOTALS .035 1.000 95.21	S* 5 (iii) 7
# # # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter AS ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL	<pre>Strittmat POND>>>> 0, 0.08 he Area Total (ha) = (mm) = (%) = (m) = (min) (min) = (min) = (cms) = (hrs) = (hrs) = (mm) = (mm) =</pre>	ter road FLOWS UNC ctares, C (ha)= Imp(%)= IMPERVIOU .08 .80 2.00 23.09 .013 162.24 10.00 .71 10.00 .17 .03 1.00 98.15 98.95	drainage CONTROLLE C= 0.95) .08 95.00 JS PEF (ii)	e d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00 40.00 .250 56.88 10.00 9.55 (10.00 .11 .00 1.17 39.49 98.95	f SWM ROAD Conn. (i)	(%) = *TOTALS .035 1.000 95.217 98.950	S* 5 (iii) 0 7 0
# # # 	Catchment SA9 - NOT ROUTED INTO (Strittmatter AS ESIGN STANDHYD 9:000410 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME	<pre>Strittmat POND>>>> 0, 0.08 he Area Total (ha) = (mm) = (%) = (m) = (min) (min) = (min) = (cms) = (hrs) = (hrs) = (mm) = (mm) = ENT =</pre>	ter road FLOWS UNC ctares, C (ha)= Imp(%)= IMPERVIOU .08 .80 2.00 23.09 .013 162.24 10.00 .71 10.00 .17 .03 1.00 98.15 98.95 .99	drainage CONTROLLE 2 0.95) .08 95.00 JS PEF (ii)	e d/s o ED DOWN Dir. RVIOUS .00 1.50 2.00 40.00 .250 56.88 10.00 9.55 (10.00 .11 .00 1.17 39.49 98.95 .40	f SWM ROAD Conn. (i)	(%) = *TOTALS .035 1.000 95.21	S* 5 (iii) 7 0

Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0035-----*# Add hydrograph #307 to hyd #410 to SWM area discharge for outflow from Strittmatter development (must be below diversion flow) *# | ADD HYD (000411) | ID: NHYD QPEAK TPEAK R.V. (cms) (hrs) (mm) AREA DWF (hrs) (cms) (cms) _____ (ha) .412 1.67 35.05 .061 1.00 53.88 .087 1.00 53.88 28.90 .32 .46 .412 .000 ID1 02:000406 +ID2 06:000307 .000 +ID3 05:000308 .000 +ID4 09:000410 .08 .035 1.00 95.22 .000 SUM 04:000411 29.76 .495 1.17 35.71 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0036-----*# *# Add major system overflow from diversion to County Road drainage *# below diversion (Areas A4 and A5) *# ADD HYD (000414) | ID: NHYD AREA QPEAK TPEAK R.V. DWF (ha) (cms) (cms) (hrs) (mm) +ID2 03:000204 .37 .000 1.00 62.97 .095 1.00 62.97 .000 SUM 02:000414 .84 .486 1.00 62.97 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0037-----*# Church Street Intersection *# *# Add hydrograph from Strittmatter Property (hyd #411) *# to County Road 24 Drainage at Church Street *# _____ ADD HYD (000205) | ID: NHYD AREA QPEAK TPEAK R.V. DWF (cms) (hrs) (mm) (ha) _____ (cms) .486 1.00 62.97 .000 ID1 02:000414 .84 +ID2 04:000411 29.76 .495 1.17 35.71 . 000 SUM 01:000205 30.60 ,902 1.00 36.45 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. *# Catchment A6 from Triton Study (0.31 hectares, C= 0.6)

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I:\LORENA\S-405\CORREC~1\MAY00\STRIT100. Post Strittmatter - 100 Year Output Flow | DESIGN STANDHYD | Area (ha) = .31 | 02:000106 DT=10.00 | Total Imp(%)= 50.00 Dir. Conn.(%)= 50.00 IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.16Dep. Storage(mm) =.80Average Slope(%) =4.00Length(m) =45.46Mannings n=.013 .16 1.50 40.00 .250 Max.eff.Inten.(mm/hr) = 162.24 56.88 over (min) 10.00 10.00 Storage Coeff. (min) = .87 (ii) 8.05 Unit Hyd. Tpeak (min) = 10.00 10.00 Unit Hyd. peak (cms) = .17 .12 8.05 (ii) *TOTALS* PEAK FLOW(cms) =.07.02TIME TO PEAK(hrs) =1.001.00RUNOFF VOLUME(mm) =98.1539.51TOTAL RAINFALL(mm) =98.9598.95RUNOFF COEFFICIENT=.99.40 .088 (iii) 1.000 68.833 98.950 .696 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0039------*# Add hydrograph from Catchments A6 to Upstream Hydrograph | ADD HYD (000206) | ID: NHYD AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) ID1 01:000205 30.60 .902 1.00 36.45 +ID2 02:000106 .31 .088 1.00 68.83 DWF (cms) .000 .000 _______ SUM 03:000206 30.91 .991 1.00 36.78 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0040-----*# *# Catchment A7 from Triton Study (0.24 hectares, C= 0.7) *# _____ | DESIGN STANDHYD | Area (ha)= .24 | 01:000107 DT=10.00 | Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00 IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.14Dep. Storage(mm) =.80Average Slope(%) =2.00Length(m) =40.00Mannings n=.013 .10 1.50 2.00 40.00 .250 Max.eff.Inten.(mm/hr)= 162.24 56.88 over (min) 10.00 10.00 Storage Coeff. (min)= .99 (ii) 9.83 (ii)

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I:\LORENA\S-405\CORREC~1\MAY00\STRIT100.

Uı	nit Hyd. 7	lpeak	(min) =	10.00 .17	10.0	0		
Uı	nit Hyd. p	beak	(cms) =	.17	.1	1	****	
T. RI	IME TO PEA UNOFF VOLU	AK JME	(hrs) = (mm) =	.06 1.00 98.15	1.1 39.5	7 1	*TOTALS* .075 1.000 74.696 98.950	
		NG: St	orage Coef	98.95 .99 Eficient is er DT or a	smaller	0 than DT!	.755	
	CN*	= 6	4.0 Ia	ED FOR PERV = Dep. Sto LD BE SMALL	rage (Ab	ove)		
(:	THAN iii) PEAK	THE S FLOW	TORAGE CON DOES NOT 1	EFFICIENT. INCLUDE BAS	EFLOW IF .	ANY.		
*#	atchment A			Study (0.3	0 hectare	s, C= 0.	7)	
DESI 02:0	GN STANDHY	YD 10.00	Area Total	(ha)= Imp(%)=	.30 60.00 D	ir. Conn	1.(%)= 6	50.00
				IMPERVIOUS	PERVIO	US (i)		
S	urface Are	ea	(ha)=	.18	.1	2		
Di A:	ep. Storag verage Slo	ye ope	(mm) = (8) =	.18 .80 4.00	4.0	0		
L	ength		(m) =	44.72 .013	40.0	0		
М	ax.eff.Int	ten.(m	m/hr)=	162.24 10.00	56.8	8		
S	torage Coe	over eff.	(min) (min)=	10.00 .86 (i	i) 10.0	0 4 (ii)		
U	nit Hyd. 5	Ipeak	(min) =	.86 (i 10.00	10.0	0		
				.17			*TOTALS*	r.
P	EAK FLOW		(cms) =	.08	.0	1	*TOTALS*	(iii)
'T' R	IME TO PEA	AK UME	(nrs)= (mm)=	1.00 98.15	1.0 39.5	1	1.000 74.696	
Т	OTAL RAIN	FALL	(mm) =	98.95	98.9	5		
		NG: St	corage Coe	.99 fficient is er DT or a	smaller	than DT!		
				ED FOR PERV = Dep. Sto				
	(ii) TIME	STEP	(DT) SHOU	LD BE SMALI				
	iii) PEAK	FLOW	DOES NOT	EFFICIENT. INCLUDE BAS				
001:00	42			 hments A7 a				
				AREA	QPEAK	TPEAK	R.V.	DWF
		 1 п 1	02:000108	(ha) .30	(cms)	(hrs) 1.00	(mm) 74.70	(cms) .000
		+ID2	01:000107	.24	.075	1.00	74.70	.000
		====						

I:\LORENA\S-405\CORREC~1\MAY00\STRIT100. Post Strittmatter - 100 Year Output Flow .54 .171 SUM 04:000207 1.00 74.70 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0043-----*# Add summed hydrographs from Catchments A7+A8 to Upstream Hydrograph -----| ADD HYD (000208) | ID: NHYD QPEAK TPEAK R.V. AREA DWF (cms) (hrs) (mm) (cms) _____ (ha) ID1 03:000206 30.91 .991 1.00 36.78 +ID2 04:000207 .54 .171 1.00 74.70 .000 .000 SUM 01:000208 31.45 1.162 1.00 37.43 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0044-----*# *# Catchment A9 from Triton Study (0.32 hectares, C= 0.7) *# | DESIGN STANDHYD | Area (ha)= .32 | 02:000109 DT=10.00 | Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.19Dep. Storage(mm) =.80Average Slope(%) =.20 (%) = .20(m) = 46 10 .13 1.50 .20 40.00 Length 46.19 Mannings n .250 over (min)162.2449.00over (min)10.0020.00Storage Coeff. (min)=2.15 (ii)20.88Unit Hyd. Tpeak (min)=10.0020.00Unit Hyd. peak (cms)=.17.05 49.00 2.15 (ii) 20.88 (ii) *TOTALS*

 PEAK FLOW
 (cms) =
 .09
 .01

 TIME TO PEAK
 (hrs) =
 1.00
 1.33

 RUNOFF VOLUME
 (mm) =
 98.15
 39.52

 TOTAL RAINFALL
 (mm) =
 98.95
 98.95

 RUNOFF COEFFICIENT
 =
 .99
 .40

 .091 (iii) 1.000 74.696 98.950 .755 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0045-----Add hydrograph from Catchments A9 to upstream drainage *# *# **# THIS IS THE FLOW AT MH 56 WHICH IS THE LIMITING CONSTRAINT.... *# 5 year - 0.68 cms *# 100 year - 1.29 cms *# ----_____

:\LORENA\S-405\CORREC~1\MAY00\STRIT100.			Post	Strittmatte	er - 100 Year Out	tput
ADD HYD (000209) ID: NHYD ID1 01:000208	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)	
ID1 01:000208 +ID2 02:000109	31.45 .32	1.162 .091	$1.00 \\ 1.00$	37.43 74.70	.000	
SUM 03:000209					=====	
				57.00	.000	
NOTE: PEAK FLOWS DO NOT INCL						
001:0046 #						
# Catchment A10 from Triton S #	tudy (0.	21 hectar	ces, C=	0.7)		
DESIGN STANDHYD Area 04:000110 DT=10.00 Total I	(ha)= mp(%)=	.21 60.00 I	Dir. Con	n.(%)=	60.00	
IM	PERVIOUS	PERVIC	DUS (i)			
Surface Area (ha) = Dep. Storage (mm) = Average Slope (%) = Length (m) =	. 80		50			
Average Slope (%)=	1.00	1.0	00			
Length (m)= Mannings n =	37.42 .013	40.0 .25	50 50			
Max.eff.Inten.(mm/hr)=	162.24	56.8	38			
over (min) Storage Coeff. (min)=	10.00 1.17 (i	i) 12.0)0)6 (ii)			
over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)=	10.00	10.0)0			
Unit Hyd. peak (cms)=	.17	.1	LO	*TOTAI	.S*	
PEAK FLOW (cms) =	.06	.()1	0 F	5 (iii)	
TIME TO PEAK (hrs) = RUNOFF VOLUME (mm) = TOTAL RAINFALL (mm) = RUNOFF COEFFICIENT =	1.00	1.1	L7	1.00	0	
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	98.15 98.95	39.5)⊥ 95	74.65	50	
RUNOFF COEFFICIENT =	.99	.4	10	.75	55	
*** WARNING: Storage Coeff Use a smaller	icient is	smaller	than DT	!		
		-				
(i) CN PROCEDURE SELECTED CN* = 64.0 Ia =						
(ii) TIME STEP (DT) SHOULD	-	-				
THAN THE STORAGE COEF			7) NTV			
(iii) PEAK FLOW DOES NOT IN						
001:0047						
Add hydrograph from Catchme represents total catchment				raph		
ADD HYD (000204) ID: NHYD						
ID1 03:000209	(ha) 31.77	1.253	1.00	37.80	.000	
ID1 03:000209 +ID2 04:000110						
SUM 01:000204						
NOTE: PEAK FLOWS DO NOT INCI	JUDE BASEF	LOWS IF A	ANY.			
D01:0048 FINISH						
E TNTOIL						

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	*****		*****
V -	WARNINGS / ERRORS / NOTES		
0003	DESIGN STANDHYD		
0000	*** WARNING: Storage Coefficient	is smaller than	DT !
	Use a smaller DT or		
0004	DESIGN STANDHYD		
	*** WARNING: Storage Coefficient	is smaller than	DT !
	Use a smaller DT or	a larger area.	
0006	DESIGN STANDHYD		
	*** WARNING: Storage Coefficient		DT!
	Use a smaller DT or	a larger area.	
0007	DESIGN STANDHYD		
	*** WARNING: Storage Coefficient		
0000	Use a smaller DT or	a larger area.	
0009	DESIGN STANDHYD	ic emplor then	
	*** WARNING: Storage Coefficient Use a smaller DT or		
0011	DESIGN STANDHYD	a lalyer area.	
OOTT	*** WARNING: Storage Coefficient	is smaller than	רייע ו
	Use a smaller DT or		~~ ~ ·
0016	DESIGN STANDHYD	- rarger area.	
	*** WARNING: Storage Coefficient	is smaller than	DT !
	Use a smaller DT or		
0020	DESIGN STANDHYD	2	
	*** WARNING: Storage Coefficient	is smaller than	DT!
	Use a smaller DT or		
0021	DESIGN STANDHYD		
	*** WARNING: Storage Coefficient		DT !
	Use a smaller DT or	a larger area.	
0023	DESIGN STANDHYD		
	*** WARNING: Storage Coefficient		DT!
	Use a smaller DT or	a larger area.	
0024	DESIGN STANDHYD	· · · · · · · · · · · · · · · · · · ·	
	*** WARNING: Storage Coefficient		D.T. i
0000	Use a smaller DT or	a larger area.	
0026	DESIGN STANDHYD *** WARNING: Storage Coefficient	ic smaller than	
	-		
0032	Use a smaller DT or DESIGN STANDHYD	a laiyei alea.	
0002	*** WARNING: Storage Coefficient	is smaller than	וידת
	Use a smaller DT or		<u> </u>
0033	DESIGN STANDHYD	yor aroa.	
	*** WARNING: Storage Coefficient	is smaller than	DT !
	Use a smaller DT or		
0034	DESIGN STANDHYD	-	
	*** WARNING: Storage Coefficient	is smaller than	DT !
	Use a smaller DT or	a larger area.	
0038	DESIGN STANDHYD		
	*** WARNING: Storage Coefficient		DT!
	Use a smaller DT or	a larger area.	
0040	DESIGN STANDHYD		
	*** WARNING: Storage Coefficient		DT !
00/1	Use a smaller DT or	a larger area.	
0041	DESIGN STANDHYD	in amplies them	
	*** WARNING: Storage Coefficient		D.T. i
0011	Use a smaller DT or	a larger area.	
0044	DESIGN STANDHYD *** WARNING: Storage Coefficient	is smaller than	וידת
	Use a smaller DT or		<i>ч</i> т.
0046	DESIGN STANDHYD	a rarger area.	
	Urpsido 6 Associatos Ltd	Page 25	R.T.B. File:

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APPENDIX B

Post McMurchy Development (Ultimate Condition) SWMHYMO Modelling Results

Strittmatter Property Sewer Design July 11, 1999 (revised Jan. 04, 2000 & April 25, 2000)

Date : 01- Project : Strittm															
	01-Jun-00				Q = 2.778 CIA	IA			8500 TORBR.	8500 TORBRAM ROAD, SUITE 56, BRAMPTON, ONTARIO L6T5C6	te 56, Bramp	TON, ONTARI	D L6T5C6		
	Strittmatter Property	rty.			Q: Peak Flow(I/sec)	w(l/sec)			TELEPHONE	TELEPHONE: 905-793-9239 FAX: 905-793-5018	FAX: 905-793-	5018			
••	Township of Erin				C: Runoff coeficient	beficient			Township of Erin	Township of Erin Rainfall I.D.F.	Rainfall I.D.F.		5 yr. storm	_	
Designer : LU					P. Rainfall In	/ tensity (mm/hr)	l =A//R+Tc)^c		(ordi indi no			820.0			
CIECKEI -					Manning's	Manning's 0.013					# (4.6 0.780			
Location											5	Sewer Data			
Street Name Fr	From	To	AREA A	COEF C	Individual 2.78AC	Accumulated 2.78AC	Time of Concentration	Rainfall	Peak Flow	Diameter	Slope	Length	Capacity	Velocity	Time of Flow
			ha						(I/s)	(mm)	(%)	(E)	(s/l)	(m/s)	(mins)
Ilnner Canada MH(MHCR 5	MHCB 4	0.54	0.4	0.60	0.60	10.00	101.30	61	300	7.85	75.0	283	3.87	0.32
		MHCB 3	0.53	0.4	0.59	1.19	10.32	99.59	118	300	7.81	64.0	282	3.86	0.28
		MHB	0.41	0.4	0.46	1.65	10.60	98.18	162	300	80	22.5	285	3.91	0.10
Street C MH	MHCR 7	DCRMH 6	22.4	03	18.68	18.68	10.00	(see note 1)	59	450	1.5	39.5	364	2.22	0.30
	0	MHB	1.04	0.4	1.16	1.16	10.30	99.73	Ľ	450	1.5	38.0	364	2.22	0.29
ada	MH B	headwall					10.69	(see note 3)	336	525	1	27.5	449	2.01	0.23
Drive	DICB (RT)	DIMH C					11.70		142	375	+	10.0	183	1.60	0.10
DIN		headwall					11.80	(see note 4)		450	1	12.8	297	1.81	0.12
	Paor		(cae note 5)	(see note 5) Defer to P 1		Bumside SMM Benot			574	375	0.71	45	154	135	0.06
	DICB.1		10 00010000						271	750	0.85	15.0	1071	2.35	0.11
Ŵ	HA	MHD				=			271	750	0.85	19.5	1071	2.35	0.14
W	MHD	MHE				=			271	750	0.37	33.0	707	1.55	0.35
₩ 	ш	ЧНЕ				-			302	750	7	22.5	1643	3.60	0.10
	-	DICB 69	2.4	0.5	3.34	3.34	10.00	101.30	338	525	5.6	78.0	1062	4.75	0.27
	DICB 69	DICB 67	0.25	0.5	0.35	3.68	10.27	99.85 09.65	368	525	5.79	73.0	1080	4.83	0.25
		00 97/1	00.0	c.0	0.30	4.03	00.01	20.05	007	740	24	0.04	107		200
New Diversion DCI	DCB 66	MHG				(No further inflow)	()		456	525	4.27	21.5	927	4.15	0.09
	MHG	HHW							456	525	1.25	53.5	502	2.25	0.40
Ē	_	MH.							400	202	7.0	10.0	111	0.00	2,0
Z	HW	neadwall							2	670	-	2	Ê	- 0.4	4

using the rational method (5 yr. storm). The severs on Strittmatter's line will have a 5 year flow and yr. storm will have so no Strittmatter's line will have a 5 year flow from Street flow from MH B to headwall (in the pond) is the combined flow from Street C and Upper Canada Drive to MC B. 4) The peak flow from DIMH C to pond is the 100 year storm flows from catchment SA4 as well as the carryover flow from the upstream catchments (SA1, SA2, and SA3). This sever must have the capacity to convey all of the runoff from the 100 year event to the pond (see Catchbasin Design Sheet). 5) 5 year outflow from Strittmatter pond (271 lts) spills partly through the high flow outlet.

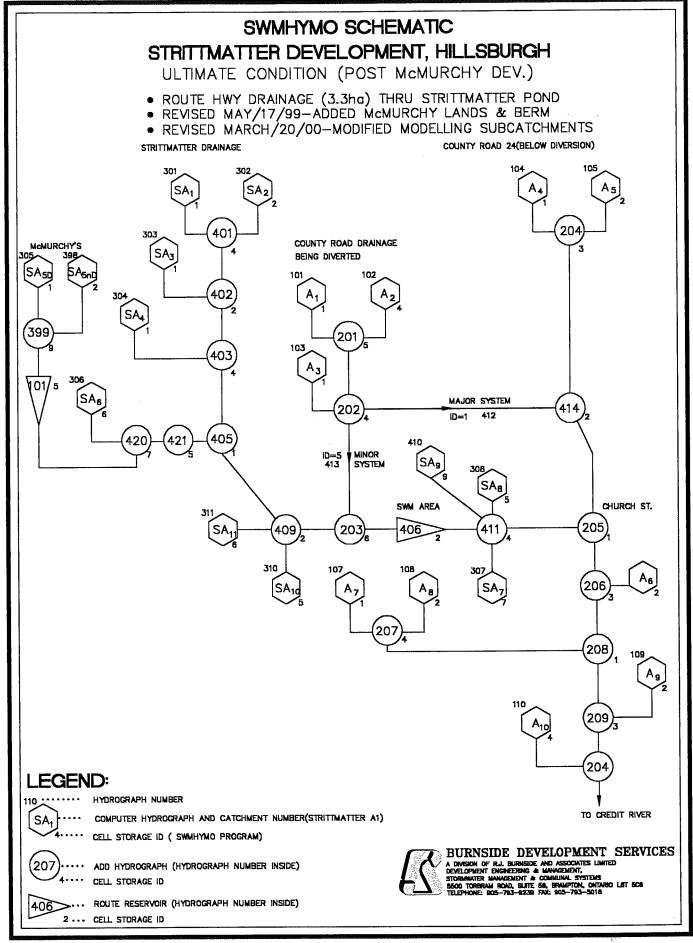
Post McMurchy Development (Ultimate Condition)

			Sum	mary of	Peak Flo	DWS			
	Р	re-Develop	ment	Post Str	ittmatter D	evelopment	Uli	timate Con	dition
Outlet	2 Year	5 Year	100 Year	2 Year	5 Year	100 Year	2 Year	5 Year	100 Year
A	.637	.806	2.344	.186	.269	.495	.187	.302	.499

Note: I) Changes in the flows from McMurchy's Pond only affect the peak flows at Outlet A.

Ulti	mate Condition	(Post McMurcl	ıy Development) Pond Perforn	nance
		Pond #1		McMuro	chy Pond
Rainfall Event	Outflow, m ³ /s	Depth, m	Volume, m ³	Outflow m ³ /s	Volume, m ³
25 mm	0.135	0.47	170	0.024	880
2 Year	0.167	0.62	310	0.035	1300
5 Year	0.271	1.04	670	0.058	2600
100 Year	0.434	2.00	1780	0.157	7300

Note: I) Pond 2 is not affected by changes in McMurchy flows so it is not included in the above table.



01-Jun-00

Strittmatter Development, Village of Hillsburgh Town of Erin

Summary of Hydrologic Analysis for Ultimate Development Conditions Drainage Area to County Road 24 Only

			5 Year Flo	Year Flows. m [^] 3/s			100 Year F	100 Year Flows, m^3/s	
Catchment ID	Drainage Area	Local Runoff		Controlled Runoff	Storage Used	Local Runoff	Combined Runoff	Controlled Runoff	Storage Used
									(m^3)
				Strittmatte	Strittmatter Drainage				
SA1	0.54	0.046	0.046	0.046	1	0.105	0.105	0.105	•
SA2	0.53	0.045	0.091	0.091	ı	0.103	0.209	0.209	ı
SA3	0.41	0.035	0.126	0.126	ı	0.080	0.289	0.289	I
SA4	0.41	0.035	0.161	0.161	I	0.080	0.369	0.369	1
SA5 D*	12.40	0.957	0.957		I	0.744	0.744		ı
SA5 nD**	10.00	0.235	1.068	0.058	2598.00	2.150	2.511	0.157	7312.00
SA6	1.04	0.063	0.240	0.240	ł	0.166	0.576	0.576	I
SA10	0.36	0.034	0.274	0.274	1	0.070	0.646	0.646	ı
SA11	0.35	0.092	0.366	0.366	T	0.154	0.801	0.801	
			County Road 24	Road 24 Drainage Being Diverted (Data from Triton Study	erted (Data from ⁻	Friton Study (1998)	38)		
A1	2.40	0.312	0.312	0.312	L	0.604	0.604	0.604	,
A2	0.25	0.033	0.344	0.344	1	0.064	0.668	0.668	I
A3	0.68	0.089	0.434	0.434	(minor system)	0.173	0.841	0.450	(minor system)
				1	(major system)			0.391	(major system)
County R	County Road + Strittmatter Drainage	Drainage	0.80	0.27	676.00		1.25	0.43	1784.00
Routed Th	Routed Through Strittmatter SWM Area	SWM Area							
SA7	0.32	0.027	0.027	0.027	1	0.061	0.061	0.061	a a construction of the second s
SA8	0.46	0.038	0.038	0.038	ı	0.087	0.087	0.087	1
SA9	0.08	0.021	0.302	0.302	I	0.035	0.499	0.499	•
A4	60.0	0.012	0.012	0.012	ş	0.023	0.023	0.023	ı
A5	0.28	0.037	0.049	0.049	I	0.072	0.095	0.095	4
A6	0.31	0.048	0.351	0.351	8	0.088	1.027	1.027	ı
A7	0.24	0.041	0.041	0.041	ų	0.075	0.075	0.075	ı
A8	0.30	0.054	0.443	0.443	ı	0.096	1.198	1.198	ŝ
6A	0.32	0.053	0.495	0.495	ı	0.091	1.289	1.289	ſ
A10	0.21	0.036	0.531	0.531	•	0.065	1.354	1.354	•
Total	31.98	Total Flow	Total Flows to Credit River	0.531				1.354	

* SA5 represents the McMurchy Property . Drainage from these lands is controlled on-site in temporary facility.

Strittmatter Development, Village of Hillsburgh Town of Erin

Stage-Storage-Discharge Relationship for Pond #1 (revised April 2000) Ultimate Condition -- Post McMurchy

Low Flow Outlet :	Conc. Pipe, diameter (m):	0.45
	Orifice, diameter (m):	0.35
	Invert Elevation (m):	442.95
Major Flow Outlet:	Conc. Pipe, diameter (m):	0.2
	Opening Elevation (m):	443.8
Centre of Low Flow Or	ifice, m	443.13
Centre of Low Flow Pip	be, m	443.18
Elevation of Major Flow	/ Pipe, m	443.80

Depth,m	Elevation, m	Low Flow Outlet	Major Flow Outlet	Total Flow, m^3/s	Total Storage, m ³
0.00	442.95	0.000	0.000	0.000	0.00
0.25	443.20	0.070	0.000	0.070	26.25
0.30	443.25	0.090	0.000	0.090	45.36
0.40	443.35	0.121	0.000	0.121	107.52
0.50	443.45	0.146	0.000	0.146	210.00
0.80	443.75	0.202	0.000	0.202	464.39
1.05	444.00	0.239	0.037	0.277	686.89
1.10	444.05	0.246	0.042	0.288	733.38
1.25	444.20	0.265	0.053	0.318	878.13
1.40	444.35	0.283	0.062	0.345	1032.38
1.60	444.55	0.305	0.072	0.378	1256.39
2.00	444.95	0.345	0.090	0.435	1786.41
2.10	445.05	0.355	0.093	0.448	1939.84
2.20	445.15	0.364	0.097	0.461	2103.02
2.30	445.25	0.373	0.101	0.473	2276.62

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R.J. Burnside & Associates Ltd.
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R.J. Burnside & Associates Ltd.

R.J.B. File: S-405

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*#
     5 year storm event
*#
*# Data from County Rd. 24 Stormsewer Analysis (Triton) used
*#
     for Road Catchments. Strittmatter Development discharge
*#
     includes stormwater controls
*#
*# Made modifications to this file to route the road portion or upper canada SA
*# into the pond and let the external property SA8 flow uncontrolled. This fil
*# was run to obtain volume requirements for the pond to store throttle the 100
*# year flows of the ultimate condition. Lot 1 was made available as pond area
*# so SA10 decreased 0.32 ha and SA11 increased the same amount.
*#
*# File was further modified to let SA9 flow uncontrolled off site
*#
*# File was further modified to collect some of the drainage from SA8 at the
*# south end of Lot 1. SA8 area decreased to 0.46 ha and SA10 area increased
*# to 0.36 ha. Change in response to Triton comments May 19, 2000
*#
_____
START
             | Project dir.: I:\LORENA\S-405\CORREC~1\MAY00\
----- Rainfall dir.: I:\LORENA\S-405\CORREC~1\MAY00\
    TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
     NRUN = 001
    NSTORM= 0
001:0002-----
*READ STORM STORM FILENAME=["c:\S-405\swmhymo\hazel.stm"
_____
| CHICAGO STORM | IDF curve parameters: A=1439.371
| Ptotal= 50.14 mm |
                                                            B= 13.688
                                                            C= .846
                               used in:
                                              INTENSITY = A / (t + B)^{C}
                               Duration of storm = 3.00 hrs
                               Storm time step = 10.00 min
                               Time to peak ratio = .33
                      TIME
                               RAIN | TIME
                                                    RAIN | TIME RAIN | TIME
                                                                                              RAIN

      mm/hr
      hrs
      <thrs</th>
      hrs
      hrs

                        hrs mm/hr |
                        .17
                        .33
                        .50
                        .67 13.224 | 1.50 15.419 | 2.33 5.419 |
                        .83 32.890 | 1.67 11.382 | 2.50 4.784 |
     001:0003-----
*# Catchment A4 from Triton Study (0.09 hectares, C= 0.5)
*#
_____
| DESIGN STANDHYD | Area (ha)=
                                                       .09
| 01:000104 DT=10.00 | Total Imp(%)= 40.00 Dir. Conn.(%)= 40.00
_____
                                       IMPERVIOUS PERVIOUS (i)
      Surface Area(ha) =.04Dep. Storage(mm) =.80Average Slope(\%) =6.00Length(m) =24.49Mannings n=.013
                                                        .05
                                                            1.50
                                                            6.00
                                                           40.00
                                                             .250
      Mannings n
      Max.eff.Inten.(mm/hr) = 98.93
                                                            20.18
```

Page 2

	Burnside & Associates		Pag	<i>je 3</i>			R.J.B. File: S-
		01:000104	(ha) .09	(cms) .012	(hrs)	(mm)	
*#	Add summed hydr DD HYD (000204)	ographs fro	n Catchment	ts A5 to	A4		DWF
	(ii) TIME STEP THAN THE (iii) PEAK FLOW	64.0 Ia = (DT) SHOULI STORAGE COEI DOES NOT II	= Dep. Stor D BE SMALLE FFICIENT. NCLUDE BASE	age (Ab IR OR EQU IFLOW IF	oove) JAL ANY.		
	Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(r over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S	<pre>nm/hr) = (min) (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = ENT =</pre>	98.93 10.00 .91 (ii 10.00 .17 .03 1.00 49.34 50.14 .98 Eicient is	20.1 10.0) 10.5 10.0 .1 .0 1.1 12.3 50.1 .2 smaller	8 0 3 (ii) 0 1 7 5 4 5 5 4 5 5 1 5		(iii)
DE 02	SIGN STANDHYD :000105 DT=10.00 Surface Area Dep. Storage	Total] 	mp(%) = 4	0.00 D	US (i)	n.(%)=	40.00
# # #	Catchment A5 fro	om Triton St	udy (0.28	hectare			
	(ii) TIME STEP	54.0 Ia = (DT) SHOULI STORAGE COEH DOES NOT IN	Dep. Stor BE SMALLE FICIENT. ICLUDE BASE	age (Ab R OR EQU FLOW IF	ove) AL ANY.		
	PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE *** WARNING: St US	(hrs) = (mm) = (mm) = ENT =	1.00 49.34 50.14 .98 Sicient is	1.1 12.3 50.1 .2 smaller	0 7 5 4 5 than DT!	012. 000 27.144 50.135 .541	(iii)
	Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min) (min) = (cms) =	10.00 .64 (ii 10.00 .17	10.0) 10.2 10.0 .1	7 (ii) 0 1	*TOTALS	*

Ultimate Condition - 5 Year Output I:\LORENA\S-405\CORREC~1\MAY00\ULT5.OUT +ID2 02:000105 .28 .037 1.00 27.14 .000 _____ SUM 03:000204 .37 .049 1.00 27.14 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0006-----*# *# Proposed Strittmatter Development *# *# Catchment SA1 (Strittmatter A1, 0.54 hectares) *# | DESIGN STANDHYD | Area (ha)= .54 | 01:000301 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.16.38Dep. Storage(mm) =.801.50Average Slope(%) =3.003.00Length(m) =60.0040.00Mannings n=.013.250 Max.eff.Inten.(mm/hr)= 98.93 25.97 over (min) 10.00 10.00 Storage Coeff. (min)= 1.36 (ii) 12.08 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .10 *TOTALS*

 PEAK FLOW
 (cms) =
 .03
 .02

 TIME TO PEAK
 (hrs) =
 1.00
 1.17

 RUNOFF VOLUME
 (mm) =
 49.34
 13.71

 TOTAL RAINFALL
 (mm) =
 50.14
 50.14

 RUNOFF COEFFICIENT
 =
 .98
 .27

 .046 (iii) 1.000 20.836 50.135 .416 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0007-----*# *# Catchment SA2 (Strittmatter A2, 0.53 hectares) *# _____ | DESIGN STANDHYD | Area (ha)= .53 | 02:000302 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.16Dep. Storage(mm) =.80Average Slope(%) =3.00Length(m) =59.44Mannings n=.013 .37 .16 1.50 3.00 40.00 .250 Max.eff.Inten.(mm/hr)= 98.93 over (min) 10.00 25.97 10.00 R.J. Burnside & Associates Ltd. Page 4 R.J.B. File: S-405

Storage Coeff. (min) =1.35 (ii)12.07 (ii)Unit Hyd. Tpeak (min) =10.0010.00Unit Hyd. peak (cms) =.17.10 *TOTALS* .045 (iii) 1.000 20.836 50.135 .416 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 64.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ 001:0008-----*# Add hydrographs from Strittmatter A1 and A2 _____ | ADD HYD (000401) | ID: NHYD AREA QPEAK TPEAK R.V. DWF (ha) (cms) (hrs) (mm) (cms) ID1 01:000301 .54 .046 1.00 20.84 .000 +ID2 02:000302 .53 .045 1.00 20.84 .000 SUM 04:000401 1.07 .091 1.00 20.84 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0009-----* # *# Catchment SA3 (Strittmatter A3, 0.41 hectares) *# _____ | DESIGN STANDHYD | Area (ha) = .41 | 01:000303 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 IMPERVIOUS PERVIOUS (i) IMPERVIOUSPERVIOUSSurface Area(ha) =.12.29Dep. Storage(mm) =.801.50Average Slope(%) =3.003.00Length(m) =52.2840.00Mannings n=.013.250 Max.eff.Inten.(mm/hr)= 98.93 25.97 over (min) 10.00 10.00 Storage Coeff. (min)= 1.25 (ii) 11.97 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .10 *TOTALS*

 PEAK FLOW
 (cms) =
 .02
 .01

 TIME TO PEAK
 (hrs) =
 1.00
 1.17

 RUNOFF VOLUME
 (mm) =
 49.34
 13.71

 TOTAL RAINFALL
 (mm) =
 50.14
 50.14

 RUNOFF COEFFICIENT
 =
 .98
 .27

 .035 (iii) 1.000 20.836 50.135 .416 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

Ultimate Condition - 5 Year Output I:\LORENA\S-405\CORREC~1\MAY00\ULT5.OUT $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0010-----*# Add hydrographs from Strittmatter A3 to Strittmatter (A1+A2) _____ SUM 02:000402 1.48 .126 1.00 20.84 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. *# *# Catchment SA4 (Strittmatter A4, 0.41 hectares) *# _____ | DESIGN STANDHYD | Area (ha) = .41 | 01:000304 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 ______ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.12Dep. Storage(mm) =.80Average Slope(%) =3.00Length(m) =52.28Mannings n=.013 .29 1.50 3.00 40.00 .250 Max.eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= 38.93 10.00 1 *TOTALS*

 PEAK FLOW
 (cms) =
 .02
 .01

 TIME TO PEAK
 (hrs) =
 1.00
 1.17

 RUNOFF VOLUME
 (mm) =
 49.34
 13.71

 TOTAL RAINFALL
 (mm) =
 50.14
 50.14

 RUNOFF COEFFICIENT
 =
 .98
 .27

 .035 (iii) 1.000 20.836 50.135 .416 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0012-----*# Add hydrographs from Strittmatter A4 to Strittmatter Upstream Drainage _____ Page 6

_________ SUM 04:000403 1.89 .161 1.00 20.84 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ______ 001:0013-----*# Catchment SA5 (Strittmatter A5, 22.4 hectares of upstream *# *# agricultural drainage) *# *# *# Dec.1,1999: This area, known as the McMurchy Property is assumed to be developed for the purpose of sizing a PRELIMINARY stormwater facility. *# *# Total Area: 22.4 hectares *# *# Assume: 10.0 hectares non-developable *# 12.4 hectares developable (30% impervious) *# Note: Although site exhibits extremely high infiltration capacity, average *# runoff potential is assumed for the purpose of sizing future stormwater *# facility. It is expected that at-source runoff controls (ie. infiltration *# facilities) will be implemented to reduce runoff potential for the developme *# *# _____ | DESIGN NASHYD | Area (ha)= 10.00 Curve Number (CN)=58.00 | 01:000305 DT=15.00 | Ia (mm)= 1.500 # of Linear Res.(N)= 3.00 ------ U.H. Tp(hrs)= .320 Unit Hyd Qpeak (cms) = 1.194 .235 (i) (cms)= PEAK FLOW (hrs) = 1.333 TIME TO PEAK RUNOFF VOLUME (mm) = 8.474 TOTAL RAINFALL (mm) = 50.135 RUNOFF COEFFICIENT = .169 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. *** WARNING: Time step is too large for value of TP. R.V. may be ok. Peak flow could be off. 001:0014-----______ | DESIGN STANDHYD | Area (ha)= 12.40 | 02:000398 DT=15.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 ______ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =3.72Dep. Storage(mm) =.80Average Slope(%) =5.00Length(m) =287.52Mannings n=.0138.68 1.50 5.00 40.00 .013 Mannings n .250 Unit Hyd. peak (cms)= .16 .09 *TOTALS* .32 (cms) = .67 (hrs) = 1.00 PEAK FLOW .957 (iii) TIME TO PEAK (hrs) = 1.000 1.17

R.J. Burnside & Associates Ltd.

$I: \ CORENA \ S-405 \ CORREC~1 \ MAY00 \ ULT5. OUT$		Ultimate Condition - 5 Year Out
RUNOFF VOLUME (mm)= 44.6 TOTAL RAINFALL (mm)= 50.1 RUNOFF COEFFICIENT = .8 *** WARNING: Storage Coefficien Use a smaller DT o	4 50.14 9 .19 at is smaller than D1	50.135 .330
 (i) CN PROCEDURE SELECTED FOR CN* = 58.0 Ia = Dep. (ii) TIME STEP (DT) SHOULD BE S THAN THE STORAGE COEFFICIE (iii) PEAK FLOW DOES NOT INCLUDE 	Storage (Above) MALLER OR EQUAL NT.	
001:0015		
ADD HYD (000399) ID: NHYD ARE (ha ID1 01:000305 10. +ID2 02:000398 12.	EAQPEAKTPEAKA)(cms)(hrs).00.2351.33.40.9571.00	R.V. DWF (mm) (cms) 8.47 .000 16.53 .000
SUM 09:000399 22. NOTE: PEAK FLOWS DO NOT INCLUDE E	40 1.068 1.00	
001:0016		
.050 .18	-	E ======== STORAGE (ha.m.) .8700E+00 .1270E+01
INFLOW >09: (000399) 22.40 OUTFLOW<05: (000101) 22.40 OVERFLOW<08: (000150) .00		12.931 12.930 .000
TIME SHIFT OF PEAR	K FLOW (min) USED (ha.m.)	= 80.00 =.2598E+00
001:0017		
ID=05 (000101) QPEAK (cms DT=10.00 PCYC= 5 TPEAK (hrs		
.00.000 19.17.015 38.83.005 20.00.013 391.67.053 20.83.012 402.50.058 21.67.011 40		FLOW TIME FLOW cms hrs cms .000 76.67 .000 .000 77.50 .000 .000 78.33 .000 .000 79.17 .000 .000 80.00 .000

Ultimate Condition - 5 Year Output

$I: \ CORENA \ S-405 \ CORREC~1 \ MA$	Y00\ULT5.OUT			Ultimate	Condition -	5 Year Out
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 43.33\\ 44.17\\ 45.00\\ 45.83\\ 46.67\\ 47.50\\ 48.33\\ 49.17\\ 50.00\\ 50.83\\ 51.67\\ 52.50\\ 53.33\\ 54.17\\ 55.00\\ 55.83\\ 56.67\end{array}$.001 62 .001 63 .001 64 .001 65 .001 65 .001 66 .001 67 .001 68 .001 69 .001 70 .001 70 .001 70 .001 71 .001 72 .000 73 .000 74 .000 75 .000 75	.17 .000 .00 .000 .83 .000 .67 .000 .50 .000 .33 .000 .17 .000 .00 .000 .83 .000 .67 .000 .50 .000 .33 .000 .50 .000 .33 .000 .33 .000 .33 .000 .83 .000 .93 .000	81.67 82.50 83.33 84.17 85.00 85.83 86.67 87.50 88.33 89.17 90.00 90.83 91.67 92.50 93.33	.000 .000 .000 .000 .000 .000 .000 .00
001:0018 *# *# Catchment SA6 (S *#						
<pre>I 06:000306 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(n</pre>	<pre>IM: (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = ENT =</pre>	PERVIOUS .21 .80 3.00 83.27 .013 98.93 10.00 1.65 (i: 10.00 .17 .03 1.00 49.34 50.14 .98 icient is	PERVIOUS .83 1.50 3.00 40.00 .250 25.21 10.00 12.50 10.00 .09 .04 1.17 13.55 50.14 .27 smaller th	(ii) (ii) *TOTZ .(1.(17.1 50.1 .3 an DT!	ALS*)63 (iii))00 L26	
(ii) TIME STEP THAN THE S (iii) PEAK FLOW	54.0 Ia = (DT) SHOULD STORAGE COEF DOES NOT IN	Dep. Sto BE SMALL FICIENT. CLUDE BAS	rage (Abov ER OR EQUAL EFLOW IF AN	e) Y.		
ADD HYD (000420)	ID: NHYD 05:000101 06:000306	AREA	QPEAK T (cms) (PEAK R.V. hrs) (mm) 2.33 12.93 1.00 17.13	DWF (cms)	

<u>. (10101011) 100 (001000 1 (11</u>						AAA	
=== SUM	07:000420	23.44	.080	1.17	13.12	.000	
NOTE: PEAK FLOWS	DO NOT INC	LUDE BASEF	LOWS IF A	ANY.			
*# Add OVERFLOW hy							
ADD HYD (000421)	ID: NHYD						
 1מד	08:000150	(ha) 00	(cms) 000	(hrs) .00	(mm)	(cms)	**DRY*:
+ID2	07:000420	23.44	.080	1.17	13.12	.000	
	05:000421						
NOTE: PEAK FLOWS	DO NOT INC	LUDE BASEF	LOWS IF A	ANY.			
ADD HYD (000405)	ID: NHYD	AREA (ha)	(Cms)	(hrs)	(mm)	(cms)	
	05:000421						
	04:000403						
SUM	01:000405	25.33	.240	1.00	13.69	.000	
NOTE: PEAK FLOWS	DO NOT INC	LUDE BASEF	LOWS IF A	ANY.			
*# *# Catchment SA10 *# Area increa *#	sed May 200	00		res)			
DESIGN STANDHYD 05:000310 DT=10.00				Dir. Cor	nn.(%)=	20.00	
		MPERVIOUS		OUS (i)			
Surface Area Dep. Storage	(ha)= (mm)=	.11 .80	1.				
Average Slope	(%)=	13.00	13.0	00			
Length Mannings n	(m) = =	48.99 .013	40.				
			25.				
Max.eff.Inten.(over	$(\min/nr) = (\min)$	98.93 10.00	10.				
Storage Coeff.			Li) 7.				
Unit Hyd. Tpeak Unit Hyd. peak		10.00 .17	10.	00 12			
					*TOTA		、
PEAK FLOW TIME TO PEAK	(cms)= (hrs)=	.02 1.00	1.	01 00	.03	34 (iii 00)
RUNOFF VOLUME	(mm) =	49.34	13.	71	20.83	36	
TOTAL RAINFALL RUNOFF COEFFICI	(mm) = ENT =	50.14 .98	50.	14 27	50.1		
*** WARNING: S	storage Coef	fficient is	s smaller	than D		± U	
ť	Jse a smalle	er DT or a	larger a	rea.			

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

 $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0023-----*# Catchment SA11 (Strittmatter A11, Pond Surface, 0.35 hecatares) *# *# _____ | DESIGN STANDHYD | Area (ha)= .35 | 06:000311 DT=10.00 | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00 .35 IMPERVIOUS PERVIOUS (i)

 Surface Area
 (ha) =
 .35
 .00

 Dep. Storage
 (mm) =
 .80
 1.50

 Average Slope
 (%) =
 .10
 .10

 Length
 (m) =
 48.30
 40.00

 Mannings n
 =
 .013
 .250

 Max.eff.Inten.(mm/hr)= 98.93 67.48 over (min) 10.00 20.00 Storage Coeff. (min)= 3.31 (ii) 23.60 (ii) Unit Hyd. Tpeak (min)= 10.00 20.00 Unit Hyd. peak (cms)= .16 .05 *TOTALS*

 PEAK FLOW
 (cms) =
 .09
 .00

 TIME TO PEAK
 (hrs) =
 1.00
 1.17

 RUNOFF VOLUME
 (mm) =
 49.34
 43.95

 TOTAL RAINFALL
 (mm) =
 50.14
 50.14

 RUNOFF COEFFICIENT =
 .98
 .88

 .092 (iii) 1.000 49.281 50.135 .983 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 98.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. ______ 001:0024-----*# Add hydrograph from Strittmatter A10 and A11 to hydrograph #405 *# ______

 | ADD HYD (000409) | ID: NHYD
 AREA
 QPEAK
 TPEAK
 R.V.
 DWF

 ----- (ha)
 (cms)
 (hrs)
 (mm)
 (cms)

 ID1 01:000405
 25.33
 .240
 1.00
 13.69
 .000

 +ID2 05:000310
 .36
 .034
 1.00
 20.84
 .000

 +ID3 06:000311
 .35
 .092
 1.00
 49.28
 .000

 ____________________________________ SUM 02:000409 26.04 .366 1.00 14.27 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0025-----*# *# Add in Areas A1, A2 and A3 from the County Road and route total flow through proposed SWM area *# *#

 $I: \ CORENA \ S-405 \ CORREC~1 \ MAY00 \ ULT5. OUT$

* # * # * #	Catchment A1 fro	m Triton S	Study (2.4	4 hectares, C= 0	.5)
01:	SIGN STANDHYD :000101 DT=10.00	Total			onn.(%)= 40.00
		г	IMPERVIOUS	PERVIOUS (i)	
	Surface Area	(ha)=	.96	1.44	
	Dep. Storage	(mm) =	.80	1.50	
	Surface Area Dep. Storage Average Slope Length	(%) = (m) =	5.00	5.00	
	Mannings n	(m) ==	.013	.250	
	Max.eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	m/hr)=	98.93	20.18	
	over	(min)	10.00	10.00	
	Storage Coeff.	(min) =	1.82 (ii) 11.99 (ii)	
	Unit Hyd. Tpeak	(min) =	10.00	10.00	
	опіт нуд. реак	(CmS) =	• 1 /		
	PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL	(cms) =	.26	.05	.312 (iii) 1.000
	TIME TO PEAK	(hrs) =	1.00	1.17	1.000
	RUNOFF VOLUME	(mm) =	49.34	12.35	27.145
	TOTAL RAINFALL	(mm) =	50.14	50.14	50.135
	RUNOFF COEFFICIE	NT =	.98	.25	.541
				s smaller than I larger area.	DT!
	(i) CN PROCEDU CN* = 6 (ii) TIME STEP	54.0 Ia	= Dep. St	orage (Above)	
)01:	THAN THE S (iii) PEAK FLOW 0026	DOES NOT I	INCLUDE BA		
*# *# *#	Catchment A2 fro	om Triton S	Study (0.	25 hectares, C=	0.5)
DE	SIGN STANDHYD	Area	(ha)=	.25	
	:000102 DT=10.00		Imp(%)=		onn.(%) = 40.00
			IMPERVIOUS)
	Surface Area	(ha)=	.10	.15	
	Dep. Storage				
		(mm) =	.80	1.50	
	Average Slope	(%)=	5.00	5.00	
	Average Slope Length	(%) = (m) =	5.00 40.82	5.00 40.00	
	Average Slope	(%)=	5.00	5.00	
	Average Slope Length Mannings n	(%) = (m) = =	5.00 40.82 .013	5.00 40.00	
	Average Slope Length Mannings n Max.eff.Inten.(m	(%) = (m) = =	5.00 40.82	5.00 40.00 .250	
	Average Slope Length Mannings n Max.eff.Inten.(n over Storage Coeff.	(%) = (m) = = mm/hr) = (min) (min) =	5.00 40.82 .013 98.93 10.00 .92 (5.00 40.00 .250 20.18 10.00 ii) 11.10 (ii)
	Average Slope Length Mannings n Max.eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak	(%) = (m) = = (min) = (min) = (min) =	5.00 40.82 .013 98.93 10.00 .92 (10.00	5.00 40.00 .250 20.18 10.00 ii) 11.10 (ii 10.00)
	Average Slope Length Mannings n Max.eff.Inten.(n over Storage Coeff.	(%) = (m) = = (min) = (min) = (min) =	5.00 40.82 .013 98.93 10.00 .92 (5.00 40.00 .250 20.18 10.00 ii) 11.10 (ii	
	Average Slope Length Mannings n Max.eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(%) = (m) = = (min) = (min) = (min) = (cms) =	5.00 40.82 .013 98.93 10.00 .92 (10.00 .17	5.00 40.00 .250 20.18 10.00 11.10 (ii 10.00 .10	*TOTALS*
	Average Slope Length Mannings n Max.eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW	<pre>(%) = (m) = = mm/hr) = (min) (min) = (min) = (cms) = (cms) =</pre>	5.00 40.82 .013 98.93 10.00 .92 (10.00 .17 .03	5.00 40.00 .250 20.18 10.00 11.10 (ii 10.00 .10 .01	*TOTALS* .033 (iii)
	Average Slope Length Mannings n Max.eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK	<pre>(%) = (m) = (m) = (min) (min) = (min) = (cms) = (cms) = (hrs) =</pre>	5.00 40.82 .013 98.93 10.00 .92 (10.00 .17 .03 1.00	5.00 40.00 .250 20.18 10.00 11.10 (ii 10.00 .10 .01 1.17	*TOTALS* .033 (iii) 1.000
	Average Slope Length Mannings n Max.eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME	<pre>(%) = (m) = (m) = (min) (min) = (min) = (cms) = (cms) = (hrs) = (mm) =</pre>	5.00 40.82 .013 98.93 10.00 .92 (10.00 .17 .03 1.00 49.34	5.00 40.00 .250 20.18 10.00 11.10 (ii 10.00 .10 .01 1.17 12.35	*TOTALS* .033 (iii) 1.000 27.144
	Average Slope Length Mannings n Max.eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK	<pre>(%) = (m) = (m) = (min) (min) = (min) = (cms) = (cms) = (hrs) = (mm) pre>	5.00 40.82 .013 98.93 10.00 .92 (10.00 .17 .03 1.00	5.00 40.00 .250 20.18 10.00 11.10 (ii 10.00 .10 .01 1.17	*TOTALS* .033 (iii) 1.000

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Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0027-----*# Add hydrographs from Catchments A1 and A2 _____ SUM 05:000201 2.65 .344 1.00 27.14 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. *# *# Catchment A3 from Triton Study (0.68 hectares, C= 0.5) *# _____ | DESIGN STANDHYD | Area (ha)= .68 | 01:000103 DT=10.00 | Total Imp(%)= 40.00 Dir. Conn.(%)= 40.00 _____ IMPERVIOUS PERVIOUS (1) Surface Area(ha) =.27Dep. Storage(mm) =.80Average Slope(%) =6.00Length(m) =67.33Mannings n=.013 .41 1.50 6.00 40.00 .250 Max.eff.Inten.(mm/hr)= 98.93 20.18 over (min) 10.00 10.00 Storage Coeff. (min)= 1.18 (ii) 10.81 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .10 *TOTALS*

 PEAK FLOW
 (cms) =
 .07
 .01

 TIME TO PEAK
 (hrs) =
 1.00
 1.17

 RUNOFF VOLUME
 (mm) =
 49.34
 12.35

 TOTAL RAINFALL
 (mm) =
 50.14
 50.14

 RUNOFF COEFFICIENT
 =
 .98
 .25

 .089 (iii) 1.000 27.145 50.135 .541 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0029-----Add hydrographs from Catchments A3 to hydrograph #201 *# *# representing total highway flow to be routed through SWM facility *# R.J. Burnside & Associates Ltd. Page 13 R.J.B. File: S-405

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ADD HYD (000202) ID:	NHYD AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)	
	00103 .68 00201 2.65	,344			.000	
	00202 3.33		1.00		.000	
NOTE: PEAK FLOWS DO N	OT INCLUDE BAS	EFLOWS IF A	ANY.			
#						
# Direct minor system #	flows to SWM A	rea, major	system	stays on	County	Road
	Total minor sy	stem capac:	ity	=	.450	
	Total major sy	stem stora	ge [TMJS	TO] =	0.(cu.m.)
ID: NHY	D AREA	QPEAK	TPEA	KR.	V.	DWF
TOTAL HYD. 04:0002		(cms) .434				
======================================	12 .00	.000	.00	0.0	00	.000
NOTE: PEAK FLOWS DO	NOT INCLUDE B	ASEFLOWS I	F ANY.			
				r draina	ge (hyd	#409)
Add minor highway dr	ainage (hyd #2 NHYD AREA	02) to Str. OPEAK	ittmatte TPEAK	R.V.	DWF	#409)
Add minor highway dr ADD HYD (000203) ID:	ainage (hyd #2 NHYD AREA	02) to Str. OPEAK	ittmatte TPEAK	R.V.	DWF	#409)
Add minor highway dr ADD HYD (000203) ID: ID1 05:0 +ID2 02:0	ainage (hyd #2	02) to Str: QPEAK (cms) .434 .366	ittmatte TPEAK (hrs) 1.00 1.00	R.V. (mm) 27.14 14.27	DWF (cms) .000 .000	#409)
Add minor highway dr ADD HYD (000203) ID: ID1 05:0 +ID2 02:0	ainage (hyd #2 NHYD AREA (ha) 00413 3.33 00409 26.04	02) to Str: QPEAK (cms) .434 .366	ittmatte TPEAK (hrs) 1.00 1.00 ========	R.V. (mm) 27.14 14.27	DWF (cms) .000 .000	 #409)
*# Add minor highway dr ADD HYD (000203) ID: ID1 05:0 +ID2 02:0 	ainage (hyd #2 NHYD AREA (ha) 00413 3.33 00409 26.04 00203 29.37	02) to Str QPEAK (cms) .434 .366 .800	ittmatte TPEAK (hrs) 1.00 1.00 ======= 1.00	R.V. (mm) 27.14 14.27	DWF (cms) .000 .000	#409)
ADD HYD (000203) ID: ID1 05:0 +ID2 02:0 SUM 06:0 NOTE: PEAK FLOWS DO N	ainage (hyd #2 NHYD AREA (ha) 00413 3.33 00409 26.04 00203 29.37 OT INCLUDE BAS	02) to Str: QPEAK (cms) .434 .366 .800 EFLOWS IF 2	ittmatte TPEAK (hrs) 1.00 1.00 1.00 ANY.	R.V. (mm) 27.14 14.27 15.73	DWF (cms) .000 .000 .000	
<pre>*# Add minor highway dr ADD HYD (000203) ID:</pre>	ainage (hyd #2 NHYD AREA (ha) 00413 3.33 00409 26.04 00203 29.37 OT INCLUDE BAS	02) to Str: QPEAK (cms) .434 .366 .800 EFLOWS IF 2	ittmatte TPEAK (hrs) 1.00 1.00 ======= 1.00 ANY.	R.V. (mm) 27.14 14.27 15.73	DWF (cms) .000 .000 .000	
<pre>*# Add minor highway dr ADD HYD (000203) ID: ID1 05:0 +ID2 02:0 ========= SUM 06:0 NOTE: PEAK FLOWS DO N 001:0032</pre>	ainage (hyd #2 NHYD AREA (ha) 3.33 000413 3.33 000409 26.04 000203 29.37 00T INCLUDE INCLUDE BAS	02) to Str: QPEAK (cms) .434 .366 .800 EFLOWS IF 2 .900) revise .999 (from 1	ittmatte TPEAK (hrs) 1.00 1.00 ======= 1.00 ANY. d July 1 50mm to	R.V. (mm) 27.14 14.27 15.73 999 - sa	DWF (cms) .000 .000 .000	
<pre>*# Add minor highway dr I ADD HYD (000203) ID: ID1 05:0 +ID2 02:0 </pre>	ainage (hyd #2 NHYD AREA (ha) 00413 3.33 00409 26.04 000203 29.37 00T INCLUDE INCLUDE BAS	02) to Str: QPEAK (cms) .434 .366 .800 EFLOWS IF 2 .90) revise .999 (from 1 with pond .100 time s	<pre>ittmatte TPEAK (hrs) 1.00 1.00 1.00 ANY. </pre>	R.V. (mm) 27.14 14.27 15.73 999 - sa 450mm)	DWF (cms) .000 .000 .000	
<pre>*# Add minor highway dr ADD HYD (000203) ID: ID1 05:0 +ID2 02:0 ======== SUM 06:0 NOTE: PEAK FLOWS DO N 001:0032</pre>	ainage (hyd #2 NHYD AREA (ha) 00413 3.33 00409 26.04 00203 29.37 OOT INCLUDE BAS re (February 19 clet Dec. 1, 19 c (April 2000) Requested rout ====== OUT	02) to Str: QPEAK (cms) .434 .366 .800 SEFLOWS IF 2 .90) revised .999 (from 1 with pond 	<pre>ittmatte TPEAK (hrs) 1.00 1.00 1.00 ANY. </pre>	R.V. (mm) 27.14 14.27 15.73 999 - sa 450mm)	DWF (cms) .000 .000 .000	
<pre>*# Add minor highway dr I ADD HYD (000203) ID: ID1 05:0 +ID2 02:0 </pre>	ainage (hyd #2 NHYD AREA (ha) 00413 3.33 00409 26.04 00203 29.37 00T INCLUDE INCLUDE BAS	02) to Str: QPEAK (cms) .434 .366 .800 EFLOWS IF 2 .90) revise .999 (from 1 with pond .10g time s .150W STORA .250W STORA	<pre>ittmatte TPEAK (hrs) 1.00 1.00 1.00 ANY. d July 1 50mm to redesign tep = 10 GE TABLE OUTFLOW (cms)</pre>	R.V. (mm) 27.14 14.27 15.73 999 - sa 450mm) .0 min. STORA (ha.m	DWF (cms) .000 .000 .000 .000 me stor	
<pre>*# Add minor highway dr ADD HYD (000203) ID: ID1 05:0 +ID2 02:0 ======== SUM 06:0 NOTE: PEAK FLOWS DO N O01:0032</pre>	ainage (hyd #2 NHYD AREA (ha) 00413 3.33 00409 26.04 00203 29.37 OT INCLUDE BAS	02) to Str: QPEAK (cms) .434 .366 .800 EFLOWS IF 2 .900) revised .990 (from 1 with pond 	<pre>ittmatte TPEAK (hrs) 1.00 1.00 1.00 ANY. </pre>	R.V. (mm) 27.14 14.27 15.73 999 - sa 450mm) .0 min. STORA (ha.m .7330E-	DWF (cms) .000 .000 .000 .000 me stor GE) 01	
<pre>*# Add minor highway dr ADD HYD (000203) ID: ID1 05:0 +ID2 02:0 ======== SUM 06:0 NOTE: PEAK FLOWS DO N O01:0032</pre>	ainage (hyd #2 NHYD AREA (ha) 00413 3.33 00409 26.04 00203 29.37 OT INCLUDE BAS 00T INCLUDE BAS 100 100 100 100 100 100 100 100 100 100 100 100 100 100 110 111 <t< td=""><td>02) to Str: QPEAK (cms) .434 .366 .800 SEFLOWS IF 2 .90) revised .990 (from 1 with pond .11 with pond .12 cm stora .14 cm stora</td><td><pre>ittmatte TPEAK (hrs) 1.00 1.00 1.00 ANY. </pre></td><td>R.V. (mm) 27.14 14.27 15.73 999 - sa 450mm) .0 min. STORA (ha.m .7330E- .8780E- .1032E+</td><td>DWF (cms) .000 .000 .000 .000 .000 .000 .000</td><td></td></t<>	02) to Str: QPEAK (cms) .434 .366 .800 SEFLOWS IF 2 .90) revised .990 (from 1 with pond .11 with pond .12 cm stora .14 cm stora	<pre>ittmatte TPEAK (hrs) 1.00 1.00 1.00 ANY. </pre>	R.V. (mm) 27.14 14.27 15.73 999 - sa 450mm) .0 min. STORA (ha.m .7330E- .8780E- .1032E+	DWF (cms) .000 .000 .000 .000 .000 .000 .000	
<pre>*# Add minor highway dr ADD HYD (000203) ID: ID1 05:0 +ID2 02:0 ======== SUM 06:0 NOTE: PEAK FLOWS DO N O01:0032</pre>	ainage (hyd #2 NHYD AREA (ha) 00413 3.33 00409 26.04 00203 29.37 OT INCLUDE BAS	02) to Str: QPEAK (cms) .434 .366 .800 EFLOWS IF .900) revised .900) evised .900 revi	<pre>ittmatte TPEAK (hrs) 1.00 1.00 1.00 ANY. </pre>	R.V. (mm) 27.14 14.27 15.73 999 - sa 450mm) .0 min. STORA (ha.m .7330E- .8780E- .1032E+	DWF (cms) .000 .000 .000 .000 .000 .000 .000	

						.448 .467			
	TING RESU			AREA (ha)	QPEAK (cms)	TPEAK (hrs) 1.000	R . (r	.V. nm)	
OUT	LOW >06: FLOW<02: FLOW<05:	(000406)	2	9.37	.271	1.500	15.7	729	
		TIME S MAXIMU	HIFT OF M STOR	PEAK FLO AGE USI	DW Ed	/Qin](%)= (min)= (ha.m.)=	= 30.(=.6759E-()))1	
PRINT : ID=02 DT=10.	HYD (000406) 00 PCYC=	AF QE 5 TE VC	EEA PEAK PEAK DLUME	(ha) = (cms) = (hrs) = (mm) =	29.370 .271 1.500 15.729	(i)			
(i)		LOW DOES							
TIME	FLOW	TIME brs	FLOW	TIME	FLOW	TIME brs	FLOW	TIME	FLOW cms
.00	cms .000 .103	19.17	.015	38.33	.002	57.50	.000	76.67	.000
.83	.103	20.00	.014	39.17	.002	58.33		77.50	.000
	.264				.002		.000		
		21.67 22.50			.002	60.00 60.83	.0001		.000 .000
4.17		23.33				61.67	.0001		.000
5.00	.053			43.33	.001		.000		.000
5.83	.0511	25.00	.0081	44.17	.001 .001	63.33	.000	82.50	.000
6.67	.050	25.83	.008	45.00	.001	64.17	.000		
7.50 8.33		26.67 27.50				65.00 65.83			
0.33 9.17		27.30				66.67			
10.00	.036	29.17	.006	48.33	.001	67.50	.000	86.67	
10.83	.033	30.00	.005	49.17	.001	67.50 68.33 69.17	.000	87.50	.000
11.67	.031		.005	50.00	.001	69.17		88.33	.000
12.50		31.67		50.83		70.00		89.17	
13.33 14.17	.026 .024			51.67 52.50	.001 .001	70.83 71.67			.000
15.00		34.17	.003	53.33	.001	72.50	.0001		.000
	.0201	35.00	.003	54.17	.000	73.33	.000		.000
16.67	.020 .019 .017	35.83	.0031	55.00	.000	73.33 74.17 75.00	.000	93.33	.000
17.50	.017 .016	36.67	.0031	55.83 56.67	.000	75.00	.000		
	.016								
*# *# Cat	chment S. ríttmatt				rainage (d∖s of S≬	IM area ·	- uncont	rolled
07:000	STANDHY 307 DT=1	0.00				Dir. Cor	ın.(%)=	20.00	
				PERVIOUS		IOUS (i)			
	face Are			.10		.22			
	. Storagerage Slo					.50 .00			
	ide & Assoc				age 15	.00		ד. כז	.B. File:

Length				
Mannings n	=	.013	.250	
	(2)	00.00		
Max.eff.Inten.(1 over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	mm/hr) =	98.93	25.97	
over	(min) (min)-	10.00 1 21 (++)	10.00	
Unit Wyd Thoak	(min) =	10 00	13.41 (11)	
Unit Hyd. ipeak	$(m \pm m) =$	17	10.00	
onite nya. peak	(Chis) -	• 1 /	.05	*TOTALS*
PEAK FLOW	(cms) =	.02	.01	.027 (iii)
TIME TO PEAK	(hrs) =	1.00	1.17	1.000
RUNOFF VOLUME	(mm) =	49.34	13.71	20.836
TOTAL RAINFALL	(mm) =	50.14	50.14	50.135
TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	ENT =	.98	.27	.416
*** WARNING: S	torage Coe	fficient is s	smaller than DT!	
U	se a small	er DT or a la	arger area.	
(-) CN DDOCED			NIG TOCCEC.	
(i) CN PROCED		= Dep. Stora		
(ii) TIME STEP				
	STORAGE CO			
(iii) PEAK FLOW			FLOW IF ANY.	
01:0035 # Catchment SA8 ()				a tea nar ear an an tea tea tea tea an an an an an an an an an an an an an
NOT ROUTED INTO)
# Area change				
#	1			
DECTON CHANDLIND	1 Area	(1)		
				1.(%)= 20.00
	Total	Imp(%) = 30).00 Dir. Conr	a.(%) = 20.00
	Total	<pre>Imp(%) = 30 IMPERVIOUS</pre>).00 Dir. Conr PERVIOUS (i)	n.(%)= 20.00
05:000308 DT=10.00 Surface Area Dep. Storage	Total (ha)= (mm)=	<pre>Imp(%) = 30 IMPERVIOUS .14 .80</pre>	0.00 Dir. Conr PERVIOUS (i) .32 1.50	n.(%)= 20.00
Dep. Storage Average Slope	Total (ha)= (mm)= (%)=	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00</pre>	0.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00	n.(%)= 20.00
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length	Total (ha) = (mm) = (%) = (m) =	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38</pre>	D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00	n.(%)= 20.00
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope	Total (ha) = (mm) = (%) = (m) =	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38</pre>	D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00	n.(%)= 20.00
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n	Total (ha) = (mm) = (%) = (m) = =	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013</pre>	D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250	n.(%)= 20.00
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.()	<pre> Total (ha) = (mm) = (%) = (m) = = mm/hr) =</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93</pre>	D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97	n.(%)= 20.00
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(sover	<pre> Total (ha) = (mm) = (%) = (m) = = mm/hr) = (min)</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00</pre>	D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00	n.(%)= 20.00
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff.	<pre> Total (ha) = (mm) = (%) = (m) = = mm/hr) = (min) (min) =</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (iii)</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 13.57 (ii)</pre>	n.(%)= 20.00
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak	<pre> Total (ha) = (mm) = (%) = (m) = = mm/hr) = (min) (min) = (min) =</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00) 13.57 (ii) 10.00</pre>	n.(%)= 20.00
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff.	<pre> Total (ha) = (mm) = (%) = (m) = = mm/hr) = (min) (min) = (min) =</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00) 13.57 (ii) 10.00</pre>	
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) = (cms) = </pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 13.57 (ii) 10.00 .09</pre>	*TOTALS*
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) = (cms) = </pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17</pre>	D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 13.57 (ii) 10.00 .09 .01	*TOTALS* .038 (iii)
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) = (cms) = (cms) = (hrs) = </pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17 .03 1.00</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 13.57 (ii) 10.00 .09 .01 1.17</pre>	*TOTALS* .038 (iii) 1.000
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(0ver Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (cms) = (hrs) = (mm) =</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (iii) 10.00 .17 .03 1.00 49.34</pre>	D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 13.57 (ii) 10.00 .09 .01 1.17 13.71	*TOTALS* .038 (iii) 1.000 20.836
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(0ver Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) =</pre>	<pre>Imp (%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17 .03 1.00 49.34 50.14</pre>	D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 13.57 (ii) 10.00 .09 .01 1.17 13.71 50.14	*TOTALS* .038 (iii) 1.000 20.836 50.135
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(0ver Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) = (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = ENT =</pre>	<pre>Imp (%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (iii) 10.00 .17 .03 1.00 49.34 50.14 .98</pre>	D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 13.57 (ii) 10.00 .09 .01 1.17 13.71 50.14	*TOTALS* .038 (iii) 1.000 20.836 50.135 .416
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(0ver Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (hrs) = (hrs) = (mm) = ENT = torage Coe</pre>	<pre>Imp (%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (iii) 10.00 .17 .03 1.00 49.34 50.14 .98</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 013.57 (ii) 10.00 .09 .01 1.17 13.71 50.14 .27 smaller than DT</pre>	*TOTALS* .038 (iii) 1.000 20.836 50.135 .416
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (hrs) = (hrs) = (mm) = (mm) = ENT = torage Coe se a small</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17 .03 1.00 49.34 50.14 .98 fficient is a er DT or a lage</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 0 13.57 (ii) 10.00 .09 .01 1.17 13.71 50.14 .27 smaller than DT arger area.</pre>	*TOTALS* .038 (iii) 1.000 20.836 50.135 .416
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S U	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (hrs) = (hrs) = (mm) = (mm) = ENT = torage Coe se a small</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17 .03 1.00 49.34 50.14 .98 fficient is a er DT or a 10 ED FOR PERVIOUS </pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 0 13.57 (ii) 10.00 .09 .01 1.17 13.71 50.14 .27 smaller than DT arger area. DUS LOSSES:</pre>	*TOTALS* .038 (iii) 1.000 20.836 50.135 .416
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S U (i) CN PROCED CN* =	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (min) = (cms) = (hrs) = (hrs) = (mm) = (mm) = ENT = torage Coe se a small URE SELECT 64.0 Ia</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17 .03 1.00 49.34 50.14 .98 fficient is a er DT or a 10 ED FOR PERVIONED = Dep. Stored</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 0 13.57 (ii) 10.00 .09 .01 1.17 13.71 50.14 .27 smaller than DT arger area. DUS LOSSES: age (Above)</pre>	*TOTALS* .038 (iii) 1.000 20.836 50.135 .416
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S U (i) CN PROCED CN* = (ii) TIME STEP	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (hrs) = (hrs) = (mm) = ENT = torage Coe se a small URE SELECT 64.0 Ia (DT) SHOU</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17 .03 1.00 49.34 50.14 .98 fficient is a er DT or a 1 ED FOR PERVIO = Dep. Stor LD BE SMALLE</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 0 13.57 (ii) 10.00 .09 .01 1.17 13.71 50.14 .27 smaller than DT arger area. DUS LOSSES: age (Above)</pre>	*TOTALS* .038 (iii) 1.000 20.836 50.135 .416
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S U (i) CN PROCED CN* = (ii) TIME STEP THAN THE	<pre> Total (ha) = (mm) = (%) = (mm) = (min) = (min) = (min) = (cms) = (hrs) = (hrs) = (hrs) = (mm) = ENT = torage Coe se a small URE SELECT 64.0 Ia (DT) SHOU STORAGE CO</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17 .03 1.00 49.34 50.14 .98 fficient is a er DT or a la ED FOR PERVIO = Dep. Stor LD BE SMALLE EFFICIENT.</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 0 13.57 (ii) 10.00 .09 .01 1.17 13.71 50.14 .27 smaller than DT arger area. DUS LOSSES: age (Above) R OR EQUAL</pre>	*TOTALS* .038 (iii) 1.000 20.836 50.135 .416
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S U (i) CN PROCED CN* = (ii) TIME STEP	<pre> Total (ha) = (mm) = (%) = (mm) = (min) = (min) = (min) = (cms) = (hrs) = (hrs) = (hrs) = (mm) = ENT = torage Coe se a small URE SELECT 64.0 Ia (DT) SHOU STORAGE CO</pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17 .03 1.00 49.34 50.14 .98 fficient is a er DT or a la ED FOR PERVIO = Dep. Stor LD BE SMALLE EFFICIENT.</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 0 13.57 (ii) 10.00 .09 .01 1.17 13.71 50.14 .27 smaller than DT arger area. DUS LOSSES: age (Above) R OR EQUAL</pre>	*TOTALS* .038 (iii) 1.000 20.836 50.135 .416
05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S U (i) CN PROCED CN* = (ii) TIME STEP THAN THE	<pre> Total (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) = (cms) = (hrs) = (hrs) = (mm) = ENT = torage Coe se a small URE SELECT 64.0 Ia (DT) SHOU STORAGE CO DOES NOT </pre>	<pre>Imp(%) = 30 IMPERVIOUS .14 .80 2.00 55.38 .013 98.93 10.00 1.46 (ii) 10.00 .17 .03 1.00 49.34 50.14 .98 fficient is a er DT or a 1 ED FOR PERVIO = Dep. Stor. LD BE SMALLE EFFICIENT. INCLUDE BASE</pre>	<pre>D.00 Dir. Conr PERVIOUS (i) .32 1.50 2.00 40.00 .250 25.97 10.00 13.57 (ii) 10.00 .09 .01 1.17 13.71 50.14 .27 smaller than DT! arger area. DUS LOSSES: age (Above) R OR EQUAL FLOW IF ANY.</pre>	*TOTALS* .038 (iii) 1.000 20.836 50.135 .416

* # * # * #	Catchment SA9 - NOT ROUTED INTO (Strittmatter AS	POND>>>>	FLOWS UNCO	NTROLLED				
09	SIGN STANDHYD 0:000410 DT=10.00	Total	(ha)= Imp(%)=	.08 95.00	Dir. Con	n.(%)=	95.00	
			IMPERVIOUS	PERVI	OUS (i)			
	Surface Area Dep. Storage Average Slope Length	(ha)=	.08		00			
	Dep. Storage	(mm) =	.80	1.	50			
	Average Slope	(%)=	2.00	2.	00			
	Length	(m) =	23.09	40.	00			
	Mannings n		.013	.2	250			
	Max.eff.Inten.(r	nm/hr)=	98.93	20.	18			
	over	(min)	10.00	10.	00			
	Max.eff.Inten.(r over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min)=	.86 (ii) 14.	25 (ii)			
	Unit Hyd. Tpeak	(min)=	10.00	10.	00			
	Unit Hyd. peak	(cms)=	.17		09	1	~ 1	
	PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE		~~		0.0	*TOTAL	S*	
	PEAK FLOW	(cms) =	.02	•	17	.02	1 (111)	
	TIME TO PEAK	(nrs) =	1.00	⊥. 10	1 / 2 E	1.00	0	
	RUNUFF VOLUME Totat datneatt	(11111) = (mm) =	49.34 50 17	12. 50	11	47.40	5	
	RUNOFE COFFEICIE		98	50.	25	50.15	5 7	
	*** WARNING: St	orage Coe	fficient i	s smaller	than DT		/	
	(ii) TIME STEP THAN THE S	(DT) SHOU STORAGE CO	LD BE SMAL EFFICIENT.)UAL			
	(ii) TIME STEP THAN THE S (iii) PEAK FLOW	(DT) SHOU STORAGE CO DOES NOT	LD BE SMAL EFFICIENT. INCLUDE BA	LER OR EÇ SEFLOW II	Above) QUAL 7 ANY.	(hvd #4	10)	
*# 	(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037 Add SWM area dis	(DT) SHOU STORAGE CO DOES NOT scharge to	LD BE SMAL EFFICIENT. INCLUDE BA 	LER OR EÇ SEFLOW II led road	Above) QUAL 7 ANY. drainage	-		
*#	(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037 Add SWM area dis	(DT) SHOU STORAGE CO DOES NOT scharge to	LD BE SMAL EFFICIENT. INCLUDE BA 	LER OR EÇ SEFLOW II led road	Above) QUAL 7 ANY. drainage TPEAK	R.V.	DWF	
*# 	(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037 Add SWM area dis	(DT) SHOU STORAGE CO DOES NOT scharge to	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha)	LER OR EQ SEFLOW IN led road QPEAK (cms) .038	Above) QUAL F ANY. drainage TPEAK (hrs) 1.00	R.V. (mm) 20.84	DWF (cms) .000	
*# 	(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037 Add SWM area dis DD HYD (000411) ID1 +ID2	(DT) SHOU STORAGE CO DOES NOT scharge to ID: NHYD 05:000308 07:000307	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32	LER OR EQ SEFLOW IN led road QPEAK (cms) .038	Above) QUAL F ANY. drainage TPEAK (hrs) 1.00	R.V. (mm) 20.84	DWF (cms) .000	
*#	<pre>(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037 Add SWM area dis 0D HYD (000411) ID1 +ID2 +ID3</pre>	(DT) SHOU STORAGE CO DOES NOT 	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32 29.37	LER OR EQ SEFLOW IN led road QPEAK (cms) .038	Above) QUAL F ANY. drainage TPEAK (hrs) 1.00	R.V. (mm) 20.84	DWF (cms) .000	
*#	(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037 Add SWM area dis DD HYD (000411) ID1 +ID2 +ID3 +ID4	(DT) SHOU STORAGE CO DOES NOT 	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32 29.37 .08	LER OR EQ SEFLOW IN led road QPEAK (cms) .038 .027 .271 .021	Above) QUAL 7 ANY. drainage TPEAK (hrs) 1.00 1.00 1.50 1.00	R.V. (mm) 20.84 20.84 15.73 47.49	DWF (cms) .000 .000 .000 .000	
*# 	<pre>(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037 Add SWM area dis 0D HYD (000411) ID1 +ID2 +ID3 +ID4 ====</pre>	(DT) SHOU STORAGE CO DOES NOT 	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32 29.37	LER OR EQ SEFLOW IN led road QPEAK (cms) .038 .027 .271 .021	Above) QUAL 7 ANY. drainage TPEAK (hrs) 1.00 1.00 1.50 1.00	R.V. (mm) 20.84 20.84 15.73 47.49	DWF (cms) .000 .000 .000	
* # AD 	<pre>(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037 Add SWM area dis 0D HYD (000411) ID1 +ID2 +ID3 +ID4 ====</pre>	(DT) SHOU STORAGE CO DOES NOT 	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32 29.37 .08 30.23	LER OR EQ SEFLOW IN led road QPEAK (cms) .038 .027 .271 .021 .302	Above) QUAL F ANY. drainage TPEAK (hrs) 1.00 1.50 1.00 1.33	R.V. (mm) 20.84 20.84 15.73 47.49	DWF (cms) .000 .000 .000	
* # AD 	(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037 Add SWM area dis 0D HYD (000411) ID1 +ID2 +ID3 +ID4 SUM NOTE: PEAK FLOWS	(DT) SHOU STORAGE CO DOES NOT 	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32 29.37 .08 30.23 CLUDE BASE	LER OR EQ SEFLOW IN led road QPEAK (cms) .038 .027 .271 .021 .302 FLOWS IF	Above) QUAL F ANY. drainage TPEAK (hrs) 1.00 1.50 1.00 1.33 ANY.	R.V. (mm) 20.84 20.84 15.73 47.49 ======== 15.94	DWF (cms) .000 .000 .000	
* # AD N 	<pre>(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037 Add SWM area dis 0D HYD (000411) ID1 +ID2 +ID3 +ID4 SUM NOTE: PEAK FLOWS</pre>	(DT) SHOU STORAGE CO DOES NOT 	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32 29.37 .08 30.23 CLUDE BASE	LER OR EQ SEFLOW IN led road QPEAK (cms) .038 .027 .271 .021 .302 FLOWS IF	Above) QUAL F ANY. drainage TPEAK (hrs) 1.00 1.50 1.00 1.33 ANY.	R.V. (mm) 20.84 20.84 15.73 47.49 ======== 15.94	DWF (cms) .000 .000 .000	
* # AD N 001: *# *# *#	<pre>(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037</pre>	(DT) SHOU STORAGE CO DOES NOT scharge to ID: NHYD 05:000308 07:000307 02:000406 09:000410 04:000411 DO NOT IN	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32 29.37 .08 30.23 CLUDE BASE	LER OR EQ SEFLOW IN led road QPEAK (cms) .038 .027 .271 .021 .302 FLOWS IF	Above) QUAL F ANY. drainage TPEAK (hrs) 1.00 1.50 1.00 1.33 ANY.	R.V. (mm) 20.84 20.84 15.73 47.49 15.94	DWF (cms) .000 .000 .000	
*# AD 001: *# *# *#	<pre>(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037</pre>	(DT) SHOU STORAGE CO DOES NOT 	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32 29.37 .08 29.37 .08 30.23 CLUDE BASE 	LER OR EC SEFLOW IN led road QPEAK (cms) .038 .027 .271 .021 .302 FLOWS IF rsion to	Above) QUAL F ANY. drainage TPEAK (hrs) 1.00 1.00 1.50 1.00 1.33 ANY. County R TPEAK	R.V. (mm) 20.84 20.84 15.73 47.49 15.94	DWF (cms) .000 .000 .000 .000	
*# AD AD AD AD AD AD AD AD	<pre>(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037</pre>	(DT) SHOU STORAGE CO DOES NOT scharge to ID: NHYD 05:000308 07:000307 02:000406 09:000410 04:000411 DO NOT IN DO NOT IN 	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32 29.37 .08 29.37 .08 30.23 CLUDE BASE 	LER OR EQ SEFLOW IN led road QPEAK (cms) .038 .027 .271 .021 .302 FLOWS IF rsion to QPEAK (cms)	Above) QUAL F ANY. drainage TPEAK (hrs) 1.00 1.00 1.50 1.00 1.33 ANY. County R TPEAK (hrs)	R.V. (mm) 20.84 20.84 15.73 47.49 15.94 	DWF (cms) .000 .000 .000 .000 .000	* DRY* *
*# AD AD AD AD AD AD AD AD	<pre>(ii) TIME STEP THAN THE S (iii) PEAK FLOW 0037</pre>	(DT) SHOU STORAGE CO DOES NOT 	LD BE SMAL EFFICIENT. INCLUDE BA uncontrol AREA (ha) .46 .32 29.37 .08 29.37 .08 30.23 CLUDE BASE 	LER OR EQ SEFLOW IN led road QPEAK (cms) .038 .027 .271 .021 .302 FLOWS IF rsion to QPEAK (cms) .000	Above) QUAL F ANY. drainage TPEAK (hrs) 1.00 1.00 1.50 1.00 1.33 ANY. County R TPEAK (hrs)	R.V. (mm) 20.84 20.84 15.73 47.49 15.94 	DWF (cms) .000 .000 .000 .000	*DRY**

==== SIIM	02:000414			1 00	======================================	.000
NOTE: PEAK FLOWS					41.17	
001:0039						
*# Church Street In *#						
*# Add hydrograph : *# to County Road :				rd #411)		
*#						
ADD HYD (000205)						
TD1	02.000414	(ha) 37	(cms) 049	(hrs) 1 00	(mm) 27 14	(cms)
+ID2	02:000414 04:000411	30.23	.302	1.33	15.94	.000
	01:000205					
NOTE: PEAK FLOWS	DO NOT INCI	LUDE BASEFI	LOWS IF A	ANY.		
001:0040						
*# Catchment A6 fro *# 		udy (0.3)	L hectare	es, C= 0	.6)	
DESIGN STANDHYD	Area					
02:000106 DT=10.00		[mp(응)=	50.00 I)ir. Con	n.(%)=	50.00
	11	APERVIOUS	PERVIC	OUS (i)		
Surface Area Dep. Storage Average Slope	(ha) = (mm) =	.16	.]	-6 60		
Average Slope	(%) =	4.00	4.0	0		
Length	(m) =	45.46	40.0)0		
Mannings n	=	.013	.25	50		
Max.eff.Inten.(1 over	mm/hr) =	98.93	20.1	.8		
Storage Coeff. Unit Hyd. Tpeak			10.0			
Unit Hyd. peak						
שטע אעזס	(cms) =	0.4	ſ	11	*TOTAL	S* 8 (iii)
PEAK FLOW TIME TO PEAK RUNOFF VOLUME	(hrs) =	1.00	1.1	-	1.00	0
RUNOFF VOLUME	(mm) =	49.34	12.3	35	30.84	3
TOTAL RAINFALL	(mm) =	50.14	50.1	4	50.13	5
RUNOFF COEFFICI *** WARNING: S					.61	5
	se a smalle:				<u>!</u>	
(i) CN PROCED	URE SELECTE	D FOR PERV	IOUS LOSS	SES:		
CN* =		= Dep. Sto				
(ii) TIME STEP THAN THE	(DI) SHOULI STORAGE COEI		er or equ	ЛЧГ		
(iii) PEAK FLOW			EFLOW IF	ANY.		
001:0041 *# Add hydrograph						
ADD HYD (000206)			1		· · · · · · · · · · · · · · · · · · ·	
		AREA	QPEAK	TPEAK	R.V.	DWF

:\LORENA\S-405\CORREC~1\MA	Y00\ULT5.OUT				Ultimate	Condition - 5 Year	<u>Out</u>
 T I 1	01.000205	(ha)	(cms) 317	(hrs)	(mm)	(cms)	
+ID1	01:000205 02:000106	.31	.048	1.00	30.84	.000	
	03:000206						
SOM	03.000200	20.91	.540	1.00	10.25	.000	
NOTE: PEAK FLOWS							
01:0042							
ŧ ŧ Catchment A7 frc	m Triton S	tudv (0.2	4 hectare	$e_{\rm S}$ $C=0$.7)		
		cuuy (0.2	1 HOODALC		• / /		
DESIGN STANDHYD	- Area	(ha)=	.24				
01:000107 DT=10.00	Total	Imp(%)=	60.00 I	Dir. Con	n.(%)=	60.00	
		MPERVIOUS	PERVIC	DUS (i)			
Surface Area	(ha)=	.14	.1	.0			
Dep. Storage							
Average Slope							
Length Manningg n		40.00 .013	40.0	0			
Mannings n	=	.013	.25				
Max.eff.Inten.(m	um/hr)=	98.93	16.7	78			
over	(min)	10.00	20.0	00			
Storage Coeff.							
Unit Hyd. Tpeak							
Unit Hyd. peak	(cms) =	.17	.()6	+ EOE		
PEAK FLOW	(cms) =	0.4	ſ	10	IATOT*	LS* 41 (iii)	
TIME TO PEAK	(hrs) =	1.00	1.3	33	1.00	······································	
RUNOFF VOLUME	(mm) =	49.34	12.3	35	34.54	42	
TOTAL RAINFALL							
RUNOFF COEFFICIE	INT =	.98	.2	25	.68	39	
*** WARNING: St					1		
Us	se a smalle	r DT or a	larger an	rea.			
(i) CN PROCEDU							
CN* = 6		= Dep. Sto					
(ii) TIME STEP			ER OR EQU	JAL			
(iii) PEAK FLOW	STORAGE COE DOES NOT I		יד שרודים	ANY			
01:0043							
# # Catchment A8 fro	m Triton 9	+udv (0 3	0 hostars) 7)		
# Catchinent Ao IIC #	Mi IIICOII D	tudy (0.5	U HECCAL	es, c- c	•••)		
DESIGN STANDHYD					(0)	<u> </u>	
02:000108 DT=10.00	'l'otal	1mp(%)=	60.00 1	Jir. Cor	ın.(%)=	60.00	
	I	MPERVIOUS	PERVIC	DUS (i)			
Surface Area			-	12			
Don Storage	(mm) =	.18 .80		- 0			
Dep. Storage	(응) =	4.00	4.(00			
Dep. Storage Average Slope	(0)						
Average Slope Length	(m) =	44.72	40.0	10			
Average Slope	(m) =	44.72	40.0	10			
Average Slope Length	(m) = =	44.72 .013	40.0	50			

Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min)=	10.00	10.0	0	*TOTAI	.5*
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI *** WARNING: S ⁻ U	(mm) = (mm) = ENT =	49.34 50.14 .98 Sicient is	12.3 50.1 .2 smaller	5 4 5 than DT	.05 1.00 34.54 50.13 .68	54 (iii) 00 11 35
(ii) TIME STEP	64.0 Ia = (DT) SHOULI STORAGE COEF DOES NOT IN	= Dep. Stor) BE SMALLE FFICIENT. ICLUDE BASE	rage (Ab ER OR EQU EFLOW IF	oove) JAL ANY.		
001:0044 *# Add hydrographs						
ADD HYD (000207) 	02:000108 01:000107	(ha) .30 .24	(cms) .054 .041	(hrs) 1.00 1.00	(mm) 34.54 34.54	(cms) .000 .000
	04:000207	.54	.094	1.00		
001:0045 *# Add summed hydr						lrograph
ADD HYD (000208) ID1 +ID2	ID: NHYD 03:000206 04:000207	AREA (ha) 30.91 .54	QPEAK (cms) .348 .094	TPEAK (hrs) 1.00 1.00	R.V. (mm) 16.23 34.54	DWF (cms) .000 .000
	01:000208	31.45	.443	1.00		
001:0046 *# *# Catchment A9 fr *#					.7)	
DESIGN STANDHYD 02:000109 DT=10.00	Total]	(ha)= [mp(%)=	.32 60.00 [Dir. Con	n.(%)=	60.00
Surface Area Dep. Storage Average Slope Length Mannings n	(ha) = (mm) =	.80	.1	50 20 00		
	(min)	98.93 10.00	30.0			
R.J. Burnside & Associates	Ltd.	Pag	re 20			R.J.B. File: S

Unit Hyd.	Tpeak	(min)=	2.62 (i 10.00	30.0	0		
Unit Hyd.	peak	(cms) =	.17	.0	3	*TOTAL	C *
TIME TO P	EAK	(hrs) =	.05 1.00	1.5	0	.05 1.00	3 (iii) 0
			49.34				
			50.14 .98		4 5	.68	9
	ING: St	corage Coe	efficient is	s smaller	than DT	!	
	Us	se a small	ler DT or a	larger ar	ea.		
			TED FOR PERV				
			a = Dep. Sto JLD BE SMALI				
THA	N THE S	STORAGE CO	DEFFICIENT.				
(iii) PEA	K FLOW	DOES NOT	INCLUDE BAS	SEFLOW IF	ANY.		
 01:0047							
ŧ Add hydro			nments A9 to				
ŧ \$ THIS IS T	'HE FLOV	WATMH 56	6 WHICH IS 1	CHE LIMITI	NG CONS	TRAINT	
∮ 5 year -	0.68 cm	ns					
‡ 100 year ‡	- 1.29	CMS					
ŧ 	· ···· ····						
ADD HYD (000							
			(ha)	(CmS)	(hrs)	(mm)	(Cms)
	т р 1	01:000208	31.45	.443	1.00	16.54	.000
	ID1 +ID2	01:000208	31.45 9	.443	$1.00 \\ 1.00$	16.54 34.54	.000
	ID1 +ID2 ====		3 31.45 9 .32 ====================================				
	ID1 +ID2 ==== SUM	03:000209	9 31.77	.495	1.00		
NOTE: PEAK	ID1 +ID2 ==== SUM	03:000209	9 31.77	.495	1.00		
	ID1 +ID2 ==== SUM X FLOWS	03:000209 DO NOT IN	9 31.77 NCLUDE BASEF	.495 FLOWS IF A	1.00 NY.		
01:0048	ID1 +ID2 ==== SUM X FLOWS	03:000209 DO NOT IN	9 31.77 NCLUDE BASEF	.495 FLOWS IF A	1.00 NY.		
01:0048 # # Catchment	ID1 +ID2 SUM & FLOWS	03:000209 DO NOT IN	9 31.77 NCLUDE BASEE	.495 FLOWS IF A	1.00 NY.	16.72	
NOTE: PEAK 01:0048 # # Catchment #	ID1 +ID2 SUM & FLOWS	03:000209 DO NOT IN	9 31.77 NCLUDE BASEF	.495 FLOWS IF A	1.00 NY.	16.72	
D1:0048 # # Catchment # DESIGN STANE	ID1 +ID2 ==== SUM C FLOWS 	03:000209 DO NOT IN rom Tritor Area	9 31.77 NCLUDE BASER n Study (0. (ha)=	.495 FLOWS IF A .21 hectar .21	1.00 NY. es, C=	16.72 0.7)	.000
01:0048 # # Catchment #	ID1 +ID2 ==== SUM C FLOWS 	03:000209 DO NOT IN rom Tritor Area	9 31.77 NCLUDE BASEF	.495 FLOWS IF A .21 hectar .21	1.00 NY. es, C=	16.72	.000
01:0048 Catchment DESIGN STANE 04:000110 DT	ID1 +ID2 	03:000209 DO NOT IN rom Triton Area Tota:	<pre> 31.77 31.77 NCLUDE BASER</pre>	.495 FLOWS IF A .21 hectar .21 do.00 D PERVIO	1.00 NY. es, C= Vir. Con	16.72 0.7)	.000
01:0048 Catchment DESIGN STANE 04:000110 DT Surface A	ID1 +ID2 	03:000209 DO NOT IN rom Tritor Area Tota: (ha)=	<pre> 31.77 31.77 NCLUDE BASER</pre>	.495 FLOWS IF A .21 hectar .21 c.21 60.00 D PERVIC .0	1.00 NY. es, C= ir. Con US (i) 8	16.72 0.7)	.000
D1:0048 Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor	ID1 +ID2 	03:000209 DO NOT IN 	<pre> 31.77 31.77 NCLUDE BASEE</pre>	.495 FLOWS IF A .21 hectar .21 contactor .21 .21 contactor .21 .21 .21 .21 .21 .21 .21 .21 .21 .21	1.00 NY. es, C= ir. Con US (i) 8 0	16.72 0.7)	.000
D1:0048 Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor Average S	ID1 +ID2 	03:000209 DO NOT IN 	<pre> 31.77 31.77 NCLUDE BASEE (ha)= 1 Imp(%)= IMPERVIOUS .13 .80 1.00</pre>	.495 FLOWS IF A .21 hectar .21 hectar 60.00 D PERVIC .0 1.5 1.0	1.00 NY. es, C= ir. Con US (i) 8 0 0	16.72 0.7)	.000
D1:0048 Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor	ID1 +ID2 SUM SUM FLOWS A10 fr 	03:000209 DO NOT IN 	<pre> 31.77 31.77 NCLUDE BASEE</pre>	.495 FLOWS IF A .21 hectar .21 contactor .21 .21 contactor .21 .21 .21 .21 .21 .21 .21 .21 .21 .21	1.00 NY. es, C= vir. Con US (i) 8 0 0	16.72 0.7)	.000
01:0048 Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor Average S Length	ID1 +ID2 SUM SUM FLOWS ATEA A10 fr 	03:000209 DO NOT IN 	<pre> 31.77 31.77 NCLUDE BASER (ha)= 1 Imp(%)= IMPERVIOUS .13 .80 1.00 37.42</pre>	.495 FLOWS IF A .21 hectar .21 hectar 60.00 D PERVIC .0 1.5 1.0 40.0	1.00 NY. es, C= ir. Con US (i) 8 0 0 0 0	16.72 0.7)	.000
D1:0048 Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor Average S Length Mannings Max.eff.1	ID1 +ID2 SUM SUM FLOWS ATEA A10 fr DHYD C=10.00 Area cage Slope n Inten.(r over	03:000209 DO NOT IN rom Tritor Area Tota (ha) = (mm) = (%) = (m) = (m) = (m) = (m) = (m) = (m) = (m) = (m) =	<pre> 31.77 31.77 NCLUDE BASER (ha)= Imp(%)= IMPERVIOUS 13 80 1.00 37.42 .013 98.93 10.00</pre>	.495 FLOWS IF A .21 hectar .21 hectar 60.00 D PERVIC .0 1.5 1.0 40.0 .25 16.7 20.0	1.00 NY. es, C= ir. Con US (i) 8 0 0 0 8 0 0	16.72 0.7)	.000
01:0048 Catchment Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor Average S Length Mannings Max.eff.1 Storage C	ID1 +ID2 ==== SUM C FLOWS AFLOWS AFLOWS ====================================	03:000209 DO NOT IN rom Tritor Area Tota (ha) = (mm) = (%) = (m) = (m) = (m) = (min) (min) =	<pre> 31.77 31.77 NCLUDE BASER (ha)= Imp(%)= IMPERVIOUS 13 80 1.00 37.42 .013 98.93 10.00 1.42 (:: </pre>	.495 FLOWS IF A .21 hectar .21 hectar .21 hectar .21 .21 hectar .21 .21 .21 .21 .21 .21 .21 .21 .21 .21	1.00 NY. es, C= ir. Con US (i) 8 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0	16.72 0.7)	.000
01:0048 Catchment Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor Average S Length Mannings Max.eff.I Storage C Unit Hyd.	ID1 +ID2 SUM SUM FLOWS AFLOWS	03:000209 DO NOT IN rom Tritor Area Tota (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) =	<pre> 31.77 31.77 NCLUDE BASER (ha)= Imp(%)= IMPERVIOUS .13 .80 1.00 37.42 .013 98.93 10.00 1.42 (10.00</pre>	.495 FLOWS IF A .21 hectar .21 hectar 60.00 D PERVIC .0 1.5 1.0 40.0 .25 16.7 20.0 ii) 19.1 20.0	1.00 NY. es, C= oir. Con US (i) 8 0 0 0 0 28 0 0 7 (ii) 0	16.72 0.7)	.000
01:0048 Catchment Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor Average S Length Mannings Max.eff.1 Storage C	ID1 +ID2 SUM SUM FLOWS AFLOWS	03:000209 DO NOT IN rom Tritor Area Tota (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) =	<pre> 31.77 31.77 NCLUDE BASER (ha)= Imp(%)= IMPERVIOUS 13 80 1.00 37.42 .013 98.93 10.00 1.42 (:: </pre>	.495 FLOWS IF A .21 hectar .21 hectar .21 hectar .21 .21 hectar .21 .21 .21 .21 .21 .21 .21 .21 .21 .21	1.00 NY. es, C= oir. Con US (i) 8 0 0 0 0 28 0 0 7 (ii) 0	16.72 	.000
D1:0048 Catchment Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor Average S Length Mannings Max.eff.I Storage C Unit Hyd.	ID1 +ID2 SUM SUM FLOWS AFLOWS	03:000209 DO NOT IN rom Tritor Area Tota (ha) = (mm) = (%) = (m) = (m) = (min) = (min) = (min) =	<pre> 31.77 NCLUDE BASEH (ha)= Imp(%)= IMPERVIOUS .13 .80 1.00 37.42 .013 98.93 10.00 1.42 (: 10.00 .17 .03</pre>	.495 FLOWS IF A .21 hectar .21 hectar 60.00 D PERVIC .0 1.5 1.0 40.0 .25 16.7 20.0 ii) 19.1 20.0	1.00 NY. es, C= oir. Con US (i) 8 0 0 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0	16.72 	.000
D1:0048 Catchment Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor Average S Length Mannings Max.eff.I Storage C Unit Hyd. Unit Hyd. PEAK FLOW TIME TO F	ID1 +ID2 SUM SUM FLOWS AFLOWS	03:000209 DO NOT IN 	<pre> 31.77 NCLUDE BASEH (ha)= I Imp(%)= IMPERVIOUS .13 .80 1.00 37.42 .013 98.93 10.00 1.42 (: 10.00 .17 .03 1.00</pre>	.495 FLOWS IF A .21 hectar .21 hectar 60.00 D PERVIC .0 1.5 1.0 40.0 .25 16.7 20.0 ii) 19.1 20.0 .0 .0 1.3	1.00 NY. es, C= ir. Con US (i) 8 0 0 0 0 0 2 8 0 0 0 0 0 0 0 0 0 0 0 0	16.72 	.000 .000 60.00 60.00
D1:0048 Catchment Catchment DESIGN STANE 04:000110 DT Surface A Dep. Stor Average S Length Mannings Max.eff.1 Storage C Unit Hyd. Unit Hyd. PEAK FLOW	ID1 +ID2 SUM SUM FLOWS AFLOWS	03:000209 DO NOT IN 	<pre> 31.77 NCLUDE BASEH (ha)= Imp(%)= IMPERVIOUS .13 .80 1.00 37.42 .013 98.93 10.00 1.42 (: 10.00 .17 .03</pre>	.495 FLOWS IF A .21 hectar .21 hectar .21 contactor .21 contactor .20 co	1.00 NY. es, C= ir. Con US (i) 8 0 0 0 0 8 0 0 0 0 8 0 0 0 0 0 1 7 (ii) 0 0 6 0 0 3 3 5	16.72 	.000 .000

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I		NG: S	ENT = torage Coeff se a smaller	ficient is		than DT	.68	39	
	CN* (ii) TIME	ROCED = STEP	URE SELECTEI 64.0 Ia = (DT) SHOULI) FOR PER = Dep. Sto) BE SMALI	/IOUS LOSS prage (Ak	SES: pove)			
			STORAGE COEF DOES NOT IN		SEFLOW IF	ANY.			
001:00	049			• •••• •••• •••• •••• •••• •••• •••• ••••					
*# 2	Add hydrog	raph	from Catchme l catchment	ent AlO to	o Upstream	n Hydrog			
	HYD (0002	04)	ID: NHYD	AREA	QPEAK (cms)	TPEAK (brs)	R.V.	DWF (Cms)	
		ID1	03:000209	31.77	.495	1.00	16.72	.000	
		+ID2	04:000110	.21	.036	1.00	34.54	.000	
			01:000204						
NO	TE: PEAK	FLOWS	DO NOT INCI	LUDE BASE	FLOWS IF A	ANY.			
001:00	050 FINISH								
			************ RS / NOTES	*******	*******	*******	******	* * * * * * * * * * *	:****
·									
0003	DESIGN ST								
	*** WARNI		torage Coeff				!		
0004	DESIGN ST		se a smalle: D	r Dr or a	larger a	rea.			
0001			torage Coefi	ficient is	s smaller	than DT	!		
			se a smaller	r DT or a	larger a:	rea.			
0006	DESIGN ST			tatont i	~ ~~~]]~~	them DE)		
	AAA WARNI		torage Coefi se a smallei				•		
0007	DESIGN ST				Idigol d.				
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0009	DESIGN ST *** WARNT		D torage Coef:	ficient i	s smaller	than DT	1		
	W111(1V1		se a smaller				•		
0011	DESIGN ST	ANDHY	D		-				
	*** WARNI		torage Coef:				1		
0013	DESIGN NA		se a smalle:	r DT or a	larger a	rea.			
0010			ime step is	too larg	e for val	ue of TE			
			.V. may be d						
0014	DESIGN SI								
	*** WARNI		torage Coef:				· [
0018	DESIGN SI		se a smalle: D	r ni or a	татует а	red.			
0010			torage Coef:	ficient i	s smaller	than DI	1		
		U	se a smalle:						
0022	DESIGN ST					- h			
	*** WARN]		torage Coef se a smalle				: !		
0023	DESIGN SI			a	Turyer a	- u ·			
	urnside & Ass			P	age 22			R.J.B.	File: 2

Page 22

	*** WARNING:	Storage Coefficient Use a smaller DT or		DT!
0025	DESIGN STAND	HYD		
	*** WARNING:	Storage Coefficient	is smaller than	DT !
		Use a smaller DT or	a larger area.	
0026	DESIGN STAND	HYD		
	*** WARNING:	Storage Coefficient		DT!
		Use a smaller DT or	a larger area.	
0028	DESIGN STAND			
	*** WARNING:	Storage Coefficient		DT!
0004		Use a smaller DT or	a larger area.	
0034	DESIGN STAND		is smaller than	ן ייינט
	WARNING:	Storage Coefficient Use a smaller DT or		D1:
0035	DESIGN STAND		a lalyer area.	
0035		Storage Coefficient	is smaller than	י יית
	W141(1110).	Use a smaller DT or		51.
0036	DESIGN STAND		a hargor area.	
0000		Storage Coefficient	is smaller than	DT !
		Use a smaller DT or		
0040	DESIGN STAND		-	
	*** WARNING:	Storage Coefficient	is smaller than	DT !
		Use a smaller DT or	a larger area.	
0042	DESIGN STAND			
	*** WARNING:	Storage Coefficient		DT!
		Use a smaller DT or	a larger area.	
0043	DESIGN STAND			
	*** WARNING:	Storage Coefficient		DT!!
		Use a smaller DT or	a larger area.	
0046	DESIGN STAND		·	
	*** WARNING:	Storage Coefficient		D.T.:
0040	DEGICN CENND	Use a smaller DT or	a larger area.	
0048	DESIGN STAND	Storage Coefficient	ie emaller than	וייירו
	WARNING:	Use a smaller DT or		21.
Simulation ended on $2000-06-01$ at $10:47:07$				

SSSSS W W M МН Н Ү Ү М М 000 999 55555 ======== ΥΥ S WWW MM MM Н Н MM MM 0 0 9 9 5 _____ SSSSS WWW MMM ннннн МММ 0 0 ## 9 9 5 Υ Ver. 3.1 S WW М МН Η Υ М M O O 9999 5555 Oct. 1997 SSSSS W W Μ м н H Y М М 000 9 5 ======== 9 5 # 3877524 9 StormWater Management HYdrologic Model 999 5555 ======= ****** A single event and continuous hydrologic simulation model ****** ****** based on the principles of HYMO and its successors ****** ****** OTTHYMO-83 and OTTHYMO-89. * * * * * * * * ****** Distributed by: J.F. Sabourin and Associates Inc. ****** Ottawa, Ontario: (613) 727-5199 ****** ****** Gatineau, Quebec: (819) 243-6858 ****** ****** E-Mail: swmhymo@jfsa.Com ****** ++++++ Licensed user: R.J. Burnside & Associates Ltd. +++++++ Brampton SERIAL#:3877524 ****** +++++ PROGRAM ARRAY DIMENSIONS ++++++ ****** * * * * * * * Maximum value for ID numbers : 10 ****** * * * * * * * Max. number of rainfall points: 5000 ****** ****** Max. number of flow points : 5000 ****** DATE: 2000-06-01 TIME: 10:47:39 RUN COUNTER: 001100 * * Input filename: I:\LORENA\S-405\CORREC~1\MAY00\ULT100.DAT * * Output filename: I:\LORENA\S-405\CORREC~1\MAY00\ULT100.out * * Summary filename: I:\LORENA\S-405\CORREC~1\MAY00\ULT100.sum * User comments: * * 1: * 2: + * 3: ÷ 001:0001-----*# Project Name: [Strittmatter Development, Hillsburgh] Project Number: [S-405 *# Date : 12-17-1998 *# Modeller : [LD] *# Company : R. J. Burnside & Associates Ltd. *# License # : 3877524 *# Hydrologic analysis of County Road 24 stormsewer system combined with *# Strittmatter Development at the north end of the village of Hillsburgh. *# *# McMurchy Berm added May '99

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*#
R.J. Burnside & Associates Ltd.
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```
*#
     100 year storm event
*#
*#
    Data from County Rd. 24 Stormsewer Analysis (Triton) used
*#
    for Road Catchments. Strittmatter Development discharge
*#
    includes stormwater controls
*#
*# Made modifications to this file to route the road portion or upper canada SA
*# into the pond and let the external property SA8 flow uncontrolled. This fil
*# was run to obtain volume requirements for the pond to store throttle the 100
*# year flows of the ultimate condition. Lot 1 was made available as pond area
*# so SA10 decreased 0.32 ha and SA11 increased the same amount.
*#
*# File was further modified to let SA9 flow uncontrolled off site
*#
*# File was further modified to collect some of the drainage from SA8 at the
*# south end of Lot 1. SA8 area decreased to 0.46 ha and SA10 area increased
*# to 0.36 ha. Change in response to Triton comments May 19, 2000
*#
| START | Project dir.: I:\LORENA\S-405\CORREC~1\MAY00\
----- Rainfall dir.: I:\LORENA\S-405\CORREC~1\MAY00\
    TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
    NRUN = 001
    NSTORM= 0
001:0002------
*READ STORM STORM FILENAME=["c:\S-405\swmhymo\hazel.stm"
_____
| CHICAGO STORM | IDF curve parameters: A=3113.230
| Ptotal= 98.95 mm |
                                                           B= 21.416
  _____
                                                           C= .857
                              used in: INTENSITY = A / (t + B)^{C}
                              Duration of storm = 3.00 hrs
                               Storm time step = 10.00 min
                              Time to peak ratio = .33
                              RAIN | TIME
                      TIME
                                                  RAIN | TIME RAIN | TIME
                                                                                            RAIN

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                       .67 29.523 | 1.50 34.281 | 2.33 11.990 |
                       .83 67.430 | 1.67 25.529 | 2.50 10.521 |
          001:0003-----
*# Catchment A4 from Triton Study (0.09 hectares, C= 0.5)
*#
_____
| DESIGN STANDHYD | Area (ha)=
                                                     .09
| 01:000104 DT=10.00 | Total Imp(%)= 40.00 Dir. Conn.(%)= 40.00
IMPERVIOUS PERVIOUS (i)
      Surface Area(ha) =.04Dep. Storage(mm) =.80Average Slope(\%) =6.00Length(m) =24.49Mannings n=.013
                                                       .05
                                                           1.50
                                                          6.00
                                                          40.00
                                                           .250
      Max.eff.Inten.(mm/hr) = 162.24
                                                           56.88
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                                                  Page 2
                                                                                         R.J.B. File: S-405
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over (min)10.0010.00Storage Coeff. (min)=.53 (ii)6.89 (ii)Unit Hyd. Tpeak (min)=10.0010.00Unit Hyd. peak (cms)=.17.13 *TOTALS*

 PEAK FLOW
 (cms) =
 .02
 .01

 TIME TO PEAK
 (hrs) =
 1.00
 1.00

 RUNOFF VOLUME
 (mm) =
 98.15
 39.52

 TOTAL RAINFALL
 (mm) =
 98.95
 98.95

 RUNOFF COEFFICIENT
 =
 .99
 .40

 .023 (iii) 1.000 62.969 98.950 .636 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0004-----*# *# Catchment A5 from Triton Study (0.28 hectares, C= 0.5) *# | DESIGN STANDHYD | Area (ha)= .28 | 02:000105 DT=10.00 | Total Imp(%)= 40.00 Dir. Conn.(%)= 40.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.11Dep. Storage(mm) =.80Average Slope(%) =6.00Length(m) =43.20Mannings n=.013 .17 1.50 6.00 40.00 .250 Max.eff.Inten.(mm/hr)= 162.24 56.88 over (min) 10.00 10.00 Storage Coeff. (min)= .74 (ii) 7.10 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .13 *TOTALS*

 PEAK FLOW (cms) =
 .05
 .02
 .072

 TIME TO PEAK (hrs) =
 1.00
 1.000
 1.000

 RUNOFF VOLUME (mm) =
 98.15
 39.52
 62.969

 TOTAL RAINFALL (mm) =
 98.95
 98.950
 98.950

 RUNOFF COEFFICIENT =
 .99
 .40
 .636

 .072 (iii) 1.000 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0005------*# Add summed hydrographs from Catchments A5 to A4

 YD (000204) | ID: NHYD
 AREA
 QPEAK
 TPEAK
 R.V.
 DWF

 ----- (ha)
 (cms)
 (hrs)
 (mm)
 (cms)

 ID1 01:000104
 .09
 .023
 1.00
 62.97
 .000

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 Ltd
 DEF
 2

 | ADD HYD (000204) | ID: NHYD AREA R.J. Burnside & Associates Ltd. Page 3 R.J.B. File: S-405

Ultimate Condition - 100 Year Output

. (110.	+TD2	02:000105		072			000
		03:000204					
						02.97	.000
	OTE: PEAK FLOWS						
01:	0006						
# #	Proposed Stritt	matter Deve	lopment				
ŧ			-				
ŧ ⊧	Catchment SA1 (Strittmatte	er A1, 0.5	4 hectares	5)		
			<i></i> .				
DE 01	SIGN STANDHYD :000301 DT=10.00	Area	(ha)= Tmn(%)=	.54 30.00 r)ir Cor	(\$) =	20 00
		10001	Tub(0)	30.00 I			20.00
	Surface Area		IMPERVIOUS		DUS (i)		
	Dep. Storage			1.5			
	Average Slope	(%) =	3.00	3.0			
	Length	(m) =	60.00	40.0			
	Mannings n	=	.013	.25	υU		
	Max.eff.Inten.(1	mm/hr)=	162.24	71.6	51		
	over	(min)	10.00	10.0	0		
	Storage Coeff.	(min) =	1.11 (ii) 8.2	26 (ii)		
	Unit Hyd. Tpeak Unit Hyd. peak	(min) =	10.00	10.0)() 2		
	onite nyu. peak	(CIIIS) –	• ± /	• 1	. 2	*TOTA]	[.S*
	PEAK FLOW					.1(O5 (iii)
	TIME TO PEAK						
	RUNOFF VOLUME						
	TOTAL RAINFALL RUNOFF COEFFICIE	ENT =	.99	.4	93 13	.54	
	*** WARNING: S	torage Coef	ficient i	s smaller	than DI		
	U	se a smalle	er DT or a	larger ar	cea.		
	(i) CN PROCED	URE SELECTH	ED FOR PER	VIOUS LOSS	SES:		
	$CN \star =$	64.0 Ia	= Dep. St	orage (Ab	oove)		
	(ií) TIME STEP				JAL		
	(iii) PEAK FLOW	STORAGE CON DOES NOT			ANY.		
	` <i>`</i>						
-	0007						
# #	Catchment SA2 (g+ri+tmatt	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	3 hostaros	- \		
т ŧ	Catchinent DAZ (SI A2, 0.0	J Hectares	5)		
			(1 - 1)	БЭ			
	SIGN STANDHYD :000302 DT=10.00				Dir. Cor	n.(%)=	20.00
			<u>f</u> (0 /				20100
	0	· · · ·	IMPERVIOUS	PERVIC	DUS (i)		
	Suriace Area Dep Storage	(na) = (mm) =	.16 80	1.5	57 50		
	Surface Area Dep. Storage Average Slope	(%)=	3.00	3.0	00		
	Length	(m) =	59.44	40.0	00		
	Mannings n	=	.013	.25	50		
	Max.eff.Inten.(mm/hr) =	162.24	71.0 10.0	51		

Storage Coeff. Unit Hyd. Tpeal	(min) =				
Unit Hyd. peak	< (min)=	10.00	10.00		
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICT *** WARNING: S	(mm)= IENT = Storage Coef	98.95 .99	98.95 .43 smaller than	98.950 .545	(iii)
(ii) TIME STER	64.0 Ia ? (DT) SHOUI STORAGE COE V DOES NOT I	= Dep. Stora LD BE SMALLEN EFFICIENT. ENCLUDE BASE	age (Above) R OR EQUAL FLOW IF ANY.		
001:0008 # Add hydrographs					
ADD HYD (000401) ID: +ID2	-	(ha)	QPEAK TPEA (cms) (hrs .105 1.0 .103 1.0	s) (mm)	(CMS)
			.209 1.0		
NOTE: PEAK FLOWS					
001:0009 *# *# Catchment SA3 *#	(Strittmatte	er A3, 0.41)	hectares)		
)01:0009	(Strittmatte	er A3, 0.41)	hectares)	Conn.(%)=	20.00
001:0009 # # Catchment SA3	(Strittmatte Area D Total	er A3, 0.41)	hectares)		20.00
001:0009 # Catchment SA3 # DESIGN STANDHYD 01:000303 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.	<pre>(Strittmatte Area) Total] (ha) = (mm) = (%) = (m) = (m) = r (min) (min) = k (min) =</pre>	er A3, 0.41) (ha)= Imp(%)= 30 IMPERVIOUS .12 .80 3.00 52.28	hectares) .41 0.00 Dir. (PERVIOUS (: .29 1.50 3.00 40.00 .250 71.61 10.00	i)	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: Page 5

 $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0010------*# Add hydrographs from Strittmatter A3 to Strittmatter (A1+A2) | ADD HYD (000402) | ID: NHYD AREA QPEAK TPEAK R.V. DWF (ha) (cms) (hrs) (mm) (cms) ID1 01:000303 .41 .080 1.00 53.88 .000 +ID2 04:000401 1.07 .209 1.00 53.88 .000 SUM 02:000402 1.48 .289 1.00 53.88 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0011-----*# *# Catchment SA4 (Strittmatter A4, 0.41 hectares) *# _____ | DESIGN STANDHYD | Area (ha)= .41 | 01:000304 DT=10.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.12Dep. Storage(mm) =.80Average Slope(%) =3.00Length(m) =52.28Mannings n=.013 .29 1.50 3.00 40.00 .250 Max.eff.Inten.(mm/hr)= 162.24 71.61 over (min) 10.00 10.00 Storage Coeff. (min)= 1.03 (ii) 8.17 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .12 *TOTALS*

 PEAK FLOW
 (cms) =
 .04
 .04
 .080

 TIME TO PEAK
 (hrs) =
 1.00
 1.000
 1.000

 RUNOFF VOLUME
 (mm) =
 98.15
 42.82
 53.883

 TOTAL RAINFALL
 (mm) =
 98.95
 98.950
 98.950

 RUNOFF COEFFICIENT
 =
 .99
 .43
 .545

 .080 (iii) 1.000 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0012-----*# Add hydrographs from Strittmatter A4 to Strittmatter Upstream Drainage

 00403) | ID: NHYD
 AREA
 QPEAK
 TPEAK
 R.V.
 DWF

 ----- (ha)
 (cms)
 (hrs)
 (mm)
 (cms)

 ID1
 01:000304
 .41
 .080
 1.00
 53.88
 .000

 +ID2
 02:000402
 1.48
 .289
 1.00
 53.88
 .000

 | ADD HYD (000403) | ID: NHYD AREA _____ Page 6

R.J. Burnside & Associates Ltd.

SUM 04:000403 1.89 .369 1.00 53.88 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0013-----*# *# Catchment SA5 (Strittmatter A5, 22.4 hectares of upstream *# agricultural drainage) *# *# *# Dec.1,1999: This area, known as the McMurchy Property is assumed to be *# developed for the purpose of sizing a PRELIMINARY stormwater facility. *# *# Total Area: 22.4 hectares Assume: 10.0 hectares non-developable *# *# 12.4 hectares developable (30% impervious) *# *# Note: Although site exhibits extremely high infiltration capacity, average *# runoff potential is assumed for the purpose of sizing future stormwater facility. It is expected that at-source runoff controls (ie. infiltration *# *# facilities) will be implemented to reduce runoff potential for the developme *# _____ | DESIGN NASHYD | Area (ha)= 10.00 Curve Number (CN)=58.00 (mm) = 1.500 # of Linear Res.(N) = 3.00 | 01:000305 DT=15.00 | Ia ----- U.H. Tp(hrs)= .320 Unit Hyd Qpeak (cms)= 1.194 (cms) = .744 (i) PEAK FLOW TIME TO PEAK (hrs) = 1.333 RUNOFF VOLUME (mm) = 28.013 1.333 TOTAL RAINFALL (mm) = 98.950 RUNOFF COEFFICIENT = .283 (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. *** WARNING: Time step is too large for value of TP. R.V. may be ok. Peak flow could be off. 001:0014------______ | DESIGN STANDHYD | Area (ha) = 12.40 | 02:000398 DT=15.00 | Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =3.72Dep. Storage(mm) =.80Average Slope(%) =5.00Length(m) =287.52Mannings n=.0138.68 1.50 5.00 40.00 .250 Max.eff.Inten.(mm/hr)= 162.24 59.89 over (min) 10.00 10.00 Storage Coeff. (min)= 2.45 (ii) 9.03 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .11 *TOTALS*
 PEAK FLOW
 (cms)=
 1.11
 1.05

 TIME TO PEAK
 (hrs)=
 1.00
 1.17
 2.150 (iii) 1.000

R.J. Burnside & Associates Ltd. Page 7

R.J.B. File: S-405

I:\LORENA\S-405\CORREC~1\MAY00\ULT100.OU	Ultimate Condition - 100 Year Output
RUNOFF VOLUME (mm) = 87.84 30.72 TOTAL RAINFALL (mm) = 98.95 98.95 RUNOFF COEFFICIENT = .89 .31 *** WARNING: Storage Coefficient is smaller than Use a smaller DT or a larger area.	98.950 .426
 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 58.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 	
001:0015	
ADD HYD (000399) ID: NHYD AREA QPEAK TPEA (ha) (cms) (hrs ID1 01:000305 10.00 .744 1.3	K R.V. DWF
ID1 01:000305 10.00 .744 1.3 +ID2 02:000398 12.40 2.150 1.0	00 42.14 .000
SUM 09:000399 22.40 2.511 1.0	
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.	
001:0016	
ROUTE RESERVOIR Requested routing time step = IN>09:(000399) ======= OUTLFOW STORAGE TAB OUT<05:(000101)	BLE ======== DW STORAGE (ha.m.) 00 .8700E+00 50 .1270E+01
ROUTING RESULTS AREA QPEAK TPEA	$\begin{array}{llllllllllllllllllllllllllllllllllll$
MAXIMUM STORAGE USED (ha.m.	·
001:0017	
PRINT HYD AREA (ha)= 22.400 ID=05 (000101) QPEAK (cms)= .157 (i) DT=10.00 PCYC= 5 TPEAK (hrs)= 2.333 VOLUME (mm)= 35.833	
(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. TIME FLOW TIME FLOW TIME FLOW TIME hrs cms hrs cms hrs cms hrs .00 .000 22.50 .046 45.00 .005 67.50 .83 .015 23.33 .042 45.83 .005 68.33 1.67 .114 24.17 .039 46.67 .004 69.17 2.50 .157 25.00 .036 47.50 .004 70.00 3.33 .145 25.83 .033 48.33 .004 70.83 R.J. Burnside & Associates Ltd.	3 .001 90.83 .000 7 .000 91.67 .000 0 .000 92.50 .000

R.J. Burnside & Associates Ltd.

Ultimate Condition - 100 Year Output

<pre>4.17 .1331 26.67 .0301 99.17 .003 71.67 .000 94.17 .000 5.00 .1211 27.50 .026 50.03 .003 72.50 .0001 95.02 .000 6.67 .1011 29.17 .022 52.53 .0021 73.53 .0001 95.63 .000 9.67 .001 92.17 .002 175.03 .001 97.50 .000 9.33 .0841 30.83 .020 55.33 .0021 75.63 .0001 97.50 .000 9.17 .0791 31.67 .0131 54.17 .0021 76.67 .001 99.17 .000 10.00 .0761 32.30 .017 55.03 .0021 76.53 .0001 100.00 .000 10.00 .0761 32.30 .017 55.03 .0021 77.50 .0001 100.00 .000 11.67 .0721 34.7 .0151 55.67 .0021 97.15 .001 100.00 .000 11.63 .0741 33.33 .0161 55.63 .0021 77.50 .0001 100.00 .000 11.63 .0701 35.00 .0144 57.50 .001 80.00 .001 102.50 .000 11.64 .7.0561 36.67 .0121 55.33 .001 80.63 .0001 103.33 .000 14.17 .0561 36.67 .0121 55.33 .001 80.63 .0001 103.33 .000 15.00 .0641 37.50 .011 60.02 .001 32.50 .0001 15.00 .0641 37.50 .011 60.63 .0011 83.33 .000 16.67 .000 17.50 .0581 40.00 .008 62.55 .0011 81.67 .000 17.50 .0581 40.60 .008 62.55 .0011 85.00 .000 105.00 .000 15.83 .0561 40.83 .0021 65.63 .0011 83.33 .000 16.67 .000 17.50 .0581 40.60 .008 62.55 .0011 87.50 .0000 12.03 .0561 40.83 .0061 65.83 .0011 85.33 .000 12.03 .0561 40.83 .0061 65.83 .0011 85.33 .000 12.03 .0561 40.83 .0061 65.83 .0011 85.33 .000 12.03 .0561 40.83 .0061 65.83 .0011 87.50 .000 12.03 .0561 40.83 .0061 65.83 .0011 87.50 .000 12.03 .0561 40.83 .0061 65.83 .0011 87.50 .000 12.03 .0561 40.83 .0061 65.83 .0011 87.50 .000 12.03 .0561 40.83 .0061 65.83 .0011 87.50 .000 12.03 .051 41.70 .001 60.64 6.67 .001 187.50 .000 12.03 .051 41.70 .001 60.64 6.67 .001 187.50 .000 12.03 .051 41.70 .0061 65.63 .0011 87.50 .000 12.03 .051 41.70 .0061 65.63 .0011 87.50 .000 12.03 .051 41.70 .0061 65.63 .001 187.50 .000 12.03 .051 41.70 .006 66.67 .001 87.60 .00 12.03 .051 41.70 .006 66.67 .001 87.60 .00 12.03 .051 41.70 .006 66.67 .001 87.60 .00 12.03 .051 41.70 .0061 65.83 .001 187.50 .000 12.03 .051 41.90 .00 10.0</pre>	2. (Dordini 10 400 (conduct	<u>, i (imito (obiito).c</u>			04		100 Tear Output
<pre> 106:000306 DT=10.00 Total Imp(%)= 20.00 Dir. Conn.(%)= 10.00 IMPERVIOUS PERVIOUS (i) Surface Area (ha)= .21 .83 Dep. Storage (mm)= .80 1.50 Average Slope (%)= 3.00 3.00 Length (m)= 83.27 40.00 Mannings n = .013 .250 Max.eff.Inten.(mm/hr)= 162.24 69.71</pre>	5.00 .121 5.83 .110 6.67 .101 7.50 .092 8.33 .084 9.17 .079 10.00 .076 10.83 .074 11.67 .072 12.50 .070 13.33 .068 14.17 .066 15.00 .064 15.83 .062 16.67 .060 17.50 .058 18.33 .056 19.17 .055 20.00 .053 20.83 .051 21.67 .050 001:0018	27.50 .02 28.33 .02 29.17 .02 30.00 .02 30.83 .02 31.67 .01 32.50 .01 33.33 .01 34.17 .01 35.83 .01 36.67 .01 37.50 .01 38.33 .01 39.17 .00 40.83 .00 41.67 .00 43.33 .01 44.17 .00	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$.003 .003 .003 .002 .002 .002 .002 .002 .002 .002 .002 .001	72.50 73.33 74.17 75.00 75.83 76.67 77.50 78.33 79.17 80.00 80.83 81.67 82.50 83.33 84.17 85.00 85.83 84.17 85.00 85.83 86.67 87.50 88.33 89.17	.000 95.00 .000 95.83 .000 96.67 .000 97.50 .000 98.33 .000 99.17 .000 100.00 .000 100.83 .000 101.67 .000 101.67 .000 102.50 .000 103.33 .000 104.17 .000 105.83 .000 105.83 .000 106.67 .000 107.50 .000 108.33 .000 108.33 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000 .000 .00
IMPERVIOUS PERVIOUS (i) Surface Area (ha) = .21 .83 Dep. Storage (mm) = .80 1.50 Average Slope (%) = 3.00 3.00 Length (m) = 83.27 40.00 Mannings n = .013 .250 Max.eff.Inten.(mm/hr) = 162.24 69.71 over (min) 10.00 10.00 Unit Hyd. Tpeak (min) = 1.36 (ii) 8.58 (ii) Unit Hyd. peak (Cms) = .17 .12 PEAK FLOW (cms) = .05 .12 .166 (iii) TIME TO FEAK (hrs) = 1.00 1.000 1.000 RUNOFF VOLUME (mm) = 98.15 42.42 47.996 TOTAL RAINFALL (mm) = 9.99 .43 .485 **** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: .1485 .01 IM E STDF (OT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. .111 .11 PEAK FLOW					Dir Con	$p_{1}(s) = 10.00$	
001:0019 *# Add routed hydrograph from Strittmatter A5 (McMurchy Property) to A6	Surface Area Dep. Storage Average Slop Length Mannings n Max.eff.Inte Storage Coes Unit Hyd. T Unit Hyd. T Unit Hyd. T Unit Hyd. pe PEAK FLOW TIME TO PEAN RUNOFF VOLUN TOTAL RAINF? RUNOFF COEFS *** WARNING (i) CN PR CN* (ii) TIME THAN (iii) PEAK	= en.(mm/hr)= over (min) ff. (min)= peak (min)= eak (cms)= (cms)= K (hrs)= ME (mm)= ALL (mm)= FICIENT = G: Storage Coe Use a small OCEDURE SELECT = 64.0 Ia STEP (DT) SHOU THE STORAGE CO FLOW DOES NOT	.21 .80 3.00 83.27 .013 162.24 10.00 1.36 (ii) 10.00 .17 .05 1.00 98.15 98.95 .99 efficient is Ler DT or a 1 TED FOR PERVI a = Dep. Stop JLD BE SMALLE DEFFICIENT. INCLUDE BASE	1. 3. 40. .2 69. 10. 10. 10. 10. 10.	83 50 00 50 71 00 58 (ii) 00 12 12 12 00 42 95 43 than DT rea. SES: bove) UAL ANY.	.166 (iii) 1.000 47.996 98.950 .485 !	
	001:0019 *# Add routed	hydrograph fro					
			Рас	ge 9		R.J	.B. File: S-405

		une	1		U	ltimate Co		100 lear
ADD HYD ((000420)	ID: NHYD	AREA	QPEAK	TPEAK	R.V.	DWF	
			(ha)	(cms)	(hrs)	(mm)		
	ID1	05:000101	22.40	.157	2.33	35.83	.000	
	+1DZ	06:000306	1.04	.166	1.00	48.00	.000	
			23.44					
NOTE: P	PEAK FLOWS	DO NOT INC	CLUDE BASEF	LOWS IF 2	ANY.			
# Add OV	/ERFLOW hyd	drograph fi	rom McMurch	y Pond				
ADD HYD ((000421)	ID: NHYD	AREA					
	тр1	00.000150	(ha)	(Cms)	(nrs)	(mm)	(Cms)	++00044
	נעד+ וחד	07:000420	.00 23.44	.000 207	.00	,00 76 27	.000	^ ^ DKY * *
	====							
	SUM	05:000421	23.44	.207	1.00	36.37	.000	
NOTE: F			CLUDE BASEF					
01:0021								
ADD HYD ((000405)	ID: NHYD	AREA	QPEAK	TPEAK	R.V.	DWF	
			(ha)					
			23.44	.207	1.00	36.37	.000	
			1.89					
			25.33					
NOTE: E	PEAK FLOWS	DO NOT INC	CLUDE BASEF	LOWS IF A	ANY.			
NOTE: P			CLUDE BASEF					
001:0022								
)01:0022								
01:0022 # # Catchm	nent SA10	(Strittmatt	cer A10, 0.					
01:0022 # # Catchm # Ar	nent SA10		cer A10, 0.					
001:0022 # # Catchm # Ar	nent SA10	(Strittmatt	cer A10, 0.					
01:0022 # Catchm # Ar # DESIGN SI	nent SA10 rea increas FANDHYD	(Strittmatt sed May 200 Area	cer A10, 0.)0 (ha)=	.36	res)			
01:0022 # Catchm # Ar # DESIGN SI	nent SA10 rea increas	(Strittmatt sed May 200 Area	cer A10, 0.	.36	res)		20.00	
001:0022 # Catchm f# Ar f# DESIGN SI	nent SA10 rea increas FANDHYD	(Strittmatt sed May 200 Area Total	cer A10, 0.)0 (ha)=	.36 30.00	res)		20.00	
001:0022 # Catchm # Ar # DESIGN ST 05:000310 Surfac	nent SA10 rea increas TANDHYD) DT=10.00 ce Area	(Strittmatt sed May 200 Area Total 	<pre>cer A10, 0. 00 (ha) = Imp(%) = IMPERVIOUS .11</pre>	.36 hecta: .36 30.00 1 PERVIO	res) Dir. Con OUS (i) 25		20.00	
001:0022 (# Catchm (# Ar (# Ar (DESIGN ST 05:000310 Surfac Dep. S	nent SA10 rea increas TANDHYD D DT=10.00 ce Area Storage	(Strittmatt sed May 200 Area Total (ha)= (mm)=	<pre>ter A10, 0. 00 (ha) = Imp(%) = IMPERVIOUS .11 .80</pre>	36 hecta: .36 30.00 PERVIC	Dir. Con 0US (i) 25		20.00	
001:0022 # Catchm # Ar DESIGN ST 05:000310 Surfac Dep. S Averac	nent SA10 rea increas TANDHYD) DT=10.00 ce Area Storage ge Slope	(Strittmatt sed May 200 Area Total (ha)= (mm)= (%)=	<pre>ter A10, 0. 00 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00</pre>	36 hecta .36 30.00 PERVIC .1. 13.	res) Dir. Con OUS (i) 25 50 00		20.00	
01:0022 # Catchm # Ar # DESIGN ST 05:000310 Surfac Dep. S Averac Length	nent SA10 cea increas CANDHYD) DT=10.00 ce Area Storage ge Slope	(Strittmatt sed May 200 Area Total 	<pre>(ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99</pre>	.36 hecta .36 30.00 PERVIO 1. 13. 40.	Dir. Con OUS (i) 25 50 00 00		20.00	
001:0022 # Catchm # Ar DESIGN ST 05:000310 Surfac Dep. S Averac	nent SA10 cea increas CANDHYD) DT=10.00 ce Area Storage ge Slope	(Strittmatt sed May 200 Area Total (ha)= (mm)= (%)=	<pre>ter A10, 0. 00 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00</pre>	36 hecta .36 30.00 PERVIC .1. 13.	Dir. Con OUS (i) 25 50 00 00		20.00	
001:0022 # Catchm = DESIGN ST 05:000310 Surfac Dep. S Averac Length Mannir	nent SA10 rea increas TANDHYD D DT=10.00 ce Area Storage ge Slope h ngs n ff.Inten.(r	(Strittmatt sed May 200 Area Total (ha) = (m) = (%) = (m) = = mm/hr) =	<pre>cer A10, 0. 00 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99 .013 162.24</pre>	.36 .36 30.00 PERVIO 1.1 13.1 40.1 .22 71.	Dir. Con OUS (i) 25 50 00 50 61		20.00	
001:0022 d d d c c c c c c c c c c c c c	nent SA10 rea increas TANDHYD D DT=10.00 ce Area Storage ge Slope h ngs n ff.Inten.(n over	<pre>(Strittmatt sed May 200 Area Total (ha)= (mm)= (%)= (m)= = mm/hr)= (min)</pre>	<pre>(ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99 .013 162.24 10.00</pre>	.36 .36 30.00 PERVIO 1. 13. 40. .2 71. 10.	Dir. Con OUS (i) 25 50 00 50 61 00		20.00	
001:0022 # Catchm # Ar # DESIGN ST 05:000310 Surfac Dep. S Averac Length Mannir Max.ef	nent SA10 rea increas TANDHYD D DT=10.00 ce Area Storage ge Slope n ngs n ff.Inten.(r over ge Coeff.	<pre>(Strittmatt sed May 200</pre>	<pre>cer A10, 0.)0 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99 .013 162.24 10.00 .64 (i</pre>	36 hecta .36 30.00 PERVIO 13. 40. .2. 71. 10. i) 5.	res) Dir. Con OUS (i) 25 50 00 50 61 00 24 (ii)		20.00	
01:0022 # Catchm # Ar # DESIGN ST 05:000310 Surfac Dep. S Averac Length Mannir Max.ef Storac Unit F	nent SA10 rea increas TANDHYD D DT=10.00 Ce Area Storage ge Slope n ngs n ff.Inten.(r over ge Coeff. Hyd. Tpeak	<pre>(Strittmatt sed May 200 Area Total (ha) = (mm) = (%) = (m) = = mm/hr) = (min) (min) = (min) =</pre>	<pre>cer A10, 0.)0 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99 .013 162.24 10.00 .64 (i 10.00</pre>	36 hecta: .36 30.00 PERVIO 13. 40. .2. 71. 10. 10. 10.	res) Dir. Con OUS (i) 25 50 00 50 61 00 24 (ii) 00		20.00	
001:0022 # Catchm # Ar # DESIGN ST 05:000310 Surfac Dep. S Averac Length Mannir Max.ef Storac Unit F	nent SA10 rea increas TANDHYD D DT=10.00 ce Area Storage ge Slope n ngs n ff.Inten.(r over ge Coeff.	<pre>(Strittmatt sed May 200 Area Total (ha) = (mm) = (%) = (m) = (min) = (min) = (min) = (min) =</pre>	<pre>cer A10, 0.)0 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99 .013 162.24 10.00 .64 (i</pre>	36 hecta: .36 30.00 PERVIO 13. 40. .2. 71. 10. 10. 10.	res) Dir. Con OUS (i) 25 50 00 50 61 00 24 (ii)	un.(%)=		
001:0022 # Catchm # Ar # DESIGN ST 05:000310 Surfac Dep. S Averac Length Mannir Max.ef Storac Unit F Unit F	nent SA10 rea increas TANDHYD D DT=10.00 ce Area Storage ge Slope n ngs n ff.Inten.(r over ge Coeff. lyd. Tpeak	<pre>(Strittmatt sed May 200 Area Total Total (ha) = (mm) = (%) = (m) = (min) = (min) = (min) = (min) = (cms) =</pre>	<pre>cer A10, 0. 00 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99 .013 162.24 10.00 .64 (i 10.00 .17</pre>	36 hecta: .36 30.00 PERVIC .1 .1 .1 .1 .1 .2 .1 .2	res) Dir. Con OUS (i) 25 50 00 00 50 61 00 24 (ii) 00 14	n.(%)=	LS*	
001:0022	nent SA10 rea increas TANDHYD D DT=10.00 ce Area Storage ge Slope h ngs n ff.Inten.(r over ge Coeff. Hyd. Tpeak Hyd. peak	<pre>(Strittmatt sed May 200 Area Total Total (ha) = (mm) = (%) = (m) = (min) (min) = (min) (min) = (cms) = (cms) =</pre>	<pre>cer A10, 0. 00 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99 .013 162.24 10.00 .64 (i 10.00 .17 .03</pre>	36 hecta: .36 30.00 PERVIO .1 .13. 40. .2 71. 10. .10.	res) Dir. Con OUS (i) 25 50 00 00 50 61 00 24 (ii) 00 14 04	n.(%)= *TOTA .0	LS* 77 (iii)
001:0022 *# Catchm *# Ar *# DESIGN ST 05:000310 Surfac Dep. S Averac Length Mannir Max.ef Storac Unit H Unit H PEAK H TIME D	nent SA10 rea increas TANDHYD D DT=10.00 DT=10.00 ce Area Storage ge Slope n ngs n Ef.Inten.(r over ge Coeff. Hyd. Tpeak Hyd. peak FLOW TO PEAK	<pre>(Strittmatt sed May 200 Area Total (ha)= (mm)= (%)= (m)= (min)= (min) (min)= (min)= (cms)= (cms)= (hrs)=</pre>	<pre>cer A10, 0. 00 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99 .013 162.24 10.00 .64 (i 10.00 .17 .03 1.00</pre>	36 hecta: .36 30.00 PERVIO 13. 40. .2 71. 10. 10.	res) Dir. Con OUS (i) 25 50 00 00 50 61 00 24 (ii) 00 14 04 00	nn.(%)= *TOTA .0 1.0	LS* 77 (iii 00)
001:0022 # Catchm # Ar # DESIGN ST 05:000310 Surfac Dep. S Averac Length Mannir Max.ef Storac Unit H Unit H PEAK H TIME T RUNOFH	nent SA10 rea increas TANDHYD D DT=10.00 DT=10.00 ce Area Storage ge Slope h ngs n ff.Inten.(r over ge Coeff. lyd. Tpeak Hyd. Tpeak Hyd. peak FLOW TO PEAK F VOLUME	<pre>(Strittmatt sed May 200 Area Total (ha) = (mm) = (%) = (m) = (min) (min) = (min) (min) = (cms) = (cms) = (hrs) = (mm) =</pre>	<pre>cer A10, 0. 00 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99 .013 162.24 10.00 .64 (i 10.00 .17 .03 1.00 98.15</pre>	36 hecta: .36 30.00 PERVIO 13. 40. .2 71. 10. 10. 10.	<pre>pir. Con ous (i) 25 50 00 00 50 61 00 24 (ii) 00 14 04 00 82</pre>	*TOTA .0 1.0 53.8	LS* 77 (iii 00 83)
001:0022 # Catchm # Ar # DESIGN ST 05:000310 Surfac Dep. S Averac Length Mannir Max.ef Storac Unit H Unit H PEAK H TIME T RUNOFH TOTAL	nent SA10 rea increas TANDHYD D DT=10.00 DT=10.00 ce Area Storage ge Slope n ngs n Ef.Inten.(r over ge Coeff. Hyd. Tpeak Hyd. peak FLOW TO PEAK	<pre>(Strittmatt sed May 200 Area Total (ha) = (mm) = (%) = (m) = (min) (min) = (min) (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = (mm) =</pre>	<pre>cer A10, 0. 00 (ha) = Imp(%) = IMPERVIOUS .11 .80 13.00 48.99 .013 162.24 10.00 .64 (i 10.00 .17 .03 1.00</pre>	36 hecta: .36 30.00 PERVIO 13. 40. .22 71. 10. 10. 10. 10.	<pre>pir. Con ous (i) 25 50 00 00 50 61 00 24 (ii) 00 14 04 00 82</pre>	*TOTA .0 1.0 53.8 98.9	LS* 77 (iii 00 83)

() (i:	ii) TIME STEP	64.0 Ia (DT) SHOUL STORAGE COE DOES NOT I	= Dep. Stc D BE SMALI FFICIENT. NCLUDE BAS	rage (Ak ER OR EQU EFLOW IF	DOVE) JAL ANY.			
01:002: #	3 tchment SA11							
06:00	N STANDHYD 0311 DT=10.00	Total	(ha)= Imp(%)=	.35 99.00 I	Dir. Con	n.(%)=	99.00	
			MPERVIOUS	PERVI	OUS (i)			
Su	rface Area p. Storage	(ha)=	.35	, (00			
Dej	p. Storage	(mm) =	.80	1.5	50			
Ave	erage Slope ngth nnings n	(%)=	.10	•	10			
Lei	ngth	(m) =	48.30	40.0	JU ~ 0			
Mai	nnıngs n	=	.013	.25	5 U			
М ~ -	x.eff.Inten.(mm/hr) -	162 24	100 /	11			
Ma.	A. CII. INCEN. (. OVer	(min)	10 00	20 () I 1 ()			
Ste	orage Coeff.	(min) =	2.71 (i	i) 18.7	73 (ii)			
Un	it Hyd. Tpeak	$(\min) =$	10.00	20.0	, o (±±) 00			
Uni	it Hyd. peak	(cms) =	.17	. (06 06			
						TOTAI	`S	
PE	AK FLOW ME TO PEAK	(cms) =	.15	. (00	.15	54 (iii)	
TI	ME TO PEAK	(hrs) =	1,00	1.1	17	1.00	00 0	
RUI	NOFF VOLUME	(mm) =	98.15	92.5	53	98.09	94	
TOT	TAL RAINFALL	(mm) =	98.95	98.9	95	98.95	50	
	NOFF COEFFICI						91	
*	** WARNING: S					1		
	U	se a smalle	r DT or a	larger a	rea.			
	(i) CN PROCED	ווסד פדנדכייד			252.			
		98.0 Ia						
()	ii) TIME STEP							
		STORAGE COE		-				
(i)	ii) PEAK FLOW	DOES NOT I	NCLUDE BAS	EFLOW IF	ANY.			
	4							
	d hydrograph							
		TD. NUVD	ᠵ᠐ᢑ᠉		אַגייזַקיי	77 G	ਸਯਾਦ	
нор н	YD (000409) ID1	ID. NHID	AREA (ba)	(CTEAN	LFEAK (bre)	K.V.		
	 1חד	01:000405	25 33	. 576	1 00	37.68		
	+ID2	05:000310	.36	.077	1.00	53.88	.000	
		06:000311						
								:
	CITA	02:000409	26.04	.807	1.00	38.72	.000	
	SOM							
NOTE	: PEAK FLOWS	DO NOT INC	LUDE BASEE	LOWS IF 2	ANY.			

*#

Ultimate Condition - 100 Year Output

*# Add in Areas A1, A2 and A3 from the County Road *# and route total flow through proposed SWM area *# *# *# Catchment A1 from Triton Study (2.4 hectares, C= 0.5) *# _____ | DESIGN STANDHYD | Area (ha)= 2.40 | 01:000101 DT=10.00 | Total Imp(%)= 40.00 Dir. Conn.(%)= 40.00 _____ IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.961.44Dep. Storage(mm) =.801.50Average Slope(%) =5.005.00Length(m) =126.4940.00Mannings n=.013.250 Max.eff.Inten.(mm/hr)= 162.24 56.88 over (min) 10.00 10.00 Storage Coeff. (min)= 1.50 (ii) 8.21 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .12 *TOTALS*

 PEAK FLOW
 (cms) =
 .43
 .17

 TIME TO PEAK
 (hrs) =
 1.00
 1.00

 RUNOFF VOLUME
 (mm) =
 98.15
 39.52

 TOTAL RAINFALL
 (mm) =
 98.95
 98.95

 RUNOFF COEFFICIENT
 =
 .99
 .40

 .604 (iii) 1.000 62.969 98.950 .636 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. *# *# Catchment A2 from Triton Study (0.25 hectares, C= 0.5) *# | DESIGN STANDHYD | Area (ha)= .25 | 04:000102 DT=10.00 | Total Imp(%)= 40.00 Dir. Conn.(%)= 40.00 ------IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.10Dep. Storage(mm) =.80Average Slope(%) =5.00Length(m) =40.82Mannings n=.013 .15 1.50 5.00 40.00 .250 Max.eff.Inten.(mm/hr)= 162.24 56.88 over (min) 10.00 10.00 Storage Coeff. (min)= .76 (ii) 7.48 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .13 *TOTALS*

 PEAK FLOW
 (cms) =
 .05
 .02

 TIME TO PEAK
 (hrs) =
 1.00
 1.00

 R.J. Burnside & Associates Ltd.
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 .064 (iii) 1.000

R.J.B. File: S-405

:\LORENA\S-405\CORREC~1\MAY00\ULT100.OU			<i>U</i>	ltimate Cor	ndition ~ 100 Year Outp
RUNOFF VOLUME (mm) = TOTAL RAINFALL (mm) = RUNOFF COEFFICIENT =	98.95	98.9	5	98.95	0
*** WARNING: Storage Coeff Use a smaller	icient is	smaller	than DT		0
(i) CN PROCEDURE SELECTEI CN* = 64.0 Ia =					
(ii) TIME STEP (DT) SHOULE THAN THE STORAGE COEF (iii) PEAK FLOW DOES NOT IN	FICIENT.				
01:0027					
# Add hydrographs from Catchm					
ADD HYD (000201) ID: NHYD ID1 01:000101 +ID2 04:000102	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
ID1 01:000101 +ID2 04:000102	2.40 .25	.604 .064	1.00 1.00	62.97 62.97	.000 .000
SUM 05:000201	2.65		 1.00	======== 62.97	.000
NOTE: PEAK FLOWS DO NOT INCI	יתקסגם קרוז		NT \7		
Catchment A3 from Triton St DESIGN STANDHYD Area 01:000103 DT=10.00 Total D					
01:000103 DT=10.00 Total]	Imp(%)=	40.00 D	ir. Con	n.(%)=	40.00
IN Surface Area (ha)=	IPERVIOUS				
Dep. Storage (mm)=	.80	1.5	0		
Average Slope (%)= Length (m)=	6.00 67.33	6.0 40.0	0		
Mannings n =	.013	.25			
	162.24				
over (min) Storage Coeff. (min)=	10.00 .97 (i				
Unit Hyd. Tpeak (min)=	10.00	10.0			
Unit Hyd. peak (cms)=	.17	.1	.3	*	C+
PEAK FLOW (cms) =	.12	.0	5	*TOTAL .17	3 (iii)
TIME TO PEAK (hrs) =	1.00	1.0	0	1.00	
RUNOFF VOLUME (mm) =	98.15	39.5		62.96	
TOTAL RAINFALL (mm) = RUNOFF COEFFICIENT =	98.95 .99	98.9 .4		98.95 .63	
*** WARNING: Storage Coeff Use a smaller	ficient is	smaller	than DT		
(i) CN PROCEDURE SELECTED CN* = 64.0 Ia =) FOR PERV = Dep. Sto				
(ii) TIME STEP (DT) SHOULI THAN THE STORAGE COEI) BE SMALL				
(iii) PEAK FLOW DOES NOT IN		EFLOW IF	ANY.		

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IADD HYD (000202) ID: NHYD (AREA (DEXK TPEAK R.V. DWF) OWF (Cms) (*# 	ng total	m Catchm	ents A3 to flow to be	b hydrogi	aph #201	1		
SUM 04:000202 3.33 .841 1.00 62.97 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0030	ADD HYD (00020	02) ID: ID1 01: +ID2 05:	000103 000201	(ha) .68 2.65	(cms) .173 .668	(hrs) 1.00 1.00	(mm) 62.97 62.97	(cms) .000 .000	
001:0030	NOTE: PEAK H	SUM 04:	000202	3.33	.841	1.00			
<pre>COMPUTE DUALHYD Average inlet capacities [CINLET] = .450 (cms) TotalHyd 04:000202 Number of inlets in system [NINLET] = .1 Total major system storage [TMJSTO] = .450 (cms) Total major system storage [TMJSTO] =</pre>	001:0030 *# *# Direct minc *#	or system							
(ha) (cms) (hrs) (mm) (cms) TOTAL HYD. 04:000202 3.33 .841 1.000 62.969 .000 MAJOR SYST 01:000412 .47 .391 1.000 62.969 .000 MINOR SYST 05:000413 2.86 .450 1.000 62.969 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0031			Number of Total material	of inlets inor syste	in syste em capaci	em [NINL] ty	ET] = =	1 .450	(cms)
<pre>MAJOR SYST 01:000412 .47 .391 1.000 62.969 .000 MINOR SYST 05:000413 2.86 .450 1.000 62.969 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0031</pre>		04:000	202	(ha) 3.33	(cms) .841	(hrs) 1.00) (m D 62.9	m) 69	(cms) .000
001:0031	MAJOR SYST MINOR SYST	01:000 05:000	412 413	.47 2.86	.391 .450	1.00) 62.9) 62.9	69 69	.000
<pre> ADD HYD (000203) ID: NHYD AREA QPEAK TPEAK R.V. DWF (ha) (cms) (hrs) (mm) (cms) ID1 05:000413 2.86 .450 1.00 62.97 .000 +ID2 02:000409 26.04 .807 1.00 38.72 .000 ==================================</pre>									
<pre>(ha) (cms) (hrs) (mm) (cms) ID1 05:000413 2.86 .450 1.00 62.97 .000 +ID2 02:000409 26.04 .807 1.00 38.72 .000 </pre>									
ID1 05:000413 2.86 .450 1.00 62.97 .000 +ID2 02:000409 26.04 .807 1.00 38.72 .000 			rainage	(hyd #202)	to Stri	ttmatte	r draina	.ge (hyd	,
SUM 06:000203 28.90 1.257 1.00 41.12 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0032	*# Add minor b ADD HYD (00020	highway d 03) ID:		AREA	QPEAK	TPEAK	R.V.	DWF	,
<pre>001:0032 *# Strittmatter SWM Area *# Original Rating Curve (February 1990) revised July 1999 - same storage *# *# Changed Low Flow Outlet Dec. 1, 1999 (from 150mm to 450mm) *# Changed Rating Curve (April 2000) with pond redesign *#</pre>	*# Add minor h 	highway d 03) ID: ID1 05: +ID2 02:	NHYD 000413 000409	AREA (ha) 2.86 26.04	QPEAK (cms) .450 .807	TPEAK (hrs) 1.00 1.00	R.V. (mm) 62.97 38.72	DWF (cms) .000 .000	,
001:0032	*# Add minor h ADD HYD (00020	highway d 03) ID: ID1 05: +ID2 02:	NHYD 000413 000409	AREA (ha) 2.86 26.04	QPEAK (cms) .450 .807	TPEAK (hrs) 1.00 1.00	R.V. (mm) 62.97 38.72	DWF (cms) .000 .000	,
ROUTE RESERVOIR Requested routing time step = 10.0 min. IN>06:(000203) OUT<02:(000406)	*# Add minor h ADD HYD (00020 NOTE: PEAK H	highway d 03) ID: ID1 05: +ID2 02: SUM 06: FLOWS DO	NHYD 000413 000409 ====== 000203 NOT INCL	AREA (ha) 2.86 26.04 ========= 28.90 UDE BASEFI	QPEAK (cms) .450 .807 1.257 LOWS IF A	TPEAK (hrs) 1.00 1.00 	R.V. (mm) 62.97 38.72 41.12	DWF (cms) .000 .000	
(cms) (ha.m.) (cms) (ha.m.) .000 .0000E+00 .288 .7330E-01	<pre>*# Add minor h</pre>	highway d ID1 05: +ID2 02: SUM 06: FLOWS DO er SWM Ar ating Cur w Flow Ou	NHYD 000413 000409 000203 NOT INCL ea ve (Febr tlet Dec	AREA (ha) 2.86 26.04 28.90 UDE BASEFI uary 1990) . 1, 1999	QPEAK (cms) .450 .807 1.257 LOWS IF A revised (from 15	TPEAK (hrs) 1.00 1.00 1.00 ANY. J.Uly 1: 50mm to	R.V. (mm) 62.97 38.72 41.12	DWF (cms) .000 .000	

				.4500E .1070E .2100E .4640E .6870E	-02 -01 -01 -01 -01	.345 .378 .428 .448 .467	.8780E .1032E .1256E .1713E .1940E .2188E	+00 +00 +00 +00	
ROUT	ING RES	ULTS		AREA	QPEAK	TPEAK	R	.V.	
			-	(ha)	(Cms)	(hrs) 1.000	(:	mm)	
		(000203) (000406)	2	8.90	1.257	1.000 1.833	41.		
		(000408)		.00		1.833		000	
		(,					•	000	
		PEAK TIME S MAXIMU	SHIFT OF JM STOR	PEAK FL AGE US	OW ED	/Qin](%)= (min)= (ha.m.)=	= 50. =.1794E+	87 00 00	
001:0033-									
	 IYD	 Af	REA	(ha)=	28.904				
ID=02 (000406)	QE	PEAK	(cms) =	.435	(i)			
DT=10.0	0 PCYC=	5 TE	PEAK	(hrs) =	1.833				
		VC	DLUME	(mm) =	41.118				
(i)	PEAK F	LOW DOES	NOT INC	LUDE BAS	EFLOW IF	ANY.			
	FLOW				FLOW	TTME	FLOW	TIME	FLOW
hrs	cms	hrs	cms	hrs	cms	hrs	Cms	hrs	CMS
.00	.0001	22.50	.046	45.00	.005	67.30	.0011	90.00	.000
.83	.154	23.33	.043 .039	45.83	.005 .004		.001		.000
1.67 2.50	.433 .421		.039		.004	69.17 70.00	.000		.000 .000
3.33	.370		.033		.004	70.83	.0001		.000
4.17	.268		.031		.003	71.67	.0001		.000
5.00	.185	27.50	.028	50.00	.003	72.50	.0001		.000
	.151	28.33	.026	50.83	.003	73.33	.000		.000
	.127		.024		.003	74.17	.000		.000
7.50 8.33		30.00 30.83			.0021	75.00 75.83			.000 .000
9.17	.080		.019		.002	76.67	.0001	98.33 99.17	.000
10.00	.077		.017		.002			100.00	.000
10.83	.075	33.33	.016		.002	78.33		100.83	.000
11.67	.073		.015		.002			101.67	.000
12.50	.070		.014		.002			102.50	.000
13.33	.068		.013			80.83		103.33	.000
14.17 15.00	.066 .064		.012 .011		.001	81.67 82.50		104.17 105.00	.000 .000
15.83	.062		.010	60.83	.001	83.33		105.83	.000
16.67	.060		.009	61.67	.001	84.17		106.67	.000
17.50	.058		.008		.001			107.50	.000
18.33	.057		.008					108.33	.000
19.17	.0551		.007		.001	86.67	.000		
20.00 20.83	.053	42.50 43.33	.007	65.00 65.83	.001	87.50 88.33	.000 .000		
20.83		43.33		66.67		89.17	.0001		
# # # Cato	chment S		ittmatte	r road d					rolled
· #		ciates Ltd.			age 15			R.J	.B. File: S-

DESIGN STANDHYD 07:000307 DT=10.00	- Area Total	(ha)= Imp(%)=	.32 30.00 Dir.	Conn.(%)= 20.00	
	-	IMPERVIOU	S PERVIOUS		
Surface Area	(ha)=	.10	.22		
Dep. Storage	(mm) = (2)	.80	1.50		
Length	(3) = (m) =	2.00 46 19	2.00		
Average Slope Length Mannings n	=	.013	.250		
Max.eff.Inten.(m	m/hr)=	162.24	71.61		
over	(min)	10.00	10.00		
Storage Coeii. Unit Hyd Thoak	$(\min) =$	10 00	(11) 9.14 (1	.l)	
Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	$(m \pm n) =$.17	.11		
				TOTALS	
PEAK FLOW					
TIME TO PEAK					
RUNOF'F VOLUME	(mm) =	98.15	42.82	53.883	
TOTAL RAINFALL RUNOFF COEFFICIE	(mm) =	98.95	98.95	98.950	
*** WARNING: St	NT = Coot	.99	.43	.545	
			a larger area.		
(i) CN PROCEDU			-		
			torage (Above)		
(ii) TIME STEP					
THAN THE S					
(iii) PEAK FLOW (DOES NOT I	INCLUDE E	ASEFLOW IF ANY.		
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *#	trittmatte POND>>>> I	er A8, 0.	46 hectares)		
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *#	trittmatte POND>>> I May 2000	er A8, 0. FLOWS UNC	46 hectares) ONTROLLED DOWN		I
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD	trittmatte POND>>>> I May 2000 - Area	er A8, 0. FLOWS UNC (ha)=	46 hectares) ONTROLLED DOWN .46	ROAD	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *#	trittmatte POND>>>> May 2000 - Area Total -	er A8, 0. FLOWS UNC (ha)= Imp(%)=	46 hectares) ONTROLLED DOWN .46 30.00 Dir.	ROAD Conn.(%)= 20.00	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00	trittmatte POND>>> May 2000 - Area Total -	er A8, 0. FLOWS UNC (ha)= Imp(%)= IMPERVIOU	46 hectares) ONTROLLED DOWN .46 30.00 Dir. TS PERVIOUS	ROAD Conn.(%)= 20.00	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00 	trittmatte POND>>> I May 2000 - Area Total - (ha)=	er A8, 0. FLOWS UNC (ha)= Imp(%)= IMPERVIOU .14	46 hectares) ONTROLLED DOWN .46 30.00 Dir. TS PERVIOUS .32	ROAD Conn.(%)= 20.00	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage	trittmatte POND>>> I May 2000 - Area Total - (ha)= (mm)=	er A8, 0. FLOWS UNC (ha)= Imp(%)= IMPERVIOU .14 .80	46 hectares) ONTROLLED DOWN .46 30.00 Dir. TS PERVIOUS .32 1.50	ROAD Conn.(%)= 20.00	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope	<pre>trittmatte POND>>>> I May 2000 - Area Total - (ha)= (mm)= (%)=</pre>	er A8, 0. FLOWS UNC (ha) = Imp(%) = IMPERVIOU .14 .80 2.00	46 hectares) ONTROLLED DOWN .46 30.00 Dir. TS PERVIOUS .32 1.50 2.00	ROAD Conn.(%)= 20.00	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length	trittmatte POND>>> I May 2000 - Area Total - (ha)= (mm)=	er A8, 0. FLOWS UNC (ha)= Imp(%)= IMPERVIOU .14 .80	46 hectares) ONTROLLED DOWN .46 30.00 Dir. TS PERVIOUS .32 1.50 2.00	ROAD Conn.(%)= 20.00	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n	<pre>trittmatte POND>>>> I May 2000 - Area Total - (ha)= (mm)= (%)= (m)= =</pre>	er A8, 0. FLOWS UNC (ha) = Imp(%) = IMPERVIOU .14 .80 2.00 55.38 .013	46 hectares) CONTROLLED DOWN .46 30.00 Dir. TS PERVIOUS .32 1.50 2.00 40.00 .250	ROAD Conn.(%)= 20.00	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(mm	<pre>trittmatte POND>>>> H May 2000 - Area Total - (ha)= (mm)= (%)= (m)= = (m)= = m/hr)=</pre>	<pre>er A8, 0. FLOWS UNC (ha) = Imp(%) = IMPERVIOU .14 .80 2.00 55.38 .013 162.24</pre>	46 hectares) CONTROLLED DOWN .46 30.00 Dir. S PERVIOUS .32 1.50 2.00 40.00 .250 71.61	ROAD Conn.(%)= 20.00	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(mm over	<pre>trittmatte POND>>>> H May 2000 - Area Total - (ha)= (mm)= (%)= (m)= = m/hr)= (min)</pre>	<pre>(ha) = Imp(%) = IMPERVIOU .14 .80 2.00 55.38 .013 162.24 10.00</pre>	46 hectares) CONTROLLED DOWN .46 30.00 Dir. 75 PERVIOUS .32 1.50 2.00 40.00 .250 71.61 10.00	ROAD Conn.(%)= 20.00 i)	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(m over Storage Coeff.	<pre>trittmatte POND>>>> I May 2000 - ! Area ! Total - (ha)= (mm)= (%)= (m)= = m/hr)= (min) (min)=</pre>	<pre>(ha) = Imp(%) = IMPERVIOU .14 .80 2.00 55.38 .013 162.24 10.00 1.20</pre>	46 hectares) CONTROLLED DOWN .46 30.00 Dir. 75 PERVIOUS .32 1.50 2.00 40.00 .250 71.61 10.00 (ii) 9.27 (2000)	ROAD Conn.(%)= 20.00 i)	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak	<pre>trittmatte POND>>>> I May 2000 - ! Area ! Total - (ha)= (mm)= (%)= (m)= = m/hr)= (min) (min)= (min)=</pre>	<pre>(ha)= Imp(%)= IMPERVIOU .14 .80 2.00 55.38 .013 162.24 10.00 1.20 10.00</pre>	46 hectares) CONTROLLED DOWN .46 30.00 Dir. 75 PERVIOUS .32 1.50 2.00 40.00 .250 71.61 10.00 (ii) 9.27 (2 10.00	ROAD Conn.(%)= 20.00 i)	
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(m over Storage Coeff.	<pre>trittmatte POND>>>> I May 2000 - ! Area ! Total - (ha)= (mm)= (%)= (m)= = m/hr)= (min) (min)= (min)=</pre>	<pre>(ha) = Imp(%) = IMPERVIOU .14 .80 2.00 55.38 .013 162.24 10.00 1.20</pre>	46 hectares) CONTROLLED DOWN .46 30.00 Dir. 75 PERVIOUS .32 1.50 2.00 40.00 .250 71.61 10.00 (ii) 9.27 (2000)	ROAD Conn.(%)= 20.00 i)	· · · · · · · · · · · · · · · · · · ·
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(mm over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	<pre>trittmatte POND>>>> I May 2000 - Area Total - (ha)= (mm)= (%)= (m)= = (m)= (min)= (min)= (min)= (cms)=</pre>	<pre>(ha)= Imp(%)= IMPERVIOU .14 .80 2.00 55.38 .013 162.24 10.00 1.20 10.00 .17</pre>	46 hectares) ONTROLLED DOWN .46 30.00 Dir. 32 1.50 2.00 40.00 .250 71.61 10.00 (ii) 9.27 (10) 10.00 .11	ROAD Conn.(%)= 20.00 i) .i) *TOTALS*	· · · · · · · · · · · · · · · · · · ·
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(mm over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW	<pre>trittmatte POND>>>> I May 2000 - ! Area ! Total - (ha)= (mm)= (%)= (m)= = m/hr)= (min) (min)= (min)=</pre>	<pre>(ha)= Imp(%)= Imp(%)= IMPERVIOU .14 .80 2.00 55.38 .013 162.24 10.00 1.20 10.00 .17 .04</pre>	46 hectares) ONTROLLED DOWN .46 30.00 Dir. 75 PERVIOUS .32 1.50 2.00 40.00 .250 71.61 10.00 (ii) 9.27 (10.00 .11 .05	ROAD Conn.(%)= 20.00 i) .i) *TOTALS* .087 (iii)	· · · · · · · · · · · · · · · · · · ·
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(mm over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK	<pre>trittmatte POND>>>> H May 2000 - Area Total - (ha)= (mm)= (%)= (m)= (%)= (m)= (mn)= (min) (min)= (min)= (cms)= (cms)= (hrs)=</pre>	<pre>(ha)= Imp(%)= IMPERVIOU .14 .80 2.00 55.38 .013 162.24 10.00 1.20 10.00 .17</pre>	46 hectares) CONTROLLED DOWN .46 30.00 Dir. S PERVIOUS .32 1.50 2.00 40.00 .250 71.61 10.00 (ii) 9.27 (: 10.00 .11 .05 1.00	ROAD Conn.(%)= 20.00 i) .i) *TOTALS*	· · · · · · · · · · · · · · · · · · ·
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(mm over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK	<pre>trittmatte POND>>>> H May 2000 - Area Total - (ha)= (mm)= (%)= (m)= (%)= (m)= (mn)= (min)= (min)= (cms)= (cms)= (hrs)= (mm)=</pre>	<pre>er A8, 0. FLOWS UNC (ha)= Imp(%)= IMPERVIOU .14 .80 2.00 55.38 .013 162.24 10.00 1.20 10.00 .17 .04 1.00</pre>	46 hectares) CONTROLLED DOWN .46 30.00 Dir. S PERVIOUS .32 1.50 2.00 40.00 .250 71.61 10.00 (ii) 9.27 (: 10.00 .11 .05 1.00 42.82	<pre>ROAD Conn.(%) = 20.00 i) i) *TOTALS* .087 (iii) 1.000</pre>	· · · · · · · · · · · · · · · · · · ·
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(mm over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME	<pre>trittmatte POND>>>> H May 2000 - Area Total - (ha)= (mm)= (%)= (m)= (%)= (m)= (min)= (min)= (min)= (cms)= (cms)= (hrs)= (mm)= (mm)=</pre>	<pre>er A8, 0. FLOWS UNC (ha)= Imp(%)= IMPERVIOU .14 .80 2.00 55.38 .013 162.24 10.00 1.20 10.00 .17 .04 1.00 98.15</pre>	46 hectares) CONTROLLED DOWN .46 30.00 Dir. S PERVIOUS .32 1.50 2.00 40.00 .250 71.61 10.00 (ii) 9.27 (: 10.00 .11 .05 1.00 42.82	<pre>ROAD Conn.(%)= 20.00 i) *TOTALS* .087 (iii) 1.000 53.883</pre>	· · · · · · · · · · · · · · · · · · ·
001:0035 *# Catchment SA8 (S *# NOT ROUTED INTO *# Area changed *# DESIGN STANDHYD DESIGN STANDHYD 05:000308 DT=10.00 Surface Area Dep. Storage Average Slope Length Mannings n Max.eff.Inten.(mu over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE *** WARNING: St	<pre>trittmatte POND>>>> H May 2000 - Area Total - (ha)= (mm)= (%)= (m)= (m)= (m)= (min) (min)= (min)= (cms)= (cms)= (hrs)= (mm)= (mm)= (mm)= NT = orage Coes</pre>	<pre>er A8, 0. FLOWS UNC (ha)= Imp(%)= IMPERVIOU .14 .80 2.00 55.38 .013 162.24 10.00 1.20 10.00 1.20 10.00 .17 .04 1.00 98.15 98.95 .99 fficient</pre>	46 hectares) CONTROLLED DOWN .46 30.00 Dir. S PERVIOUS .32 1.50 2.00 40.00 .250 71.61 10.00 (ii) 9.27 (: 10.00 .11 .05 1.00 42.82 98.95 .43	<pre>ROAD Conn.(%)= 20.00 i) *TOTALS* .087 (iii) 1.000 53.883 98.950 .545</pre>	· · · · · · · · · · · · · · · · · · ·

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0036-----* # *# Catchment SA9 - Strittmatter road drainage d\s of SWM area *# NOT ROUTED INTO POND>>>> FLOWS UNCONTROLLED DOWN ROAD *# (Strittmatter A9, 0.08 hectares, C= 0.95) *# _____ | DESIGN STANDHYD | Area (ha)= .08 | 09:000410 DT=10.00 | Total Imp(%)= 95.00 Dir. Conn.(%)= 95.00 _____ IMPERVIOUSPERVIOUS (i)Surface Area(ha)=.08.00Dep. Storage(mm)=.801.50Average Slope(%)=2.002.00Length(m)=23.0940.00Mannings n=.013.250 Max.eff.Inten.(mm/hr)= 162.24 56.88 over (min) 10.00 10.00 Storage Coeff. (min)= .71 (ii) 9.55 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .11

 PEAK FLOW
 (cms) =
 .03
 .00

 TIME TO PEAK
 (hrs) =
 1.00
 1.17

 RUNOFF VOLUME
 (mm) =
 98.15
 39.49

 TOTAL RAINFALL
 (mm) =
 98.95
 98.95

 RUNOFF COEFFICIENT
 =
 .99
 .40

 TOTALS .035 (iii) 1.000 95.217 98.950 .962 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0037------*# Add SWM area discharge to uncontrolled road drainage (hyd #410)

 | ADD HYD (000411) | ID: NHYD
 AREA
 QPEAK
 TPEAK
 R.V.
 DWF

 ----- (ha)
 (cms)
 (hrs)
 (mm)
 (cms)

 ID1 05:000308
 .46
 .087
 1.00
 53.88
 .000

 +ID2 07:000307
 .32
 .061
 1.00
 53.88
 .000

 +ID3 02:000406
 28.90
 .435
 1.83
 41.12
 .000

 +ID4 09:000410
 .08
 .035
 1.00
 95.22
 .000

 SUM 04:000411 29.76 .499 1.17 41.60 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0038-----*#

$: \ CORENA \ S-405 \$	CONTRACTION							
		n overflow (Areas A4		rsion to	County R	oad drai.	nage	
ADD HYD (0	00414)	ID: NHYD	AREA	QPEAK (cms)	TPEAK (brs)	R.V.	DWF	
	+ID2	03:000204	.37	.095	1.00	62.97	.000	
		02:000414						
NOTE: PE								
01:0039								
# # Add hyd: # to Coun	rograph f	tersection From Stritt 4 Drainage	rmatter Pr		yd #411)			
# ADD HYD (0)	00205)	TD. NHYD	AREA	OPEAK	ͲΡϝϪϗ	ъv		
			(ha)	(cms)	(hrs)	(mm)	(cms)	
	+ID2	02:000414 04:000411	.84 29.76	.486	1.00	41.60	.000	
		01:000205						
NOTE: PE	AK FLOWS	DO NOT INC	CLUDE BASE	FLOWS IF	ANY.			
01:0040 # Catchme:								
01:0040 # Catchme: # DESIGN STA	nt A6 frc NDHYD	om Triton S	Study (0. (ha)=	31 hectar .31	 es, C= 0	.6)		
001:0040 # Catchme: # DESIGN STA 02:000106	nt A6 frc NDHYD DT=10.00	om Triton S Area Total	Study (0. (ha)= Imp(%)= IMPERVIOUS	31 hectar .31 50.00 PERVI	es, C= 0 Dir. Con OUS (i)	.6)		
01:0040 # Catchme: # DESIGN STA 02:000106 Surface	nt A6 fro NDHYD DT=10.00 Area	om Triton S Area Total 	Study (0. (ha)= Imp(%)=	31 hectar .31 50.00 PERVI	es, C= 0 Dir. Con	.6)		
01:0040 # Catchme: # DESIGN STA 02:000106 Surface Dep. St Average	nt A6 fro NDHYD DT=10.00 Area orage	om Triton 9 Area Total (ha)= (mm)= (%)=	Study (0. (ha)= Imp(%)= IMPERVIOUS .16 .80 4.00	31 hectar .31 50.00 PERVI 1. 4.	Dir. Con OUS (i) 16 50 00	.6)		
01:0040 # Catchme: # DESIGN STA 02:000106 Surface Dep. St	nt A6 fro NDHYD DT=10.00 Area orage Slope	om Triton S Area Total 	Study (0. (ha)= Imp(%)= IMPERVIOUS .16 .80	31 hectar .31 50.00 PERVI 1. 4. 40.	Dir. Con OUS (i) 16 50 00	.6)		
001:0040 # Catchme: # DESIGN STA 02:000106 Surface Dep. St Average Length Manning	nt A6 fro NDHYD DT=10.00 Area orage Slope s n .Inten.(m	<pre>m Triton \$</pre>	(ha) = Imp(%) = IMPERVIOUS .16 .80 4.00 45.46 .013 162.24	31 hectar .31 50.00 PERVI 4. 40. .2 56.	Dir. Con OUS (i) 16 50 00 50 88	.6)		
01:0040 # Catchme: # DESIGN STA 02:000106 Surface Dep. St Average Length Manning Max.eff	nt A6 fro NDHYD DT=10.00 Area orage Slope s n .Inten.(m over	<pre>m Triton \$ Area I Total (ha) = (mm) = (%) = (m) /pre>	Study (0. (ha) = Imp(%) = IMPERVIOUS .16 .80 4.00 45.46 .013	31 hectar .31 50.00 PERVI 4. 40. .2 56. 10.	Dir. Con OUS (i) 16 50 00 50 88	.6)		
01:0040 # Catchme: # DESIGN STA: 02:000106 Surface Dep. St. Average Length Manning Max.eff Storage Unit Hy	nt A6 fro NDHYD DT=10.00 Area orage Slope s n .Inten.(m over Coeff. d. Tpeak	<pre>m Triton 9</pre>	Study (0. (ha) = Imp(%) = IMPERVIOUS .16 .80 4.00 45.46 .013 162.24 10.00 .87 10.00	31 hectar .31 50.00 PERVI	Dir. Con OUS (i) 16 50 00 50 88 00 05 (ii) 00	.6)		
01:0040 # Catchme: # DESIGN STA: 02:000106 Surface Dep. St. Average Length Manning Max.eff Storage Unit Hy	nt A6 fro NDHYD DT=10.00 Area orage Slope s n .Inten.(m over Coeff.	<pre>m Triton 9</pre>	Study (0. (ha) = Imp(%) = IMPERVIOUS .16 .80 4.00 45.46 .013 162.24 10.00 .87	31 hectar .31 50.00 PERVI	Dir. Con OUS (i) 16 50 00 50 88 00 05 (ii)	.6)	50.00	
001:0040 # Catchme: DESIGN STA 02:000106 Surface Dep. St Average Length Manning Max.eff Storage Unit Hy Unit Hy PEAK FL	nt A6 fro NDHYD DT=10.00 Area orage Slope s n .Inten.(m over Coeff. d. Tpeak d. peak	<pre>m Triton 3</pre>	Study (0. (ha) = Imp(%) = IMPERVIOUS .16 .80 4.00 45.46 .013 162.24 10.00 .87 10.00 .17 .07	31 hectar .31 50.00 PERVI	Dir. Con OUS (i) 16 50 00 00 50 88 00 05 (ii) 00 12 02	*TOTAL .08	50.00 .S* 8 (iii)	
01:0040 # Catchme: # DESIGN STA 02:000106 Surface Dep. Sta Average Length Manning Max.eff Storage Unit Hy Unit Hy PEAK FL TIME TO	nt A6 fro NDHYD DT=10.00 Area orage Slope s n .Inten.(m over Coeff. d. Tpeak d. peak OW PEAK	<pre>m Triton 3</pre>	Study (0. (ha) = Imp(%) = IMPERVIOUS .16 .80 4.00 45.46 .013 162.24 10.00 .87 10.00 .17 .07 1.00	31 hectar .31 50.00 PERVI 1. 4. 40. .2 56. 10. ii) 8. 10.	Dir. Con OUS (i) 16 50 00 50 88 00 05 (ii) 00 12 02 00	*TOTAL .08 1.00	50.00 .S* 8 (iii)	
01:0040 # Catchme: # DESIGN STA 02:000106 Surface Dep. St Average Length Manning Max.eff Storage Unit Hy Unit Hy PEAK FL TIME TO RUNOFF TOTAL R	nt A6 fro NDHYD DT=10.00 Area orage Slope s n .Inten.(n over Coeff. d. Tpeak d. peak OW PEAK VOLUME AINFALL	<pre>m Triton 3</pre>	Study (0. (ha) = Imp(%) = IMPERVIOUS .16 .80 4.00 45.46 .013 162.24 10.00 .87 10.00 .17 .07 1.00 98.15 98.95	31 hectar .31 50.00 PERVI	<pre>Dir. Con OUS (i) 16 50 00 00 50 88 00 05 (ii) 00 12 02 00 51 95</pre>	*TOTAL .08 1.00 68.83 98.95	50.00 50.00 88 (iii) 90 33 90	
01:0040 # Catchme: # DESIGN STA 02:000106 Surface Dep. Sta Average Length Manning Max.eff Storage Unit Hy Unit Hy PEAK FL TIME TO RUNOFF TOTAL R RUNOFF	nt A6 fro NDHYD DT=10.00 Area orage Slope s n .Inten.(n over Coeff. d. Tpeak d. peak OW PEAK VOLUME AINFALL COEFFICIE RNING: St	<pre>m Triton 3</pre>	Study (0. (ha) = Imp(%) = IMPERVIOUS .16 .80 4.00 45.46 .013 162.24 10.00 .87 10.00 .17 .07 1.00 98.15 98.95 .99 fficient i	31 hectar .31 50.00 PERVI	<pre>Dir. Con OUS (i) 16 50 00 00 50 88 00 05 (ii) 00 12 02 00 51 95 40 c than DI</pre>	*TOTAL .08 1.00 68.83 98.95 .69	50.00 50.00 88 (iii) 90 33 90	
01:0040 # Catchme: # DESIGN STA: 02:000106 Surface Dep. Sta Average Length Manning Max.eff Storage Unit Hy Unit Hy PEAK FL TIME TO RUNOFF TOTAL R RUNOFF *** WA (i) C	nt A6 fro NDHYD DT=10.00 Area orage Slope s n .Inten.(m over Coeff. d. Tpeak d. peak OW PEAK VOLUME AINFALL COEFFICIE RNING: St US N PROCEDU	om Triton S Area Area Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = CNT = corage Coe se a smalle	Study (0. (ha) = Imp(%) = IMPERVIOUS .16 .80 4.00 45.46 .013 162.24 10.00 .87 10.00 .17 .07 1.00 98.15 98.95 .99 fficient i er DT or a ED FOR PEF	31 hectar .31 50.00 PERVI	<pre>Dir. Con Dir. Con OUS (i) 16 50 00 00 50 88 00 05 (ii) 00 12 02 00 51 95 40 c than DI area. SSES:</pre>	*TOTAL .08 1.00 68.83 98.95 .69	50.00 50.00 88 (iii) 90 33 90	
001:0040 # Catchme: DESIGN STA: 02:000106 Surface Dep. St. Average Length Manning Max.eff Storage Unit Hy Unit Hy PEAK FL TIME TO RUNOFF *** WA (i) C	nt A6 fro NDHYD DT=10.00 Area orage Slope s n .Inten.(m over Coeff. d. Tpeak d. peak OW PEAK VOLUME AINFALL COEFFICIE RNING: St US N PROCEDU CN* = 6	om Triton S Area Area Total (ha) = (mm) = (%) = (m) = (m) = (min) (min) = (cms) = (cms) = (hrs) = (mm) = (mm) = CNT = corage Coe se a smalle	Study (0. (ha) = Imp(%) = IMPERVIOUS .16 .80 4.00 45.46 .013 162.24 10.00 .87 10.00 .17 .07 1.00 98.15 98.95 .99 fficient i er DT or a ED FOR PEH = Dep. St	31 hectar .31 50.00 PERVI	Dir. Con OUS (i) 16 50 00 00 50 88 00 05 (ii) 00 12 02 00 51 95 40 c than DT area. SES: above)	*TOTAL .08 1.00 68.83 98.95 .69	50.00 50.00 88 (iii) 90 33 90	

THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0041-----*# Add hydrograph from Catchments A6 to Upstream Hydrograph | ADD HYD (000206) | ID: NHYD AREA QPEAK TPEAK R.V. DWF (ha) (cms) (hrs) (mm) (cms) ID1 01:000205 30.60 .938 1.00 42.18 .000 +ID2 02:000106 .31 .088 1.00 68.83 .000 SUM 03:000206 30.91 1.027 1.00 42.45 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0042-----*# *# Catchment A7 from Triton Study (0.24 hectares, C= 0.7) *# | DESIGN STANDHYD | Area (ha)= .24 | 01:000107 DT=10.00 | Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00 IMPERVIOUS PERVIOUS (i) Surface Area(ha) =.14Dep. Storage(mm) =.80Average Slope(%) =2.00Length(m) =40.00Mannings n=.013 .10 1.50 2.00 40.00 .250 Max.eff.Inten.(mm/hr)= 162.24 56.88 over (min) 10.00 10.00 Storage Coeff. (min)= .99 (ii) 9.83 (ii) Unit Hyd. Tpeak (min)= 10.00 10.00 Unit Hyd. peak (cms)= .17 .11 *TOTALS*

 PEAK FLOW
 (cms) =
 .06
 .01
 .075

 TIME TO PEAK
 (hrs) =
 1.00
 1.17
 1.000

 RUNOFF VOLUME
 (mm) =
 98.15
 39.51
 74.696

 TOTAL RAINFALL
 (mm) =
 98.95
 98.950
 98.950

 RUNOFF COEFFICIENT
 =
 .99
 .40
 .755

 .075 (iii) 1.000 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001:0043-----*# *# Catchment A8 from Triton Study (0.30 hectares, C= 0.7) *# | DESIGN STANDHYD | Area (ha)= .30 | 02:000108 DT=10.00 | Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00 IMPERVIOUS PERVIOUS (i) Page 19 R.J. Burnside & Associates Ltd. R.J.B. File: S-405

# DESI 02:0	GN STAND 00109 DT=	HYD =10.00	Area Total	(ha)= Imp(%)=	.32 60.00	Dir. Con	n.(%)=	60.00
# 								
	atchment	A9 fro	om Triton S	Study (0.3	32 hectar	es, C= 0	.7)	
NOT	E: PEAK	FLOWS	DO NOT INC	CLUDE BASEI	FLOWS IF A	ANY.		
				31.45			<u> </u>	
		+ID2	04:000207		(cms) 1.027 .171			
			03:000206	(ha)	(cms)	(hrs)	(mm)	(cms)
- A0	dd summed	d hydro	ographs fro	om Catchmer AREA		to Upst		
)1:00	45							
NOTI	E: PEAK			CLUDE BASE			-	
				.54	==========			
		ID1 +ID2	02:000108 01:000107	(ha) .30 .24	.096 .075	$1.00 \\ 1.00$	74.70 74.70	.000 .000
			τυ. ΜΠΙΟ	AREA (ha)	(CMS)	(hrs)	(mm)	(cms)
						ת הסה זע	77 0	ज्य ज्य
				nments A7 a				
				INCLUDE BAS				
	THAN	I THE S	STORAGE COR					
	CN*	· = (54.0 Ia	ED FOR PERV = Dep. Sto	orage (Al	oove)		
				er DT or a	-			
		ING: St	torage Coet	Eficient is	s smaller	than DT		
T	OTAL RAIN	IFALL	(mm) =	98.95 .99	98.9	95	98.95	50
T	IME TO PE	LAK	(hrs)=	1.00 98.15	1.0	00	1.00)0
PI	EAK FLOW		(cms) =	.08	() 1	*TOTAI	96 (iii)
Uı	nit Hyd.	Tpeak	(min) =	10.00	10.0	00		
		over	(min)	10.00 .86 (i	10.0	00		
M				.013 162.24				
Ma				010	0.1			
Le	ength annings r		(m) =	4.00 44.72	40.0	00		

.13 1.50 .20

 Surface Area
 (ha) =
 .19

 Dep. Storage
 (mm) =
 .80

 Average Slope
 (%) =
 .20

 Length
 (m) =
 46.19

 Mannings n
 =
 .013

 40.00 .250 Max.eff.Inten.(mm/hr)= 162.24 49.00 over (min) 10.00 20.00 Storage Coeff. (min)= 2.15 (ii) 20.88 (ii) Unit Hyd. Tpeak (min)= 10.00 20.00 Unit Hyd. peak (cms)= .17 .05 .05 *TOTALS*

 PEAK FLOW
 (cms) =
 .09
 .01

 TIME TO PEAK
 (hrs) =
 1.00
 1.33

 RUNOFF VOLUME
 (mm) =
 98.15
 39.52

 TOTAL RAINFALL
 (mm) =
 98.95
 98.95

 RUNOFF COEFFICIENT
 =
 .99
 .40

 .091 (iii) 1.000 74.696 98.950 .755 *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: $CN^* = 64.0$ Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. _____ 001:0047-----*# Add hydrograph from Catchments A9 to upstream drainage *# *# THIS IS THE FLOW AT MH 56 WHICH IS THE LIMITING CONSTRAINT.... *# 5 year - 0.68 cms *# 100 year - 1.29 cms *# ____ | ADD HYD (000209) | ID: NHYD AREA QPEAK TPEAK R.V. DWF (ha) (cms) (hrs) (mm) (cms) ID1 01:000208 31.45 1.198 1.00 43.00 .000 +ID2 02:000109 .32 .091 1.00 74.70 .000 SUM 03:000209 31.77 1.289 1.00 43.32 .000 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 001:0048-----*# *# Catchment A10 from Triton Study (0.21 hectares, C= 0.7) *# _____ | DESIGN STANDHYD | Area (ha)= .21 | 04:000110 DT=10.00 | Total Imp(%)= 60.00 Dir. Conn.(%)= 60.00 IMPERVIOUSPERVIOUS (i)Surface Area(ha)=.13.08Dep. Storage(mm)=.801.50Average Slope(%)=1.001.00Length(m)=37.4240.00Mannings n=.013.250 Max.eff.Inten.(mm/hr)= 162.24 56.88 over (min) 10.00 10.00

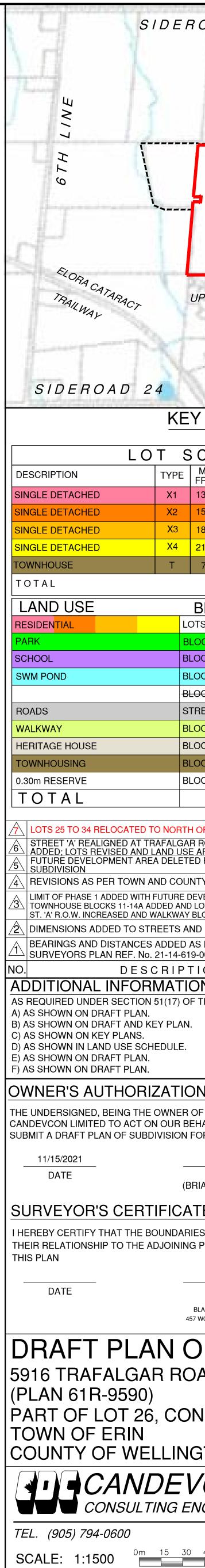
R.J. Burnside & Associates Ltd. Page 21

R.J.B. File: S-405

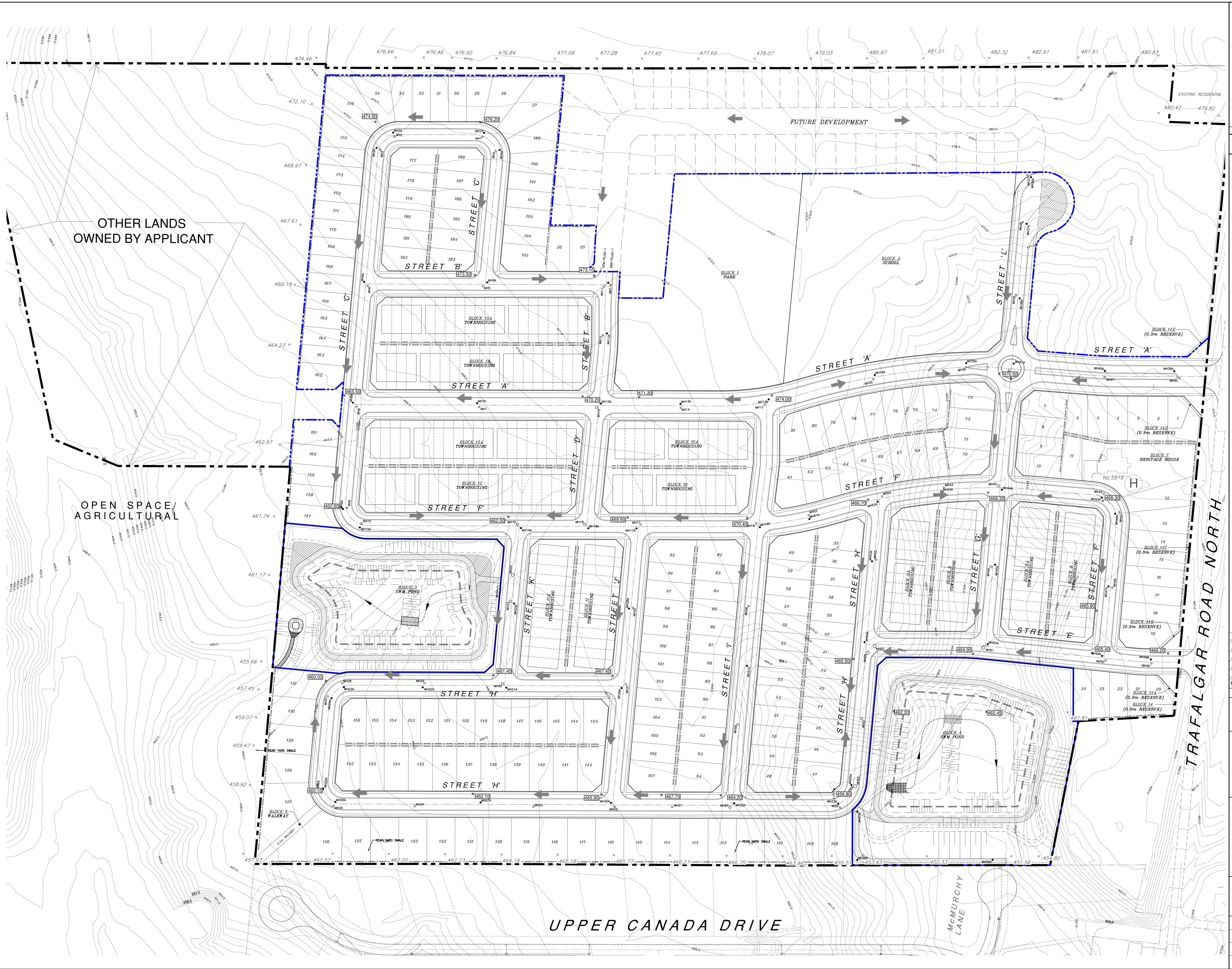
	The second second second second second second second second second second second second second second second se	ak (min)=	10.00	10.0	06 (ii) 00		
	Unit Hyd. pea	k (cms) =	.17	• -	10	****	0+
	PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFAL RUNOFF COEFFI	(hrs) = (mm) = L (mm) = CIENT =	1.00 98.15 98.95 .99	1.1 39.5 98.9	17 51 95 40	1.00 74.69 98.95 .75	5 (iii) 0 6 0
	*** WARNING:	Storage Coef Use a smalle				!	
				-			
		EDURE SELECTE 64.0 Ia					
		EP (DT) SHOUL					
		E STORAGE COE					
	(iii) PEAK FL	OW DOES NOT I	NCLUDE BA	SELTOM IL	ANY.		
*# 2	049Add hydrograp Rodd hydrograp	h from Catchm	ent A10 to	o Upstream	n Hydrog	raph	
	 HYD (000204)	 TD• NHYD	APFA	OPFAK	ͲϽϜϠϗ		DWE
			(ha)	(Cms)	(hrs)	(mm)	(cms)
	I	D1 03:000209	31.77	1.289	1.00	43.32	.000
		D2 04:000110					
		UM 01:000204					
NO	TE: PEAK FLO	WS DO NOT INC	LUDE BASE	FLOWS IF A	ANY.		
001:00	050 FINISH ************	****				 	****
001:00	050 FINISH	**************************************				****	****
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Use a smaller DT or a larger area. 0018 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0022 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0023 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0025 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0026 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0028 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0034 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0035 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0036 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0040 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0042 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0043 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0046 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. 0048 DESIGN STANDHYD *** WARNING: Storage Coefficient is smaller than DT! Use a smaller DT or a larger area. Simulation ended on 2000-06-01 at 10:47:44 _____ DRAWINGS

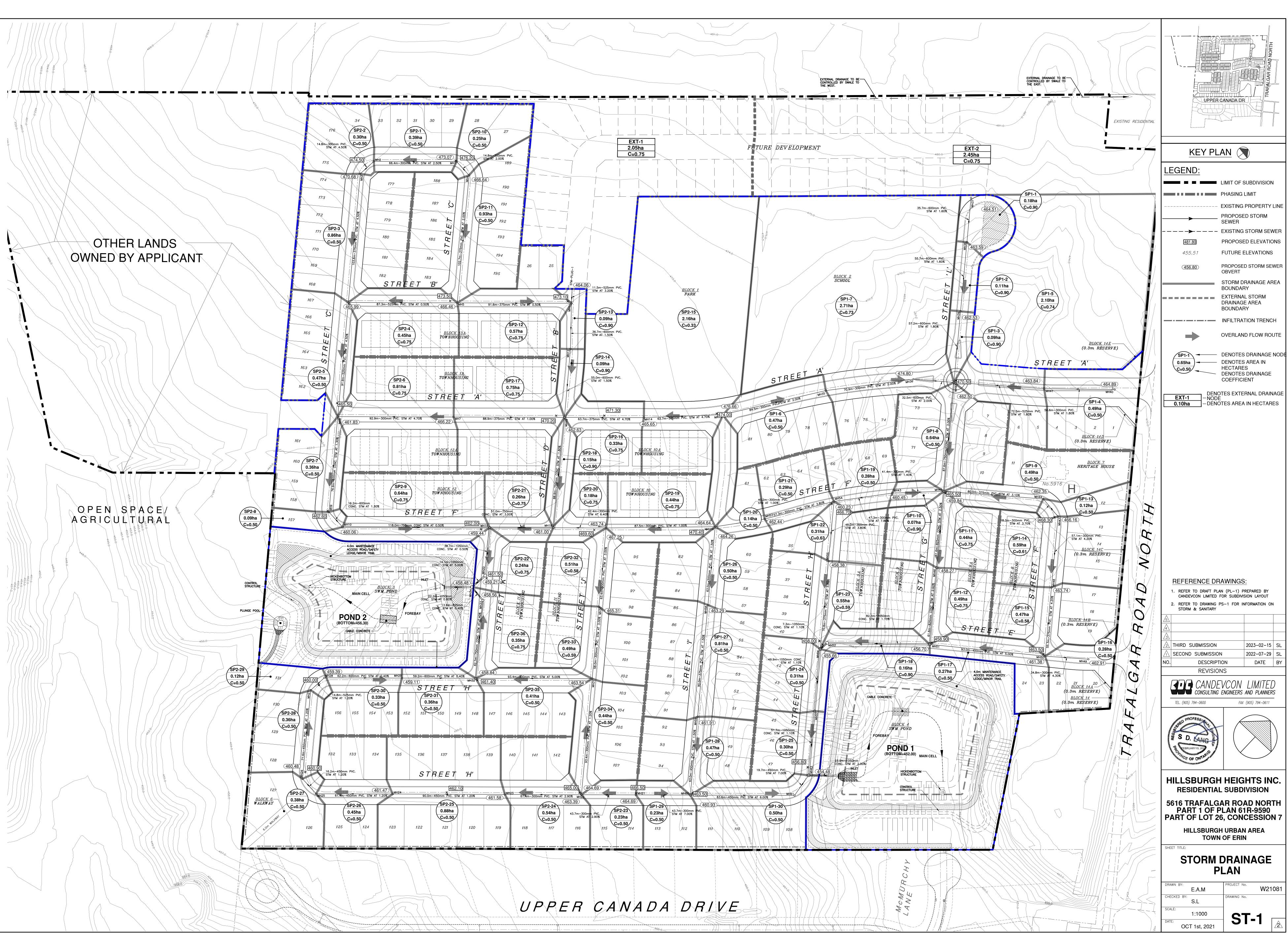




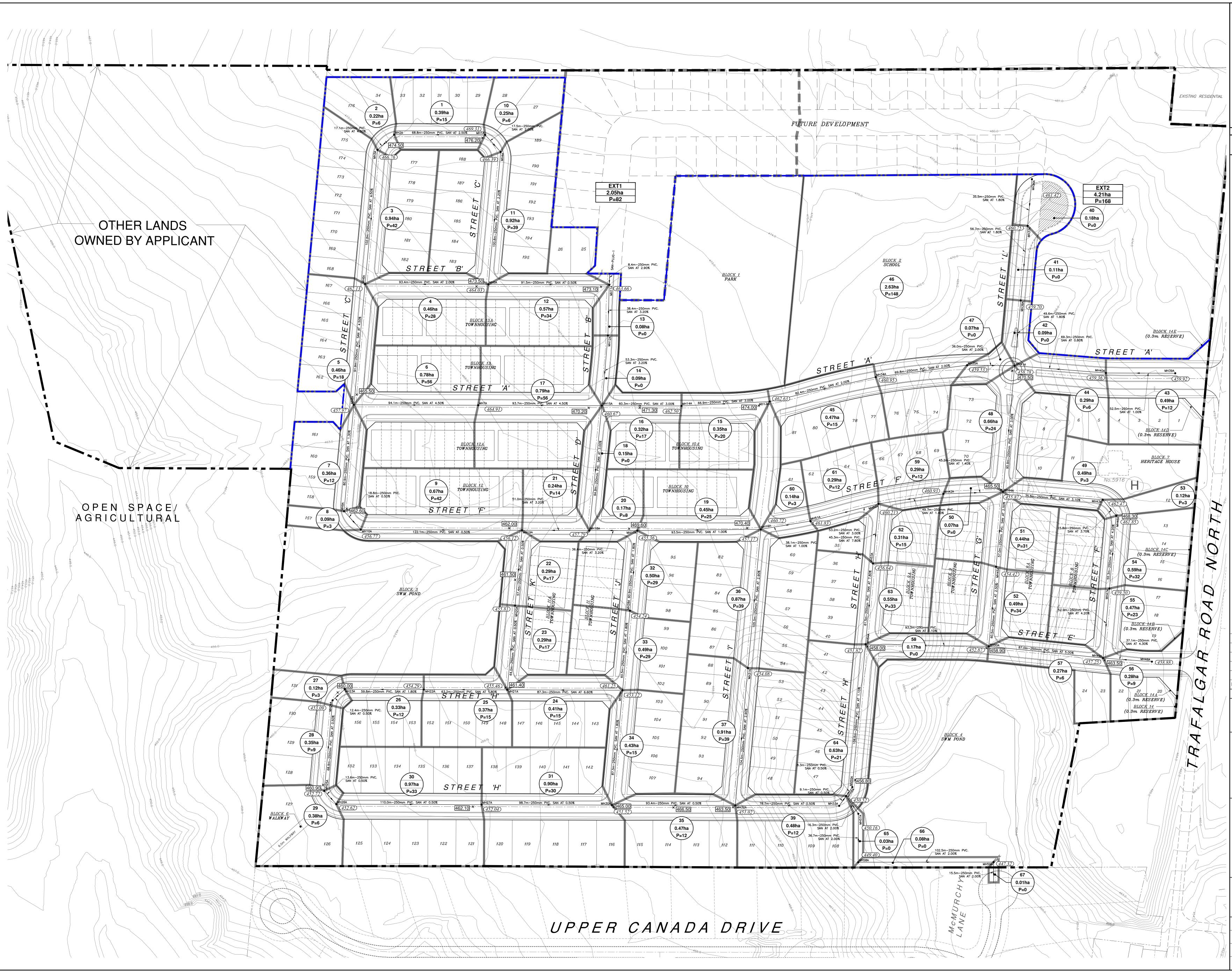
OAD 27		TRAFALGAR ROAD WORT	HINON
IPPER CANADA DRIVI			JMBER
13.7m (45.0') 35.0m (114) 15.2m (50.0') 35.0m (114)	,		116 41
18.3m (60.0') 35.0m (114 21.3m (70.0') 35.0m (114			14 24
7.5m (24.6') 35.0m (114	4.8') ⁻		174
BLOCK / LOT		⁹⁵ REA	369
TS 1-195 <mark>OCK 1</mark>	11.63 ha <mark>1.75 ha</mark>	``	74 Ac.) <mark>32 Ac.)</mark>
OCK 2 OCKS 3-4	2.27 ha 4.09 ha		
OCK 5 REETS A-L	8.75 ha	(21 6	(2 Ac)
OCK 6	0.04 ha	. (0.1	0 Ac.)
OCK 7 OCKS 8-13A (174 UNITS)	0.29 ha 5.13 ha	,	,
OCKS 14-14E	0.01 ha 33.96 ha	-	
OF STREETS 'B' AND 'C' ROAD NORTH; STREET 'L' AREAS UPDATED. D FROM LIMIT OF TY COMMENTS EVELOPMENT BLOCKS 5-5A; LOT WIDTHS REVISED; BLOCKS. S PER BSR&D LAND -00, DATED JAN., 7th 2022 I O N DN THE PLANNING ACT (R.S. G) AS SHOWN ON DR H) MUNICIPAL SERVIO I) SOIL IS CLAYEY SI J) AS SHOWN ON DR K) MUNICIPAL SERVIO L) NONE. DESCRET LANDS	23.08.20 27.07.20 17.06.20 04.02.20 07.01.20 07.01.20 07.01.20 07.01.20 07.01.20 07.01.20 07.01.20 07.01.20 07.01.20 07.01.20	22 D.H 22	(.H. (.H. <t< td=""></t<>
HALF AS AGENTS AND TO OR APPROVAL. HILLSBURGH HEIGHT RIARWOOD DEVELOPMEN TE: ES OF THE LAND TO BE S	S INC. NTS GROU	 JP) Ed Ani	D
RAYMOND J. SIBTH ONTARIO LAND SURVEYC BLACK, SHOEMAKER, ROBINSON & DO WOODLAWN ROAD WEST, UNIT 101 TEL.(519)822-1220 www.jdbar OF SUBD AD NORTH	ORS DNALDSON LT GUELPH ONT mes.com	ARIO)N
GTON /CON LII VGINEERS AND FAX (90 45 60 DWG. N	PLANI 05) 794-	NER: 0611	
PROJECT N	o. W	210	81



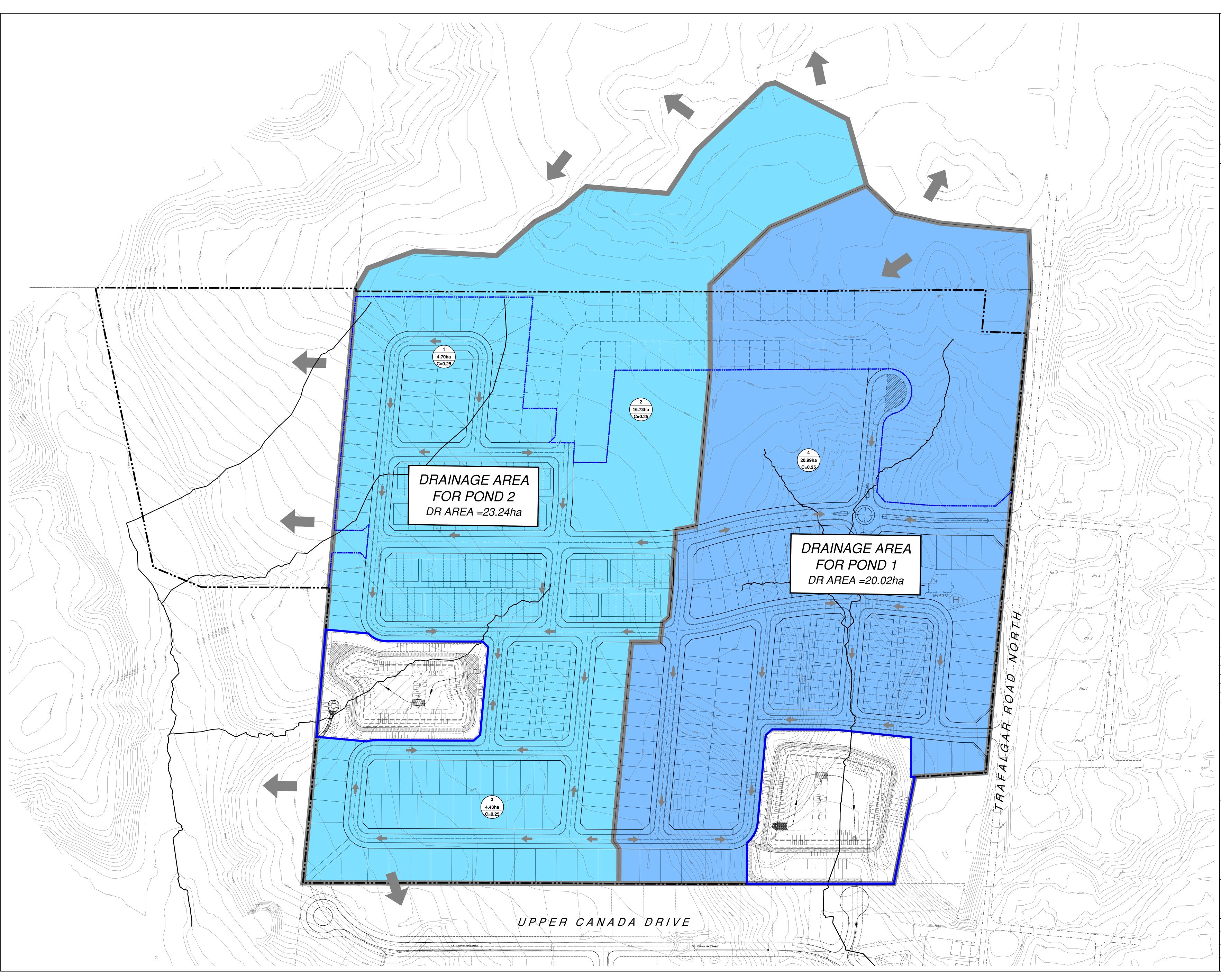
FUTURE DEVELOPMENT UPRER CANADA DR KEY PLAN LEGEND: ■ ■ ■ LIMIT OF SUBDIVISION PHASING LIMIT – EXISTING PROPERTY LINE PROPOSED ELEVATIONS 481.80 EXISTING ELEVATIONS 455.51 ------ INFILTRATION TRENCH REAR YARD SWALE OVERLAND FLOW ROUTE **REFERENCE DRAWINGS:** REFER TO DRAFT PLAN (PL-1) PREPARED BY CANDEVCON LIMITED FOR SUBDIVISION LAYOUT . REFER TO DRAWING PS-1 FOR INFORMATION ON STORM, SANITARY & FDC THIRD SUBMISSION 2023-02-15 2022-07-29 S SECOND SUBMISSION DATE B DESCRIPTION REVISIONS CANDEVCON LIMITED TEL. (905) 794–0600 FAX (905) 794–0611 D. KAN HILLSBURGH HEIGHTS INC. **RESIDENTIAL SUBDIVISION** 5616 TRAFALGAR ROAD NORTH PART 1 OF PLAN 61R-9590 PART OF LOT 26, CONCESSION 7 HILLSBURGH URBAN AREA TOWN OF ERIN SHEET TITLE: PRELIMINARY GRADING PLAN DRAWN BY: ROJECT No. W21081 E.A.M CHECKED BY: DRAWING No. S.L 1:1000 **GR-1** OCT 1st, 2021



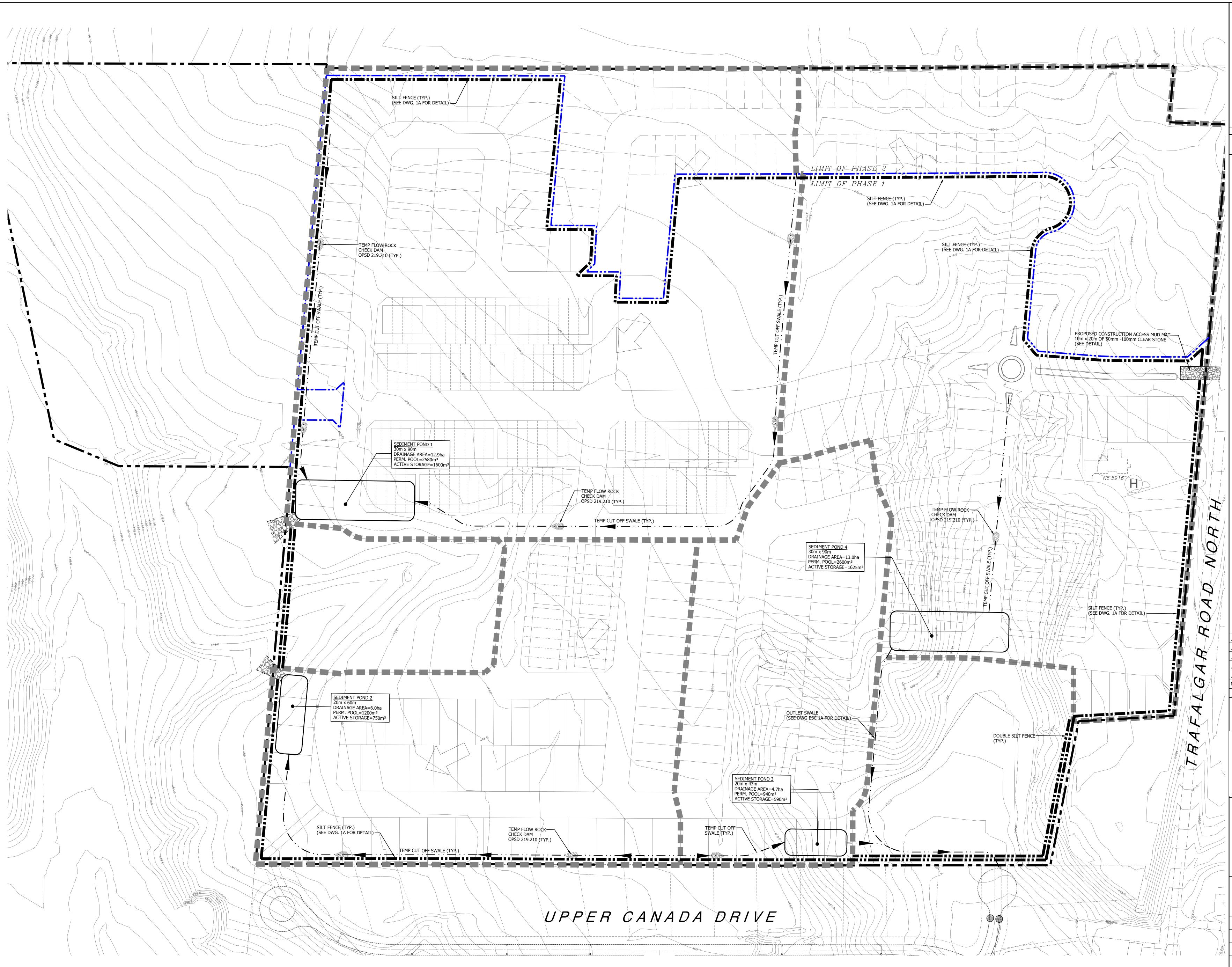
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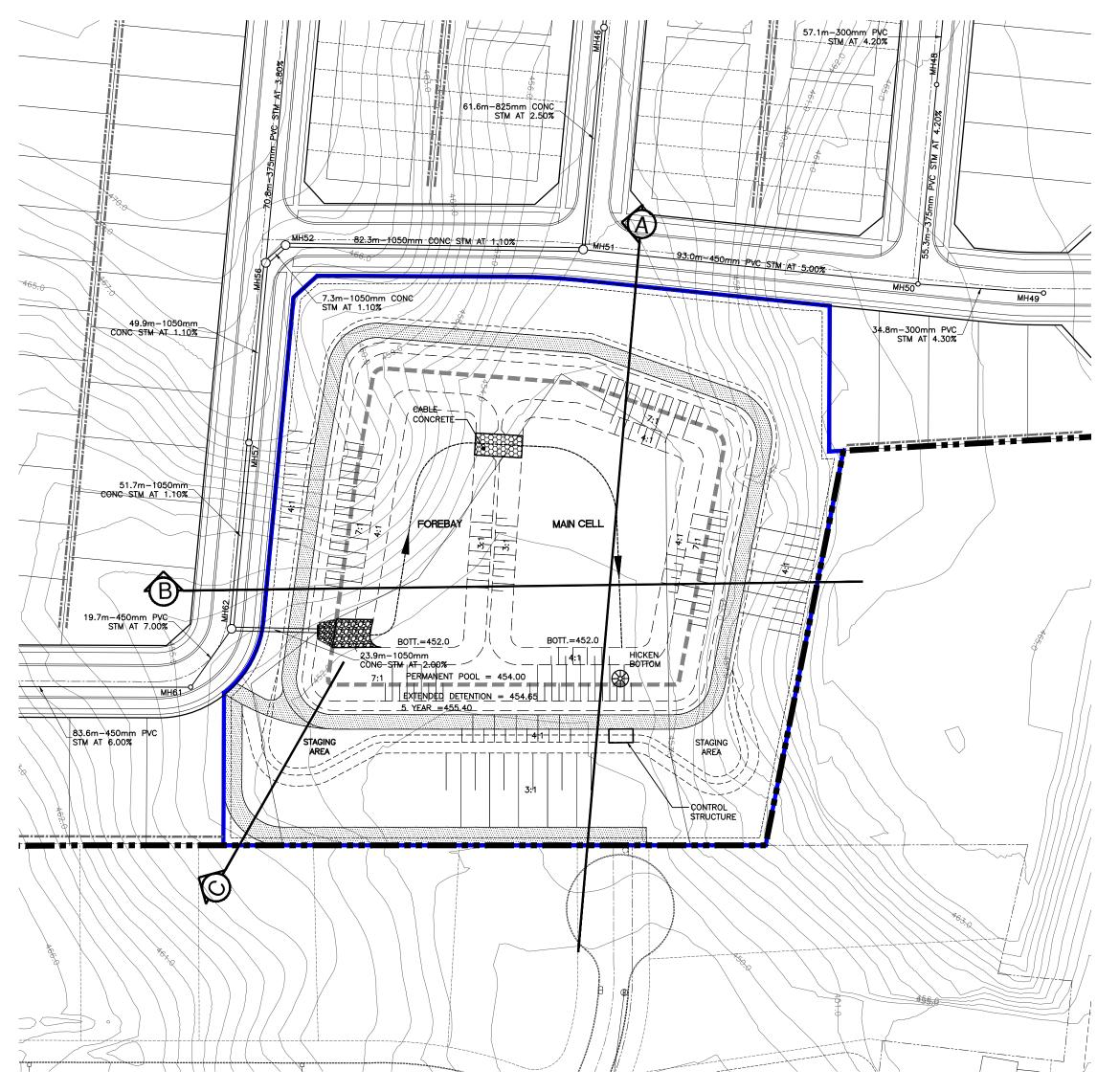
╱┶┅┅╦╘╺╘┯╘ӷ╍┝┉╘┉╴ STREET 'H' W KEY PLAN LEGEND: LIMIT OF SUBDIVISION PHASING LIMIT PROPOSED SAN SEWER EXISTING SAN SEWER · _ _ _ _ _ _ 481.80 PROPOSED ROAD GRADE (476.65) PROPOSED SAN SEWER INVERT SANITARY DRAINAGE AREA BOUNDARY EXTERNAL SANITARY DRAINAGE AREA BOUNDARY — DENOTES AREA NUMBER 0.56ha DENOTES AREA IN HECTARES DENOTES EQUIVALENT POPULATION **REFERENCE DRAWINGS:** REFER TO DRAFT PLAN (PL-1) PREPARED BY CANDEVCON LIMITED FOR SUBDIVISION LAYOUT REFER TO DRAWING PS-1 FOR INFORMATION ON STORM & SANITARY. 2023-02-15 THIRD SUBMISSION 2022-07-29 SECOND SUBMISSION DESCRIPTION DATE B REVISIONS CANDEVCON LIMITED TEL. (905) 794–0600 FAX (905) 794–0611 S D. LANG FEBRUARY15, 2 HILLSBURGH HEIGHTS INC. **RESIDENTIAL SUBDIVISION** 5616 TRAFALGAR ROAD NORTH PART 1 OF PLAN 61R-9590 PART OF LOT 26, CONCESSION 7 HILLSBURGH URBAN AREA TOWN OF ERIN SHEET TITLE: SANITARY DRAINAGE PLAN RAWN BY: OJECT No. E.A.M W21081 CHECKED BY: RAWING No. S.L 1:1000 SA-1 度 OCT 1st, 2021



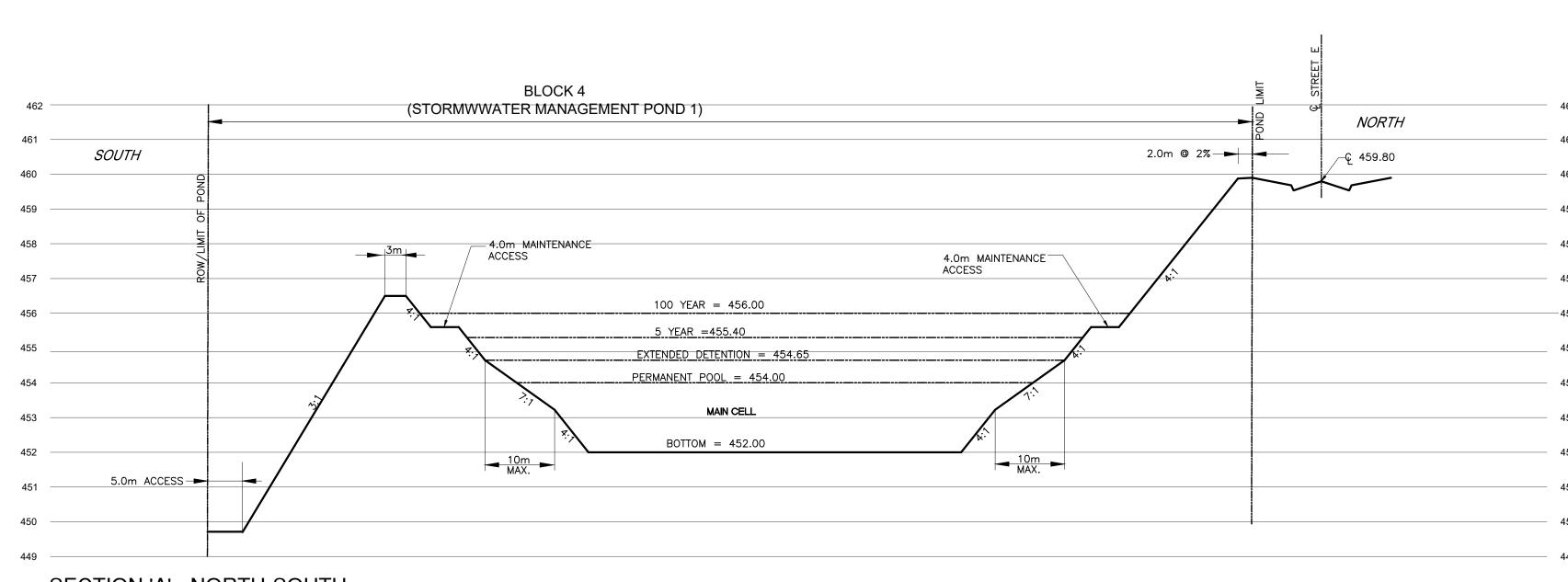
╸╪_{╴─────}╶╸╮┯╥╥╥_╹┍┓╷╖╷╖╖╖╖╴╴ FUTURE DEVELOPMENT UPPER CANADA DR KEY PLAN LEGEND: PHASING LIMIT PROPOSED SWM POND DRAINAGE AREA BOUNDARY OVERLAND FLOW ROUTE **REFERENCE DRAWINGS:** 1. REFER TO DRAFT PLAN (PL-1) PREPARED BY CANDEVCON LIMITED FOR SUBDIVISION LAYOUT REFER TO DRAWING PS-1 FOR INFORMATION ON STORM, SANITARY & FDC THIRD SUBMISSION 2023-02-15 SECOND SUBMISSION 2022-07-29 S DESCRIPTION DATE B REVISIONS CANDEVCON LIMITED TEL. (905) 794–0600 FAX (905) 794–0611 S D. LANG FEBRUARY15, 20 HILLSBURGH HEIGHTS INC. **RESIDENTIAL SUBDIVISION** 5616 TRAFALGAR ROAD NORTH PART 1 OF PLAN 61R-9590 PART OF LOT 26, CONCESSION 7 HILLSBURGH URBAN AREA TOWN OF ERIN PREDEVELOPMENT SWM POND DRAINAGE **AREA PLAN** DRAWN BY: DJECT No. W21081 E.A.M CHECKED BY: DRAWING No. S.L PDR-1 CALE 1:750 2OCT 1st, 2021

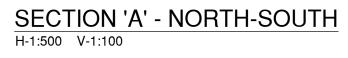


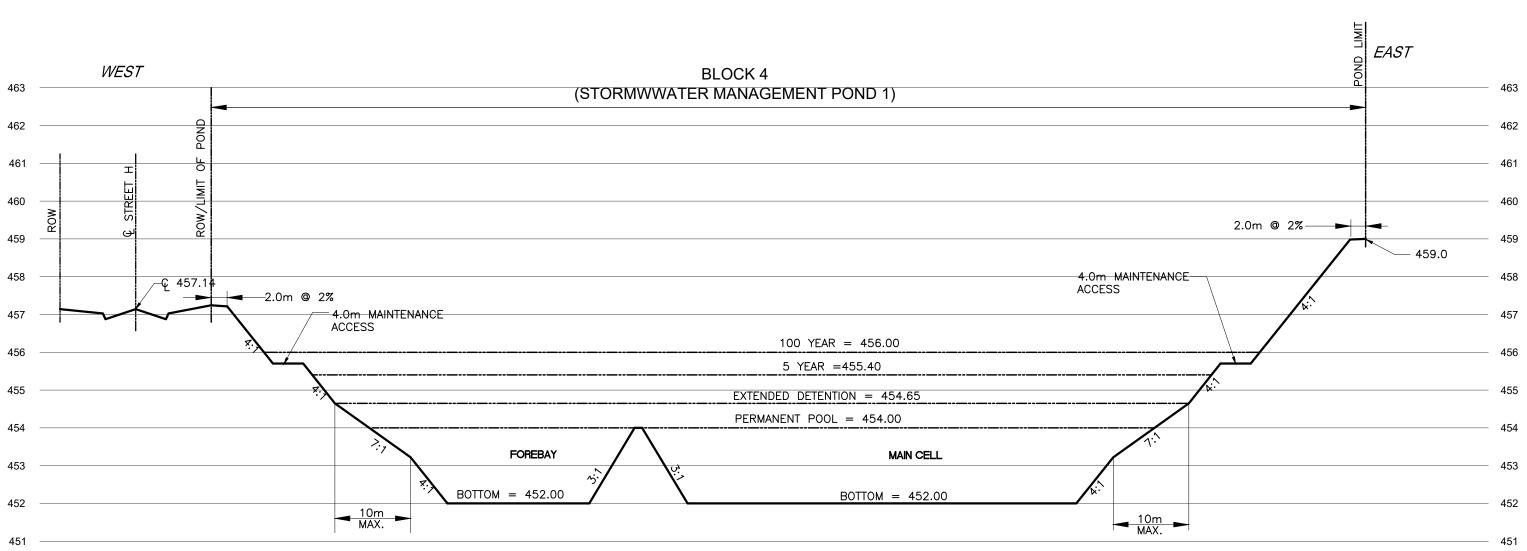
FUTURE DEVELOPMENT E ╶┥┥┥╘╝┍┥┥┥┥┥╹╸ UPPER CANADA DR KEY PLAN 🕅 LEGEND: EX.MH1 🔿 EXISTING STORM MAINTENANCE HOLE EXISTING SANITARY EX.MH1A 🌒 MAINTENANCE HOLE SUBDIVISION BOUNDARY SILT FENCE DOUBLE SILT FENCE CUT-OFF SWALE DRAINAGE AREA BOUNDARY CONSTRUCTION ACCESS MUD MAT (10m WIDE c/w 202020 THE THICKNESS OF 300mm OF 50mm TO 100mm CLEAR STONE CATCHBASIN SEDIMENT CONTROL PROTECTION FLOW ARROW **REFERENCE DRAWINGS:** . REFER TO DRAFT PLAN (PL-1) PREPARED BY CANDEVCON LIMITED FOR SUBDIVISION LAYOUT 2. REFER TO DRAWING PS-1 FOR INFORMATION ON STORM, SANITARY & FDC 2023-02-15 THIRD SUBMISSION 2022-07-29 SECOND SUBMISSION DESCRIPTION DATE B REVISIONS CANDEVCON LIMITED TEL. (905) 794–0600 FAX (905) 794–0611 S D. KAN HILLSBURGH HEIGHTS INC. **RESIDENTIAL SUBDIVISION** 5616 TRAFALGAR ROAD NORTH PART 1 OF PLAN 61R-9590 PART OF LOT 26, CONCESSION 7 HILLSBURGH URBAN AREA **TOWN OF ERIN** SHEET TITLE: **EROSION & SEDIMENT** CONTROL PLAN RAWN BY: W21081 E.A.M CHECKED BY: RAWING No. S.L ESC-1 1:1000 OCT 1st, 2021



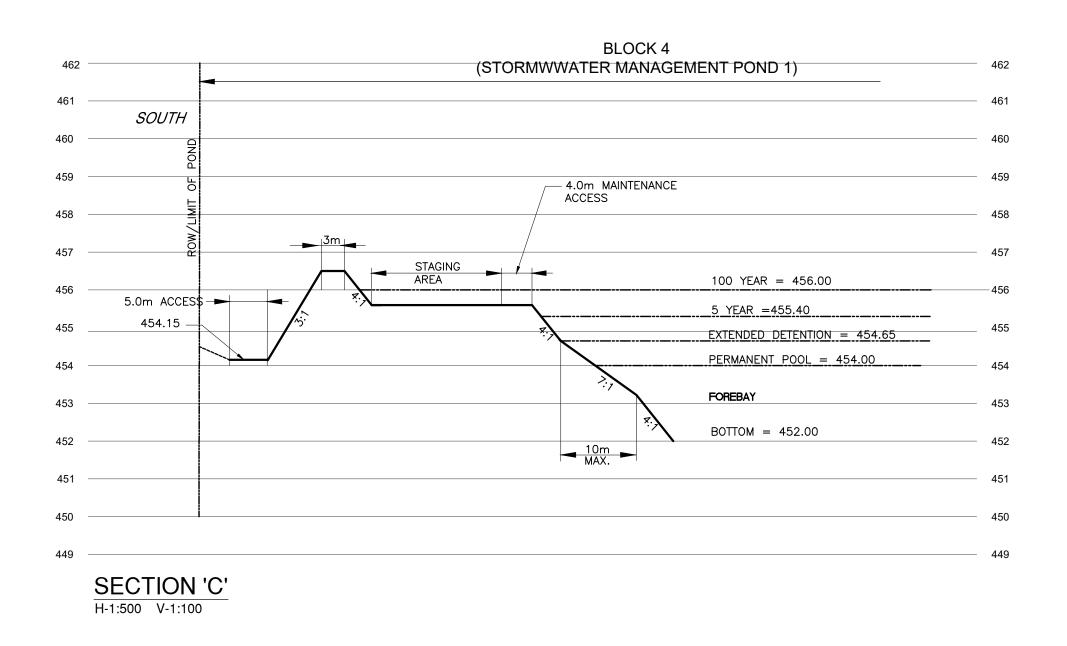




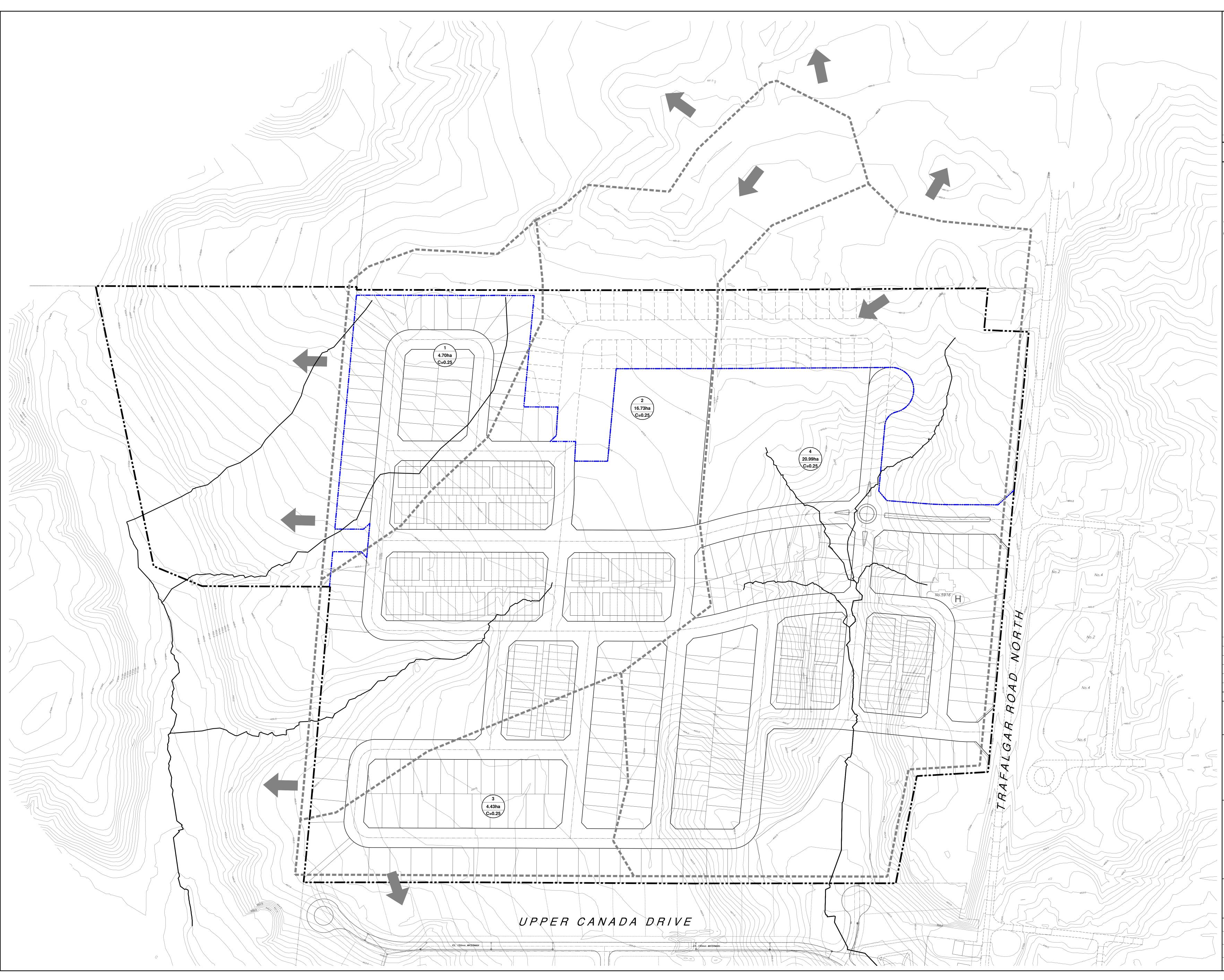




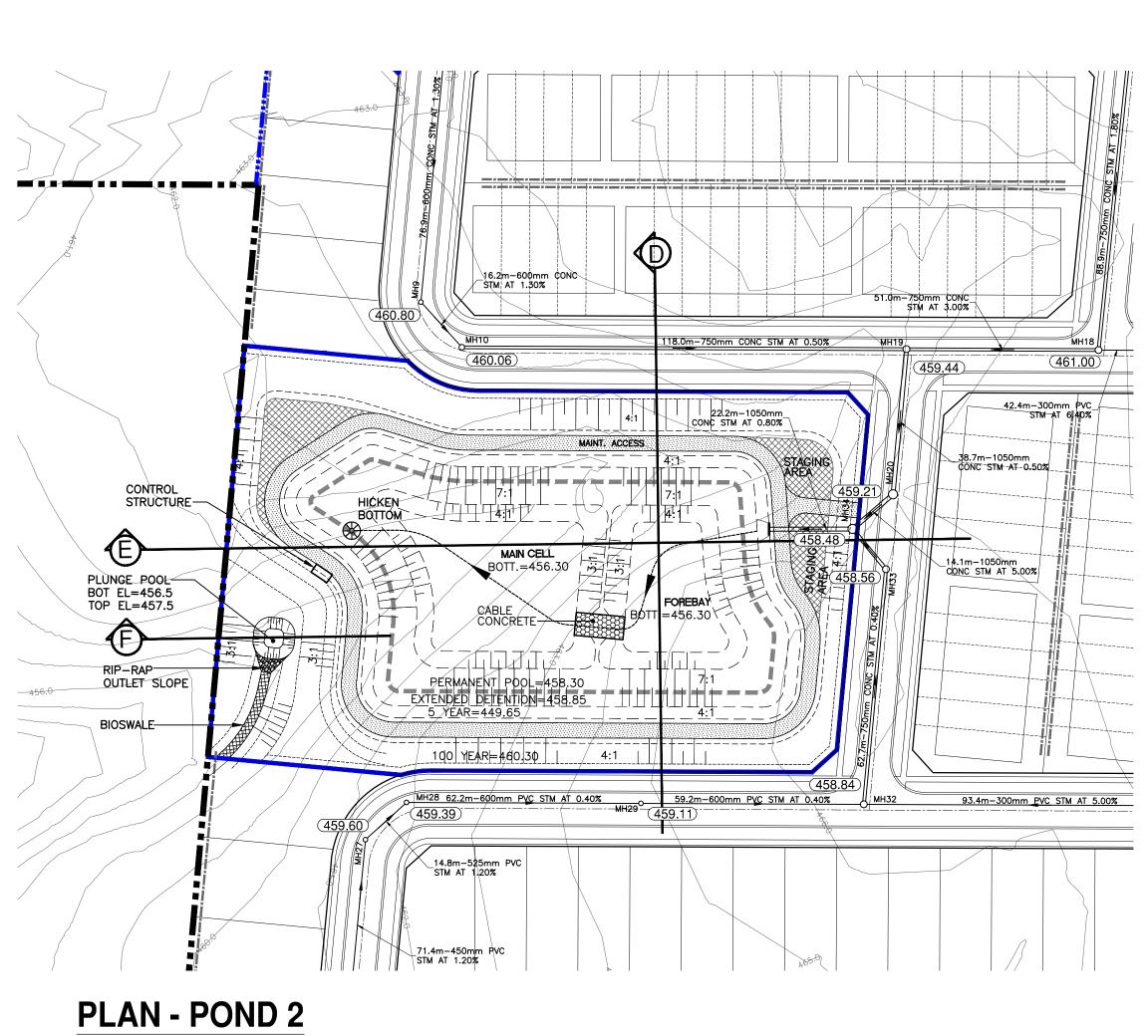




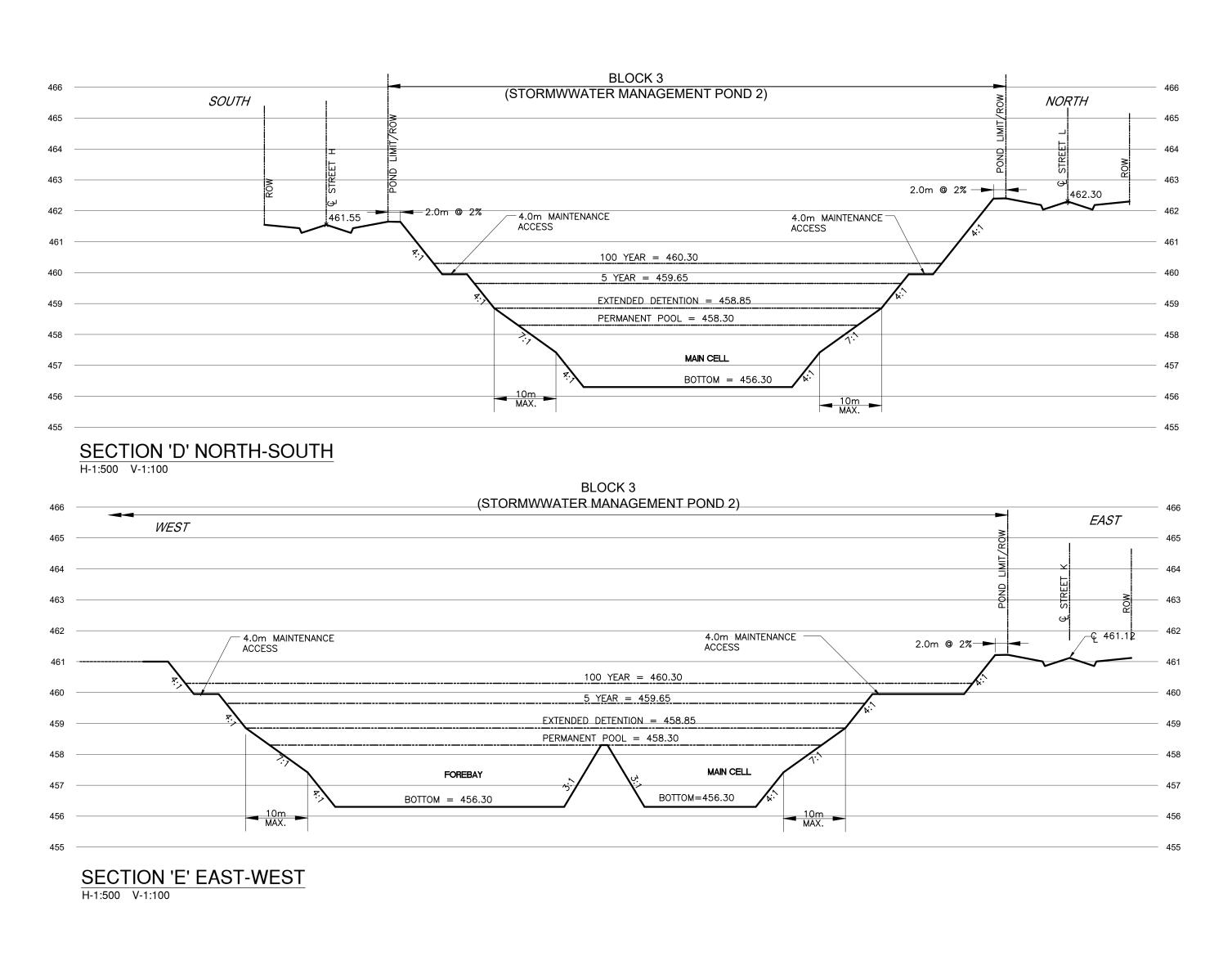
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		ICON NGINEERS	LIMITEL AND PLANNER) S			
	TEL. (905) 794–0600	FAX	(905) 794–0611				
S D. CAAIC FEBRUARY15, 203							
HILLSBURGH HEIGHTS INC.							
RESIDENTIAL SUBDIVISION							
5616 TRAFALGAR ROAD NORTH PART 1 OF PLAN 61R-9590 PART OF LOT 26, CONCESSION 7							
PART OF LOT 26, CONCESSION 7 HILLSBURGH URBAN AREA							
SHEET	TOWN	of Erii	N				
STORM WATER MANAGEMENT - POND 1 PLAN & SECTIONS							
DRAWN	E.A.M	PROJECT N	W21	081			
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DATE:	OCT 1st, 2021		,	■ <u>^</u> 2			

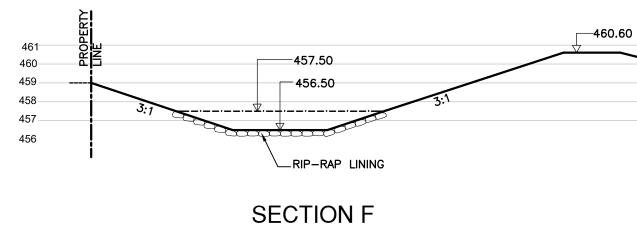


╱┶┅┅╦╘╺╘┯╘ӷ╍┝┉╘┉╴ STREET 'H' KEY PLAN LEGEND: PHASING LIMIT - EXISTING PROPERTY LINE ---- EXISTING STORM SEWER EXISTINGDRAINAGE AREA BOUNDARY OVERLAND FLOW ROUTE SP1-1 - DENOTES DRAINAGE NODE 0.65ha - DENOTES AREA IN C=0.50 HECTARES DENOTES DRAINAGE COEFFICIENT **REFERENCE DRAWINGS:** 1. REFER TO DRAFT PLAN (PL-1) PREPARED BY CANDEVCON LIMITED FOR SUBDIVISION LAYOUT 2. REFER TO DRAWING PS-1 FOR INFORMATION ON STORM & SANITARY THIRD SUBMISSION 2023-02-15 S 2022-07-29 S SECOND SUBMISSION DATE BY DESCRIPTION REVISIONS CANDEVCON LIMITED TEL. (905) 794–0600 FAX (905) 794–0611 S D. BANT HILLSBURGH HEIGHTS INC. **RESIDENTIAL SUBDIVISION** 5616 TRAFALGAR ROAD NORTH PART 1 OF PLAN 61R-9590 PART OF LOT 26, CONCESSION 7 HILLSBURGH URBAN AREA TOWN OF ERIN SHEET TITLE: EXISTING DRAINAGE PLAN DRAWN BY: ROJECT No. W21081 E.A.M CHECKED BY: DRAWING No. S.L EX-DR-1 CALE 1:750 OCT 1st, 2021

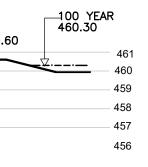


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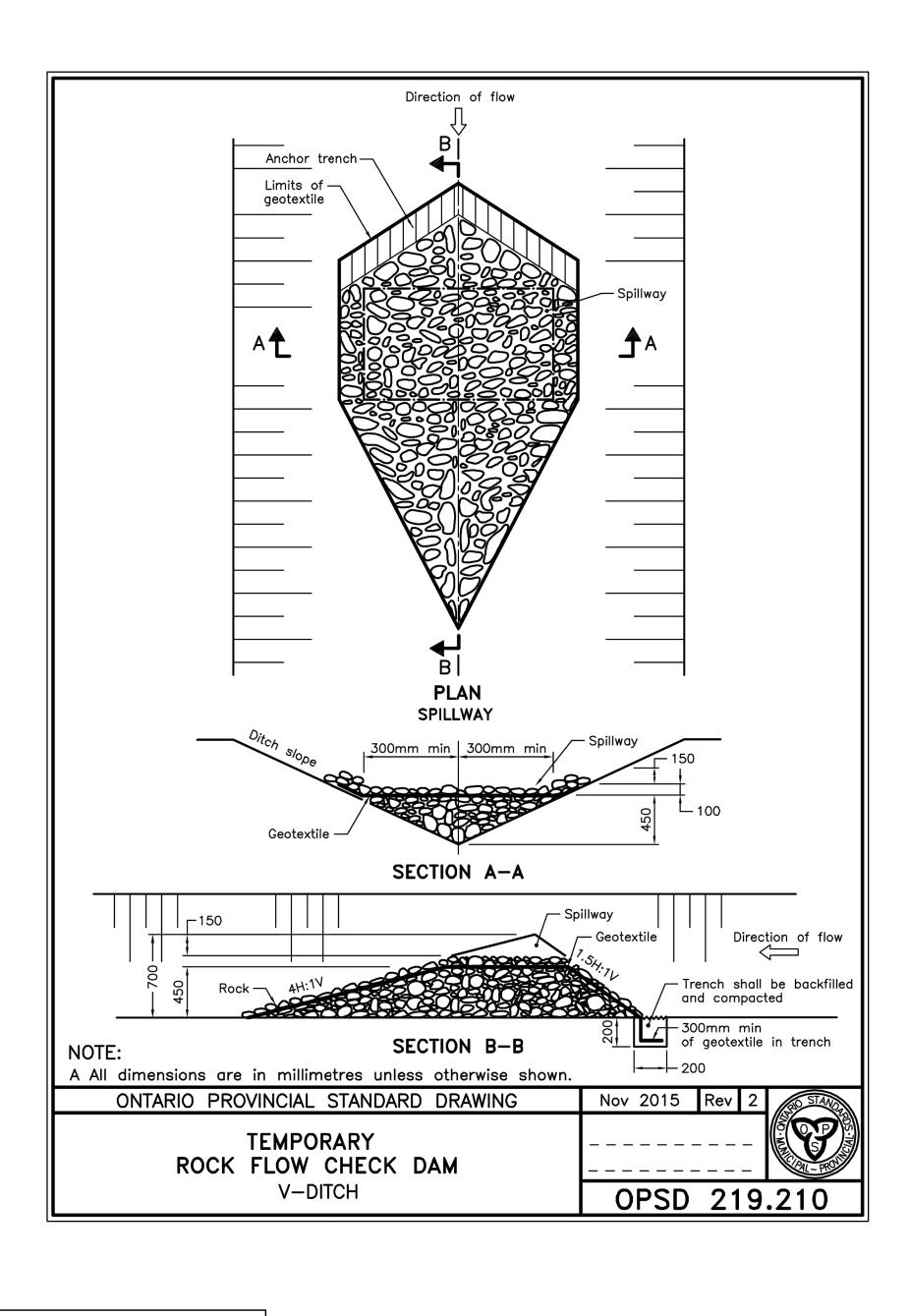


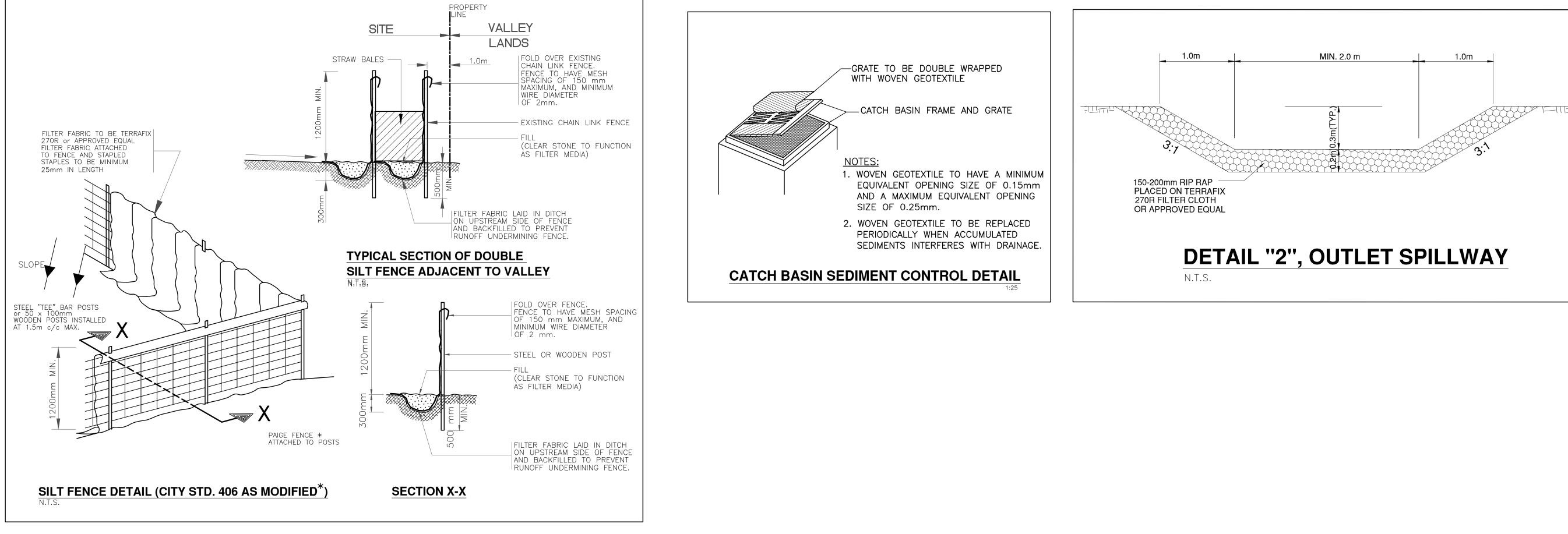


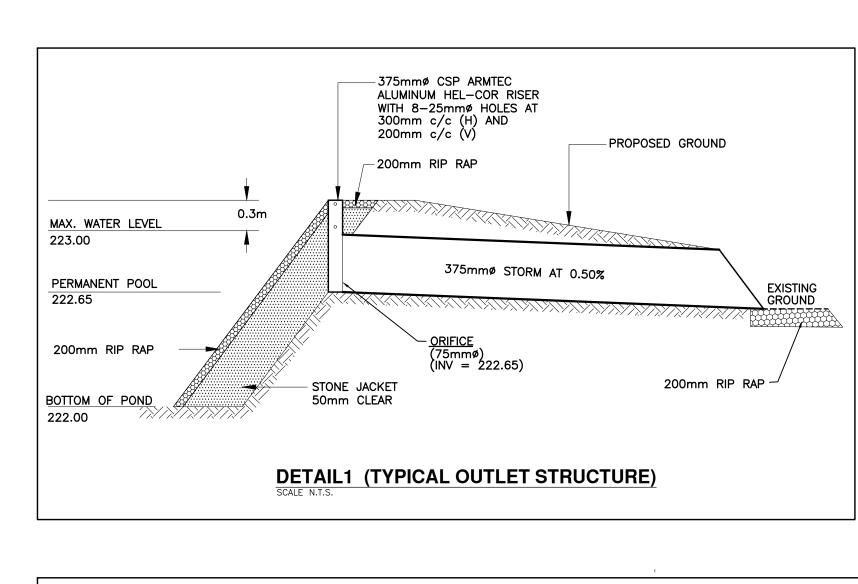
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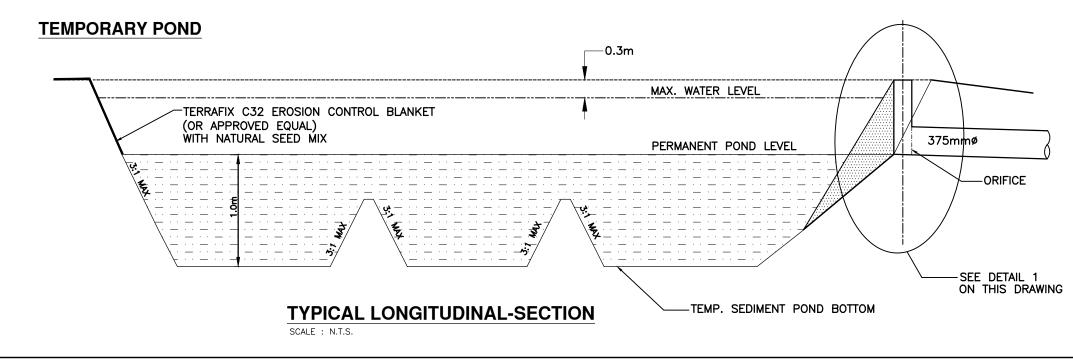


URPER C		TRAFALGAR ROAD NORTH	
<u>KEY PLA</u> 1:15,	\		
LEGEND:			
OVERLAND FL			
O O O O REGIONAL FLC	OOD LINE (20	15)	
REFERENCE DR 1. REFER TO DRAFT PLA CANDEVCON LIMITED F 2. REFER TO DRAWING F ON STORM, SANITARY	N (PL-1) OR SUBDIN PS-1 FOR	PREPARED BY /ISION LAYOUT	
$ \begin{array}{c} \underline{5}\\ \underline{4}\\ \underline{3}\\ \underline{}\\ underline{}\\\underline{}\\$			
		2023–02–15 2022–07–29	SL SL
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A B B B CANDE Consulting e	s /CON ngineers	2022–07–29 DATE LIMITEL AND PLANNER	SL BY
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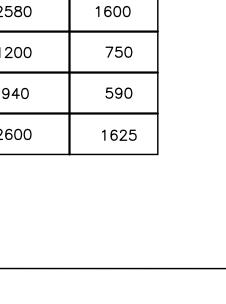








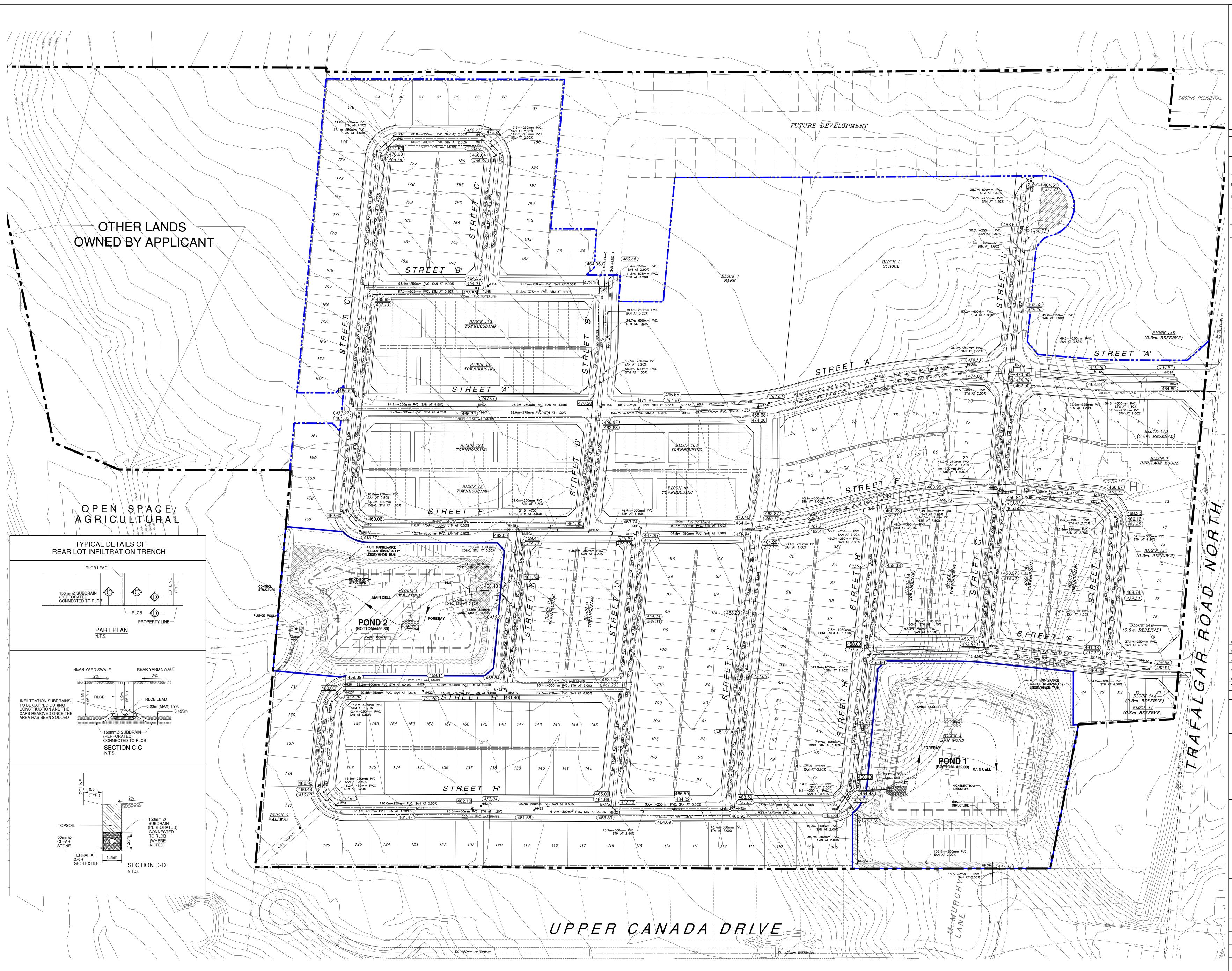
POND No./NAME	DRAINAGE AREA	PERMANENT POOL DEPTH	ACTIVE STORAGE DEPTH	PERMANENT POOL VOLUME REQUIRED	ACTIVE STORAGE REQUIRED
	(Ha.)	(m)	(m)	(m ³)	(m ³)
1	12.9	1.0	0.59	2580	1600
2	6.0	1.0	0.63	1200	750
3	4.7	1.0	0.62	940	590
4	13	1.0	0.60	2600	1625



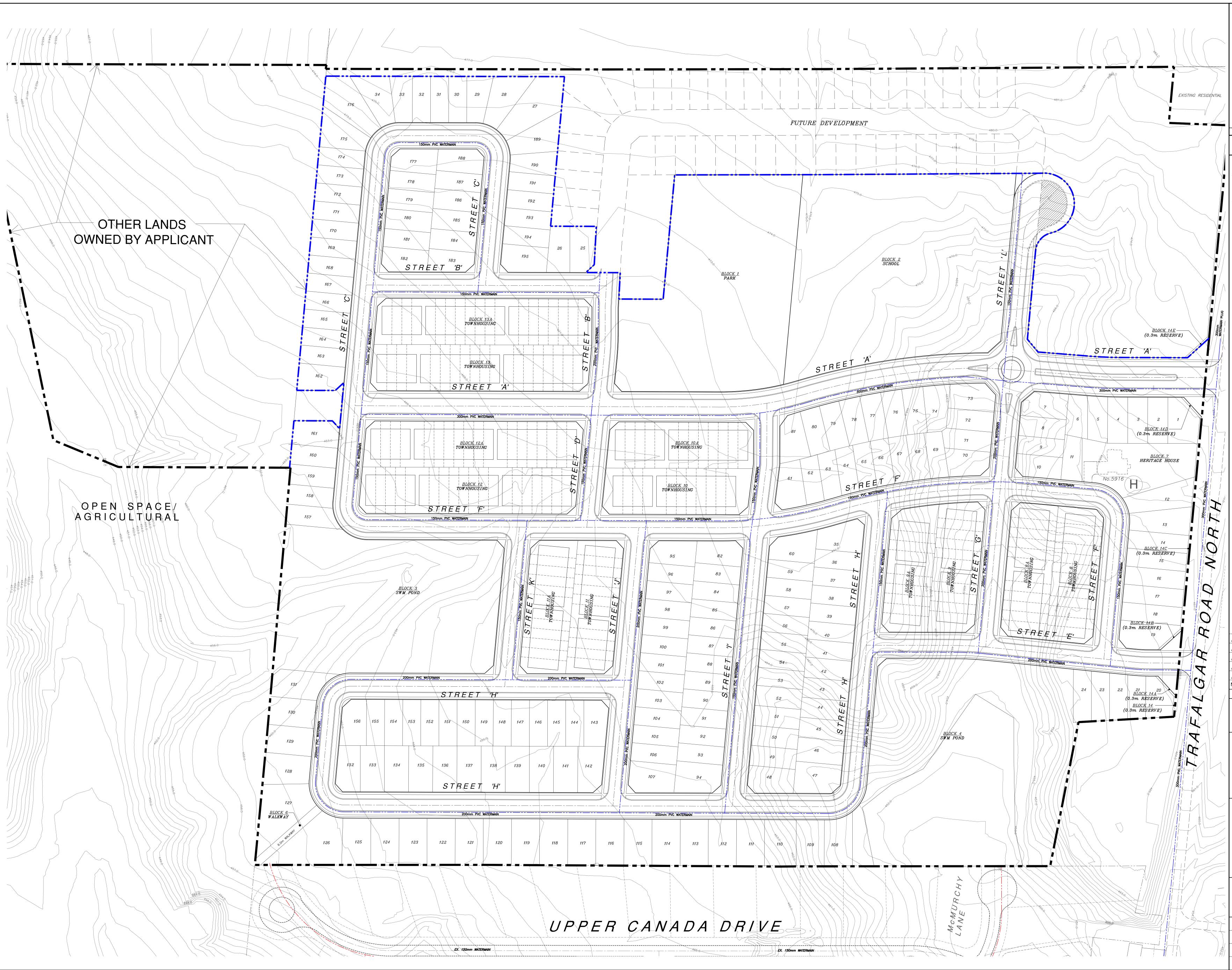




STREET 'H' ╶╎╷╿╶┥╶╪┙┍╧┥╧╪╧╎╧┥╘┥╘┥╘┥╞╧╡╹╸╷╾┰╗┙ UPPER CANADA DR KEY PLAN 🕅 **REFERENCE DRAWINGS:** 1. REFER TO DRAFT PLAN (PL-1) PREPARED BY CANDEVCON LIMITED FOR SUBDIVISION LAYOUT REFER TO DRAWING PS-1 FOR INFORMATION ON STORM, SANITARY & FDC 2023-02-15 S THIRD SUBMISSION SECOND SUBMISSION 2022-07-29 S DESCRIPTION DATE BY REVISIONS CANDEVCON LIMITED CONSULTING ENGINEERS AND PLANNERS TEL. (905) 794–0600 FAX (905) 794–0611 PROFES S D. GANC EBRUARY15, 2023 HILLSBURGH HEIGHTS INC. **RESIDENTIAL SUBDIVISION** 5616 TRAFALGAR ROAD NORTH PART 1 OF PLAN 61R-9590 PART OF LOT 26, CONCESSION 7 HILLSBURGH URBAN AREA **TOWN OF ERIN** SHEET TITLE: **EROSION & SEDIMENT CONTROL DETAILS** DRAWN BY: OJECT No. W21081 E.A.M CHECKED BY: DRAWING No. S.L ESC-1A SCALE 1:1000 2OCT 1st, 2021



+ bud unte beverop Ment STREET STREET 'H' KEY PLAN LEGEND: LIMIT OF SUBDIVISION PHASING LIMIT **EXISTING PROPERTY LINE** PROPOSED STORM SEWER ---- EXISTING STORM SEWER ------ PROPOSED SAN SEWER ---> EXISTING SAN SEWER ------ WATERMAIN EXISTING WATERMAIN INFILTRATION TRENCH _× 455.51 EXIST. GRADE PROPOSED ROAD GRADE 481.80 (476.65) PROPOSED SAN SEWER OBVERT PROPOSED STORM SEWER (456.80) OBVERT **REFERENCE DRAWINGS:** REFER TO DRAFT PLAN (PL-1) PREPARED BY CANDEVCON LIMITED FOR SUBDIVISION LAYOUT REFER TO DRAWINGS ST-1 FOR INFORMATION ON STORM DRAINAGE REFER TO DRAWINGS SA-1 FOR INFORMATION ON SANITARY DRAINAGE REFER TO DWG EXT-ST1 FOR EXTERNAL STORM DRAINAGE AREA PLAN 2023-02-15 THIRD SUBMISSION SECOND SUBMISSION 2022-07-29 5 DESCRIPTION DATE B REVISIONS CANDEVCON LIMITED TEL. (905) 794–0600 FAX (905) 794–0611 # S D. GANC BRUARY15, 20 HILLSBURGH HEIGHTS INC. **RESIDENTIAL SUBDIVISION** 5616 TRAFALGAR ROAD NORTH PART 1 OF PLAN 61R-9590 PART OF LOT 26, CONCESSION 7 HILLSBURGH URBAN AREA **TOWN OF ERIN** SHEET TITLE: PRELIMINARY SERVICING PLAN DRAWN BY: ROJECT No. W21081 E.A.M CHECKED BY: RAWING No. S.L 1 **PS-1** 1:1000 OCT 1st, 2021



╴╴╶────╴╴<u>╪_{─────}──</u>──╮┯┅┅┯╷┍╷╓╷╥╓╖╖╴╴╴ FUTURE DEVELOPMENT STREET 'H' W KEY PLAN LEGEND: LIMIT OF SUBDIVISION PHASING LIMIT - EXISTING PROPERTY LINE ------ PROPOSED WATERMAIN – FUTURE WATERMAIN - EXISTING WATERMAIN _____ **REFERENCE DRAWINGS:** 1. REFER TO DRAFT PLAN (PL-1) PREPARED BY CANDEVCON LIMITED FOR SUBDIVISION LAYOUT 2. REFER TO DRAWING PS-1 FOR INFORMATION ON STORM & SANITARY 2023-02-15 S THIRD SUBMISSION 2022-07-29 S SECOND SUBMISSION DATE B DESCRIPTION REVISIONS CANDEVCON LIMITED TEL. (905) 794–0600 FAX (905) 794–0611 S D. LAN HILLSBURGH HEIGHTS INC. **RESIDENTIAL SUBDIVISION** 5616 TRAFALGAR ROAD NORTH PART 1 OF PLAN 61R-9590 PART OF LOT 26, CONCESSION 7 HILLSBURGH URBAN AREA TOWN OF ERIN SHEET TITLE: WATER DISTRIBUTION PLAN DRAWN BY: ROJECT No. W21081 E.A.M CHECKED BY: DRAWING No. S.L 1:1000 WM-1 OCT 1st, 2021