UPPER CANADA CONSULTANTS
ENGINEERS / PLANNERS

Upper Canada Planning & Engineering Ltd.
3-30 Hannover Drive
St. Catharines, ON
L2W 1A3
Phone 905-688-9400
Fax 905-688-5274

File: 26029

FUNCTIONAL SERVICING REPORT

Barrick Dunsire Apartments – Port Colborne
September 2026

INTRODUCTION

Upper Canada Consultants has been retained to undertake and provide a Functional Servicing Report to address the servicing needs and requirements as part of a Site Plan Approval Application Submission for the proposed development. The site is situated south of Barrick Road and east of West Side Road (Highway 58) on lands previously known municipally as 484 Barrick Road. The site is limited by a Significant Woodlot to the south. The development site was historically agricultural lands however has more recently been vacant land.

The proposed development site is approximately 4.3 hectares and shall consist of six 6-storey, 62-unit residential apartment buildings (372 units), a 1-storey commercial building (approximately 558m^2) and a 2-storey parkade structure. The site will include associated asphalt road/parking lot, concrete curb, catch basins, storm sewers, stormwater management facility, sanitary sewers, and watermain.

At this time, it is expected that the site will be constructed in five phases as follows:

Phase 1	Building1, Building 2 & the Commercial Building with the roadway connections to West Side Road (Highway 58) & Barrick Road
Phase 2	Parking Structure
Phase 3	Building 6
Phase 4	Building 5
Phase 5	Building 3 & Building 4

The objectives of this study are as follows:

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

WATER SERVICING

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

- 400mm diameter PVC municipal watermain on the west side of West Side Road (Highway 58)
- 300mm diameter municipal watermain on Barrick Road

It is proposed to construct a 250mm diameter service off West Side Road (Highway 58) to provide both domestic water supply and fire protection for the proposed development.

Furthermore, the following hydrants are situated in proximity to the subject property, listed in order of increasing distance from the site:

- Fronting #341 West Side Road (west side)
- Fronting #311 West Side Road (west side)
- Northeast corner of Barrick Road and Hawthorne Boulevard (north side)
- Fronting #455 Barrick Road (north side)

Due to the size of the development site and specifications of the internal structures, three (3) on-site private hydrants will be required to provide sufficient fire protection for the proposed buildings. As the buildings will be 6-storeys in height, they will require internal fire suppression systems (sprinklers) with associated fire department connections per the Ontario Building Code.

Per the provided Site Plan, each of the residential buildings will be constructed with 31 1-bedroom suites and 31 2-bedroom suites. Per the 2022 Regional DC Background study, 2+ bedroom apartments have a population density of approximately 1.991 persons per unit (ppu), with 1 bedroom apartments having a density of 1.214ppu. To be conservative, this report has utilized a density of 1.8ppu resulting in a total population of 670 persons based on 372 units. Per the 2021 Regional Water Master Servicing Plan Update (MSPU), 240 L/cap/day is attributed as the average residential daily demand. However, a more conservative value of 270 L/cap/day has been utilized in accordance with the MECP Water Design Guidelines. Additionally, a commercial allowance of 28 m^3/ha/day has been attributed to the commercial land uses. Additionally, peaking factors of 1.8 and 2.7 can be used for maximum daily and peak hourly rates. Therefore, the average day, maximum day, and peak hour domestic requirements will be 2.11L/s, 3.80L/s, and 5.70L/s, respectively.

As part of this approval, a Fire Underwriters Survey (FUS) Calculation has been conducted and included in Appendix A to determine the minimum fire flow requirement based on the preliminary design for the development at this time. The calculation utilizes key parameters such as the type of construction, combustibility of contents and proximity to adjacent structures to determine the minimum fire flow required to provide adequate fire protection.

Calculations were conducted for Building #4 (worst case scenario residential/commercial building) and the parking garage. Building #4 was determined to require a fire flow of **67L/s** assuming ordinary construction, full internal sprinkler systems, and protected vertical openings in accordance with the National Building Code. The 2-storey parkade has been calculated as an open-air parking garage and was calculated to require a fire flow of **134L/s** assuming fire-resistive construction practices and combustible contents.

The following hydrant data was provided by the City of Port Colborne.

Table 1. Municipal Hydrant Data

Hydrant Location	Static (PSI)	Residual (PSI)	Actual Flow (GPM)	Theoretical Flow @20psi GPM (Lps)	Date Tested (y/m/d)
#341 West Side Road	50	43	1350	2962 (186)	2023/05/31
#311 West Side Road	53	45	1390	2987 (188)	2023/05/31
Barrick/Hawthorne	46	39	1307	2655 (167)	2023/05/31
#455 Barrick Road	50	39	1216	2090 (131)	2023/05/31

An analysis has been completed in Appendix A of the internal watermain system to determine the expected peak flows to be available at the farthest hydrant (fronting Building #5) under fire flow conditions (20psi). The analysis uses a static pressure of 50psi tested at the hydrant located fronting #341 West Side Road. The analysis concludes that a theoretical flow rate of 183L/s will be available from the on-site hydrant. This is greater than the combined fire flow and peak domestic flow requirement of 155.7L/s. Therefore, both the municipal and on-site water supply systems will provide adequate domestic supply and fire flows to the development.

Per the completed Site Servicing Plan, both a watermain and sanitary connection will be required at the site entrance to West Side Road (Highway 58). It is expected that these services will be constructed simultaneously, and in such a manner that two-way traffic is always maintained though reduced to a single lane. An MTO Encroachment Permit will be obtained for these works.

SANITARY SERVICING

The following sanitary sewers are located in close proximity to the proposed development:

- 200mm diameter municipal sanitary sewer on West Side Road (Highway 58) conveying flows southerly, ultimately to Steele Street SPS
- 250mm diameter municipal sanitary sewer on Barrick Road conveying flows westerly, ultimately to Omer Avenue SPS
- 250mm diameter municipal sanitary sewer on Steele Street conveying flows southerly, ultimately to Steele Street SPS

The proposed development will discharge wastewater flows to the existing 200mm diameter municipal sanitary sewer on West Side Road (Highway 58). A 200mm diameter sanitary service will extend from the connection at the municipal sewer, ensuring adequate conveyance capacity for the development. A gravity service will be provided for each on-site building, however due to the depth of some of the basements and associated elevator shafts, it is expected that all apartment buildings as well as the underground parking garage will require grinder pumps in order to pump flows from these areas to the gravity outlet.

A peak sanitary outflow calculation has been completed for the subject site for each phase of the development and included in Appendix B. The analysis uses 255L/cap/day for residential flow, and 28m^3/ha/day for the commercial/institutional uses, with 0.286L/s/ha for infiltration flow. Residential densities have been attributed as 1.8ppu for apartments. Table 2 below provides a breakdown of the expected total peak sanitary flows that would discharge from the proposed development site after each phase of construction.

Table 2. Peak Sanitary Outflow Analysis

Phase	Building Description	Peak Outflow
Phase 1	Buildings 1, 2 and Commercial	3.30 L/s
Phase 2	Parking Structure	3.37 L/s
Phase 3	Building 6	4.89 L/s
Phase 4	Building 5	6.32 L/s
Phase 5	Building 3 & 4	8.98 L/s

As noted above, the first phase of development would result in an immediate peak outflow of 3.30L/s to the downstream municipal system, ultimately culminating in a total peak flow of 8.98L/s when fully developed.

UCC has completed an overall sanitary analysis of the downstream sanitary system to analyze any constraints in the downstream municipal sanitary system, and to determine peak sanitary flows at the Regional Sanitary Pump Station. The analysis has been completed for each phase however has been included in this report for Phase 1 and Phase 5. Note that the downstream Northland Estates Subdivision has been included in the calculations as 'fully developed'. However, it is understood that the subdivision will be constructed in

phases. Accordingly, available sanitary capacity should be reviewed and allocated prior to the issuance of building permits based on development conditions and sanitary flows at that time.

Per the overall system analysis, the sanitary sewers on Northland Avenue will experience surcharging with the additional flow from the proposed development – under the condition that the Northland Estates Subdivision is fully developed. Through conversations with City staff, it is anticipated that the sanitary sewer on Northland Avenue will be upgraded through cost sharing with the City of Port Colborne through City development charges.

Through external discussions with City staff, it has also been noted that the municipal Inflow and Infiltration Reduction Program has been highly successful within the noted drainage area as part of this development. It is expected that the quantified results of this program will be determined shortly which may identify additional sanitary capacity at the Regional Pumping Station to accommodate further development.

The adjacent Northland Estates Subdivision is expected to generate peak sanitary flows that will exceed the existing capacity (25.2L/s) of the Steele Street Regional Sanitary Pumping Station (SPS). Exceedance of this capacity is anticipated to trigger the design and implementation of SPS upgrades by the Region. These upgrades are expected to accommodate the ultimate peak sanitary flow contributions from the subject proposed development site, as well as other growth within the drainage area. As occupancy of this development is contingent upon sufficient sanitary servicing capacity being available, it is expected that the required upgrades to the SPS will be completed prior to occupancy of this site.

As stated previously, it is expected that the watermain and sanitary connections on West Side Road will be constructed simultaneously, and in such a manner that two-way traffic is always maintained though reduced to a single lane. Both connections will be constructed as part of Phase 1.

STORMWATER MANAGEMENT PLAN

As part of the site development, the following is a summary of the Stormwater Management Plan.

The criteria provided by the City of Port Colborne, Region of Niagara and Ministry of Transportation for this development includes the requirement to control future development stormwater flows to allowable levels from this site for up to and including the 100-year design storm event. It is also required to improve stormwater quality levels to MECP Normal Protection (70% TSS removal) levels prior to discharge to the existing storm sewer on West Side Road (Highway 58).

To limit future stormwater flows to allowable levels, typically a control is placed on the outlet from the site that may include an orifice and site stormwater storage. To improve stormwater quality, typically a stormwater oil/grit separator or other ETV verified device provides the required TSS (Total Suspended Solids) removal for this type of development.

Existing Conditions

The majority of the subject development site has historically been vacant open lands owned and maintained by the Christian Life Assembly church at the southwest corner of the intersection of Barrick Road and West Side Road. The proposed north development entrance to Barrick Road has historically been a Single Residential Dwelling known municipally as #434 Barrick Road.

The existing site topography directs stormwater flows in a southerly direction at a approximate 1.0% grade, with internal subcatchments discharging flows to three (3) separate outlets. As shown on the Existing Overall Storm Drainage Area Plan (Figure 1), the outlets are located as follows:

Outlet A - Existing culvert inlet at the southwest corner of the site discharging to the 525mm diameter storm sewer on the east side of West Side Road conveying flows south;

Outlet B - Ditch inlet at northeast corner of Barrick Road and Northland Avenue intersection, discharging flows to the West Side Road storm sewer system; and

Outlet C - East site limit towards Steele Street.

Drainage Areas EX20 consists of the front roof area and parking lot of the Christian Life Assembly that directs flows northerly, up to and including the 5 year design storm event, to the storm sewer on Barrick Road as part of Outlet A. During major storm events, overland stormwater flows are directed south towards Drainage Area EX10. During all storm events, stormwater flows from Drainage Area EX10 are directed to a culvert inlet to the West Side Road (Highway 58) storm sewer system located across from #311 West Side Road.

Drainage Area EX30 conveys stormwater flows southwesterly through the significant woodlot to the roadside ditch along West Side Road, ultimately discharging to a ditch inlet located at the northeast corner of the Barrick Road and Northland Avenue intersection and to the MTO storm sewer system (Outlet B).

Drainage Area EX40 conveys stormwater flows easterly through the adjacent residential properties (Outlet C) and continuing east to Steele Street. Weighted Impervious calculations have been completed for most of the existing and future drainage areas and included in Appendix C.

Per documentation provided by the City of Port Colborne, the proposed development site is included in the overall drainage area for the Trunk Storm Sewer System on Franklin Avenue, Shamrock Avenue and Bartok Crescent, discharging stormwater flows to a stormwater management facility north of 70 Rosedale Avenue and to the Welland Recreational Canal.

Per the soil mapping conducted by the Ontario Ministry of Agriculture, Food and Agribusiness, the site contains Sandy Clayey Silt with a high bedrock elevation. Geotechnical analysis conducted by Soil-Mat (2025) confirmed this analysis, noting bedrock depths at 0.3-0.8m across the site. During test pit analysis, all pits were observed to be dry and the water table is anticipated at approximately 3-4m below the surface within the bedrock – below anticipated depths of construction.

Proposed Conditions

The 4.31-hectare proposed development will result in the construction of six 6-storey residential apartment buildings, an additional commercial building and an associated parking lot occupying the majority of the subject property. The site will be constructed with an internal storm sewer system conveying stormwater flows to a stormwater management (SWM) facility to be located at the southwest corner of the site.

A Future Overall Storm Drainage Area Plan (Figure 2) has been included in Appendix C outlining the future stormwater conditions for the proposed development area. These areas have been modelled to establish peak flows and volumes once development has been completed at the proposed site. Modelling has been conducted for fully developed conditions.

As in the existing conditions, Drainage Area A20 consists of the Christian Life Assembly parking lot that conveys major stormwater flows (less 5 year flows) southerly towards the development area. The majority of the internal site has been split up, with Drainage Area A10b consisting of the apartment rooftops, and the remaining site area consist of Drainage Area A10a that will capture stormwater flows within the on-site storm sewer system conveying flows to the stormwater management (SWM) facility. Drainage Area A10b will be restricting stormwater peak flows via rooftop controls and associated storage prior to discharge to the building stormwater services.

Drainage Area A11 will consist mainly of the landscape lands within the 14m MTO setback and will direct flows towards the West Side Road (Highway 58) road allowance, bypassing the on-site SWM facility and the associated peak flow controls. All stormwater flows from these drainage areas will be directed to West Side Road at Outlet A. As discussed further in the report, flows will discharge either directly to the storm sewer, or overland to the roadway.

Drainage Area A40 consists of the remaining external lands along the southeast perimeter portion of the site conveying flows directly to the adjacent residential properties (Outlet C).

As shown on Figure 2 and outlined further in the report, during major storm events, stormwater flows from the majority of the site will be directed to the on-site SWM facility prior to discharge from the site to the West Side Road stormwater system.

Please note that although the development will be phased, the SWM facility will be constructed as part of the Phase 1 works and is expected to provide greater than necessary quantity controls for the development site.

Stormwater Quantity Analysis

A MIDUSS model was created to assess the existing and future development peak flows and stormwater volumes generated at the subject site. All stormwater flows were calculated for the 2, 5, 10, 25, and 100 year design storm events using the MTO IDF Curves for the City of Port Colborne. Table 2 below outlines the IDF Curves used in this report.

Table 2. Rainfall Data

Design Storm (Return Period)	Chicago Distribution Parameters		
	a	b	c
25mm	512.000	6.00	0.800
2 Year	397.149	0.00	0.699
5 Year	524.867	0.00	0.699
10 Year	608.845	0.00	0.699
25 Year	715.568	0.00	0.699
100 Year	871.279	0.00	0.699

$$Intensity\ (mm/hr) = \frac{a}{(t_d + b)^c}$$

Input parameters for the computer model for both existing and future conditions are outlined in Table 3. The results of this modelling are shown in Table 4, where the peak flows and volumes are modelled for existing conditions, and future conditions without stormwater management.

Table 3. Hydrologic Parameters					
Area No.	**Area (ha)**	**Length (m)**	**Slope (%)**	**SCS CN**	**Percent Impervious**
Existing Conditions					
EX10	2.92	145	1.0%	74	7.8%
EX20	0.34	50	1.0%	74	92.0%
EX30	0.65	65	1.0%	74	1.0%
EX40	2.02	115	1.0%	74	4.5%
	5.93	Total Area			
Future Conditions					
A10a	4.55	190	1.0%	74	65.0%
A10b	0.67	20	1.0%	74	100.0%
A11	0.26	50	1.0%	74	1.0%
A20	0.34	50	1.0%	74	92.0%
A40	0.13	10	2.0%	74	5.0%
	5.95	Total Area			
Note: Areas may not add up due to rounding					

Table 4. Peak Flow and Volume Comparison						
Design Storm	**Peak Flow (L/s)**			**Volume (m^3)**		
	Existing	**Future**	**Change**	**Existing**	**Future**	**Change**
Outlet A – West Side Road (west)						
2 Year	32	493	+1,556%	219	1,170	+1,028
5 Year	48	699	+1,327%	376	1,756	+1,365
10 Year	62	815	+1,194%	502	2,096	+1,573
25 Year	92	962	+934%	677	2,531	+1,825
100 Year	118	1,045	+743%	835	2,942	+2,071
Outlet B – West Side Road (south)						
2 Year	5	0	-100%	38	0	-38
5 Year	11	0	-100%	71	0	-71
10 Year	17	0	-100%	96	0	-96
25 Year	28	0	-100%	131	0	-131
100 Year	36	0	-100%	164	0	-164
Outlet C – Steele Street (easterly)						
2 Year	14	1	-93%	136	5	-131
5 Year	28	3	-89%	241	10	-231
10 Year	43	4	-91%	321	13	-308
25 Year	68	6	-91%	433	17	-416
100 Year	87	8	-91%	539	21	-518
Note: Future flows are calculated in this chart without peak flow quantity controls						

Therefore, as seen in previous Table 4, the proposed development strategy will result in significantly reduced peak stormwater flows to Outlets B and C and no further quantity controls will be required for these outlets. However, peak flows to Outlet A will significantly increase and will therefore require peak flow controls prior to discharge to the West Side Road (Highway 58) stormwater system.

Stormwater Management Facility

For this development, a storm sewer will be constructed to an existing manhole as part of the 525mm diameter storm sewer on West Side Road at Outlet 'A'. A control structure manhole (MH'30') will be constructed just east of the 14m MTO setback on the development site, downstream of the proposed Dry Pond facility. A concrete (non-tamperable) Weir Wall will be constructed within the control structure manhole to provide the necessary peak flow quantity controls prior to discharge to the West Side Road (Highway 58) storm sewer.

As stated previously, the rooftop areas will be provided with peak flow controls and associated rooftop storage prior to discharge to the building storm service. For this site, it is expected that the Zurn – ZCF130 Control-Flo device will be utilized at each rooftop drain to provide additional peak flow controls.

Table 5 below provides the breakdown of peak stormwater flows discharging to Outlet A under existing and future conditions per the stormwater calculations. The allowable future peak flows have been further broken down to differentiate the maximum peak flows able to discharge to the storm sewer vs. the total peak flows discharging to the overall road allowance. As noted, peak flows to the West Side Road (Highway 58) storm sewer have been modelled to discharge a maximum allowable peak flow rate of 55L/s representing the existing 5 year flow rate plus an additional 15% to represent the full flow capacity of the system under surcharged conditions.

Table 5. Allowable Peak Flow Analysis

Design Storm	Existing Peak Flows (L/s)	Future Peak Flows (L/s)		
		Allowable		Proposed (to road allowance)
		To Sewer	Overall To Road Allowance	
2 Year	32	32	32	26
5 Year	48	48	48	37
10 Year	62	55	62	45
25 Year	92	55	92	51
100 Year	118	55	118	58

Per previous Table 5, peak stormwater flows under the proposed stormwater management plan discharging to the West Side Road (Highway 58) stormwater system will be restricted to allowable levels for all modelled storm events.

In regards to the rooftop stormwater controls, each building will be constructed with five (5) Zurn – ZCF130 Control-Flo rooftop drains, and each drain provides linear flow controls at a rate of 23LPM per inch of water buildup. The buildings will be constructed with scuppers located approximately 100mm above the roof elevation to allow stormwater to discharge during extreme storm events. Per the MIDUSS Calculations, it is expected that stormwater flows will buildup to an elevation of 0.027m and 0.044m during the 5 and 100 year design storm events, respectively. Therefore, stormwater will remain well below the scupper elevations during the 100 year events. To remain conservative, downstream storm sewers have been sized to accommodate stormwater flows of 4.0L/s during the 5 year design storm event on the calculation sheet on the Storm Drainage Area Plan (26029-STMDA).

The concrete (non-tamperable) Weir Wall within the control manhole will have a 127mm (5”) diameter orifice at the base of wall elevation of 182.23m. A second 100mm (4”) diameter orifice would be constructed at an elevation of 183.00m with the top of wall elevation to be constructed at an elevation at 183.50m. As shown in the Stage-Storage-Discharge Calculation Sheet in Appendix C, peak flows discharging from the control structure have been restricted to a maximum of 56L/s.

The stormwater management ‘dry pond’ facility will be constructed just upstream of the control manhole with a base elevation of 182.30m and top of pond elevation at 184.00m. Due to the lack of available grade on the site, both the headwall discharging flows into the facility and the outlet ditch inlet will be constructed at an elevation of 182.30m. A depressed channel will be constructed between the two structures to provide a dedicated path for stormwater flows and will act as an erosion control measure, however the channel will be completely flat.

During major storm events, peak stormwater flows reaching levels surpassing the capacity of the control structure manhole will discharge from a trapezoidal overflow weir at the top of the dry pond facility. The overflow weir will have a base elevation at 183.70m and continue to the top of pond elevation at 184.00m. Flows from the overflow weir will discharge overland directly to the road allowance and overtop the curb.

The dry pond has been sized to provide sufficient stormwater storage capacity for the development, however it is expected that the remaining upstream storm sewers will also provide additional stormwater storage. Due to the stormwater elevations in the system during the modelled events, foundation drainage (weeping tiles, sump pumps, etc.) will be required to be pumped over the foundation wall of the buildings and discharge to the stormwater service – direct connections may cause flooding and other adverse issues.

Table 6 below outlines the peak stormwater characteristics experienced by the proposed on-site stormwater management facility during the modelled storm events.

Table 6. Dry Pond Stormwater Management Facility Characteristics			
Design Storm	**Peak Outflow**	**Volume**	**Elevation**
2 Year	25	789	182.93
5 Year	36	1,105	183.14
10 Year	43	1,318	183.28
25 Year	49	1,626	183.46
100 Year	54	1,907	183.62

During major storm events greater than the 5 year storm, overland flows with the site unable to enter the on-site storm sewer system will be directed towards the dry pond facility. No overland flows from within the parking lot area will be directed out to the MTO West Side Road (Highway 58) road allowance. During extreme storm events, the pond has been designed with an overflow weir directing flows out to the West Side Road (Highway 58) road allowance, as occurs under existing conditions.

An internal storm sewer system will be constructed that will direct stormwater flows from the site to the dry pond facility. The storm sewers will be sized to accommodate flows up to and including the 5 year design storm event.

At the frontage of the site to West Side Road, the development will be raised to allow flows from within the 14m setback to discharge directly to the roadway as is standard for these types of developments. A ditch inlet has been provided north of the site entrance to provide an outlet for the roadside ditch north of the site.

Quality Assessment

As stated previously, it will be required to improve stormwater to Normal Protection (70% TSS removal) levels prior to discharge from the site. For this development, it is proposed to use an oil/grit separator to provide the necessary quality enhancements.

Modelling has been conducted using the Hydroworks software for a HydroDome OGS unit. The contributing drainage area to the proposed oil/grit separator is approximately 5.26 hectares with an impervious coverage of approximately 75%. The modelling for a Hydroworks unit has indicated that an HydroDome HD10 OGS will provide 73% TSS overall removal and capture 99% of the stormwater flows. Therefore, the Hydroworks HD10 is proposed for this site development. Output calculations for the quality assessment can be found in Appendix D.

The proposed development has been designed to convey all storm water flows from the on-site internal storm sewer system through an oil/grit separator within MH ‘10’, before discharging into the dry pond facility and ultimately to the site stormwater outlet. The Dry Pond facility has been designed with the headwall inlet (HW ‘1’) and the outlet structure (DDI ‘30’) at the same elevation of 182.30m. A defined channel will be incorporated into the

SWM facility to guide flows directly to the outlet structure under normal operation conditions. A downstream weir wall will be constructed within STM MH '30' that will provide the necessary peak flow quantity controls, forcing stormwater to backup within the dry pond facility. Discussions with the manufacturer of the Hydroworks HydroDome OGS unit have confirmed that backwater effects will have no effect on providing the necessary stormwater quality enhancements for this site.

Due to the design of this stormwater management system, runoff detained within the dry pond facility will inherently receive additional stormwater quality 'polishing' enhancements following passage through the oil/grit separator as flows wait to discharge from the site. The increased residence time associated with the controlled release of stormwater will promote further settling of suspended particles and provide additional water quality enhancements prior to discharge.

As such, the combination of the oil/grit separator and dry pond facility will function together through the treatment train process to provide a greater level of stormwater quality enhancements beyond that achieved by either component independently.

Maintenance of Stormwater Management Facility

The function of the proposed stormwater quality protection facility, a stormwater oil/grit separator, will require maintenance on an annual basis. The following is a summary of the maintenance activities required.

Regular inspections of the stormwater Maintenance Hole (MH) oil/grit interceptor will indicate whether maintenance is required or not. They should be made after every significant storm during the first two years of operation to ensure that it is functioning properly. This will translate into an average of six inspections per year.

Points of regular inspections are as follows:

- Is there sediment in the separator sump? The level of sediment can be measured from the surface without entry into the oil/grit separator via a dipstick tube equipped with a ball valve (Sludge Judge) or with a graduated pole with a flat plate attached to the bottom.

- Is there oil in the separator sump? This can be checked from the surface by inserting a dipstick in the 150mm vent tube. The presence of oil is usually indicated by an oily sheen, frothing or unusual colouring. The separator should be cleaned in the event of a major spill contamination.

- Is there debris or trash at the inlet weir and drop pipe? This can be observed from the surface without entry into the separator. Clogging at the inlet drop pipe will cause stormwater to bypass the sedimentation section and continue downstream without treatment.

Completion of the Inspection Report (a sample report is included in Appendix D for reference purposes). These reports will provide details about the operation and maintenance requirements for this type of stormwater quality device. After an evaluation period (usually 2 years) this information will be used to maximize efficiency and minimize the costs of operation and maintenance for the maintenance hole oil/grit separator.

Typically, stormwater MH oil/grit separators are cleaned out using vacuum pumping. No entry into the unit is required for maintenance. Cleaning should occur annually or whenever the accumulation reaches sediment storage specified by the manufacturer and after any major spills have occurred. Oil levels greater than 2.5 centimeters should be removed immediately by a licensed waste management firm.

Generally, the sediment removed from the separator will not be contaminated to the point that it would be classified as hazardous waste. However, the sediment should be tested to determine the disposal options. The Ministry of Environment, Conservation and Parks publishes sediment disposal guidelines which should be consulted for up-to-date information pertaining to the exact parameters and acceptable levels for the various

disposal options. The preferred option is an off-site disposal, arranged by a licensed waste management firm.

The future owners of a Hydroworks facility are provided with an Owner's Manual upon installation, which explains the function, maintenance requirements and procedures for the facility with extensive use It is recommended to follow the manufacturers instructions to allow the oil/grit separator to perform as intended. A Sample Oil/Grit Separator Inspection Report has been included in Appendix D.

CONCLUSIONS AND RECOMMENDATIONS

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

1. The existing 400mm diameter watermain on West Side Road (Highway 58) will have sufficient capacity to provide both domestic and fire protection water supply.

2. The existing 200mm diameter municipal sanitary sewer on West Side Road (Highway 58) will have adequate capacity although the downstream sewer system on Northland Avenue will require upsizing through cost sharing with the City.

3. Stormwater quantity controls will be provided to allowable conditions up to and including the 100-year design storm event.

4. During extreme storm events, on-site stormwater flows will be directed to the Dry Pond Stormwater Management Facility and be directed westerly to West Side Road (Highway 58).

5. Stormwater quality protection will be provided by to Normal Protection (70% TSS removal) levels through treatment train enhancements conducted by an Oil/Grit Separator and the Dry Pond facility.

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

Yours very truly,



Kurt Tiessen, P.Eng.
September 14, 2026
Encl.

APPENDICES

APPENDIX A

Fire Underwriters Survey Calculations
Hydrant Flow Calculation Sheet

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

Barrick Dunsire Apartments

Required Fire Flow in Litres per Minute	F=	4,000	(L/m)
		66.67	(L/s)
		1,057	(USgmp)
Type of Construction			
Non-Combustible Construction (unprotected metal structural components, masonry o	C=	0.80	
Total Floor Area in square metres (including all stories, excluding basements at least 50% below grade)	A=	1063	(m2)
Total Number of Floors - (1 floor + 25% floor area above and below)		1.5	
2. Combustibility of Contents *(may not reduce fire flow demand below 2,000 L/min)*			
Limited Combustible	=	-15%	
3. Sprinkler Systems			
Is there a complete automatic sprinkler protection system per NFPA (Yes/No).	Yes	-30%	
Water supply standard for both system and fire department hose lines (Yes/No).	Yes	-10%	
Is system fully monitored (Yes/No).	Yes	-10%	
Total Sprinker Reduction to Overall Fire Flow Demand		-50%	
4. Spacial Separation of Neighbouring Structures (within 45 metres)			
Location of Building:			
BUILDING #4			
Distance to Nearest Building to the North	25.0 m	10%	
Distance to Nearest Building to the South	23.0 m	10%	
Distance to Nearest Building to the East	-	0%	
Distance to Nearest Building to the West	28.0 m	10%	
Total Spacial Separation to Adjacent Structures		30%	
Additions			
Is roof wood shingles or shakes (Yes/No).	No		

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

Barrick Dunsire Apartments

Required Fire Flow in Litres per Minute	F=	8,000	(L/m)
		133.33	(L/s)
		2,113	(USgmp)
Type of Construction			
Fire-Resistive Construction (fully protected, frame, floors, roof).	C=	0.60	
Total Floor Area in square metres	A=	2099	(m2)
Total Number of Floors - (use largest floor area only)		1	
2. Combustibility of Contents *(may not reduce fire flow demand below 2,000 L/min)*			
Combustible	=	0%	
3. Sprinkler Systems			
Is there a complete automatic sprinkler protection system per NFPA (Yes/No).	No	0%	
Water supply standard for both system and fire department hose lines (Yes/No).	No	0%	
Is system fully monitored (Yes/No).	No	0%	
Total Sprinker Reduction to Overall Fire Flow Demand		0%	
4. Spacial Separation of Neighbouring Structures (within 45 metres)			
Location of Building:			
Parking Garage			
Distance to Nearest Building to the North	14.0 m	15%	
Distance to Nearest Building to the South	23.0 m	10%	
Distance to Nearest Building to the East	28.0 m	10%	
Distance to Nearest Building to the West	62.0 m	0%	
Total Spacial Separation to Adjacent Structures		35%	
Additions			
Is roof wood shingles or shakes (Yes/No).	No		

Headloss in a Single Ended Lead for Fire Hydrant

Project:	Barrick Dunsire Apartments
Project Number:	26029
Date:	June 2, 206
Prepared by:	Kurt Tiessen, P.Eng.

Proposed Hydrant: On Site

Single Lead Length (m):	284.0m		
Single Lead Diameter (mm):	250mm		0.25m
Internal W/M Loop Length (m):	5.0m	0.0m	
Internal W/M Loop Diameter (mm)	150mm	000mm	
Hydrant Elevation (m):	185.40m		
Theoretical Flow at 20PSI (L/s):	183.76 L/s		2913 USgpm
Hydrant Rating (NFPA 291):	BLUE		
Fire Pressure (PSI):	20PSI		137895.14 Pa

Backflow Preventor:	None		.0 PSI
Fireflow Meter:	Neptune 10" Mach 10		1.0 PSI
	SINGLE	INTERNAL	
Total Number of 90° Elbows:	0	0	ke = 0.9
Valves:	6	0	ke = 0.2
Total Number of 45° Elbows:	0	0	ke = 0.4
Reducer:	1	0	ke = 0.06
Increaser:	0	0	ke = 0.15
Number Tee Fittings (straight):	4	0	ke = 0.4
Number of Tee Fittings (turn):	3	0	ke = 1.8

Known Hydrant - #341 West Side Road, Port Colborne

Approximate Elevation (m):	184.25m		
Known Static Pressure (PSI):	50PSI		344737.85 Pa
Feeder Main Diameter (mm):	400mm		0.40m

Calculated Headloss

		INTERNAL LOOP	
	SINGLE	SMALL	LARGE
D:	0.25	0.15	0.00
Re:	6.20E+05	1.03E+06	6.89E-05
V2:	3.74 m/s	1.04E+01	1.04E+01
Q:	0.1838 m3/s	0.1838 m3/s	0.0000 m3/s
A:	0.049 m2	0.018 m2	0.000 m2
y:	1.51E-06		
ks:	0.0000015		
f:	0.013	0.013	0.013
Density:	9810		
g:	9.81 m2/s		

Bernoulli Terms

P1:	35.14 m	P2:	14.06 m
V1:	0.03 m	V2:	0.71 m
z1:	184.25m	Z2:	185.40m
		Fittings:	5.90 m
		Backflow:	0.00 m
		Fire:	0.70 m
		Straight:	12.65 m
TOTAL HEAD 1:	219.42 m	=	219.42 m

APPENDIX B

Sanitary Sewer Calculations – Internal Site
Overall Sanitary Sewer Calculation Sheet – Phase 1
Overall Sanitary Sewer Calculation Sheet – Phase 5

UPPER CANADA CONSULTANTS
3-30 HANNOVER DRIVE
ST.CATHARINES, ONTARIO
L2W 1A3

DESIGN FLOWS

RESIDENTIAL: 255 LITRES/PERSON/DAY (AVERAGE DAILY FLOW)
INFILTRATION RATE: 0.286 L / s / ha (M.O.E FLOW ALLOWANCE IS BETWEEN 0.10 & 0.28 L / s / ha)
POPULATION DENSITY: 1.8 PERSONS / APARTMENT UNIT

SEWER DESIGN

PIPE ROUGHNESS: 0.013 FOR MANNING'S EQUATION
PIPE SIZES: 1.016 IMPERIAL EQUIVALENT FACTOR
PERCENT FULL: TOTAL PEAK FLOW / CAPACITY

MUNICIPALITY: CITY OF PORT COLBORNE
PROJECT : DUNSIRE BARRICK APARTMENTS
PROJECT NO: 26029

SANITARY SEWER DESIGN SHEET

Peaking Factor= $M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = design population in thousands

LOCATION			AREA		POPULATION				ACCUMULATED PEAK FLOW				DESIGN FLOW					
Location and Description	From M.H	To M.H.	Increment (hectares)	Accumulated (hectares)	Number of Units	Population Density (persons/unit)	Population Increment	Total Population Served	Peaking Factor	Flow (L/s)	Infiltration Flow L/s	Total Peak Flow (L/s)	Pipe Diameter (mm)	Pipe Length (m)	Pipe Slope (%)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Percent Full
PHASE 1	APARTMENTS				124	1.8	223	223	4.13	2.72								
	COMMERCIAL		0.06			28 m3/ha/day			2.00	0.02								
				1.92					**TOTAL**	2.74	0.55	3.29						
PHASE 2	APARTMENTS				124	1.8	223	223	4.13	2.72								
	COMMERCIAL		0.06			28 m3/ha/day			2.00	0.02								
				2.18					**TOTAL**	2.74	0.62	3.36						
PHASE 3	APARTMENTS				186	1.8	335	335	4.06	4.01								
	COMMERCIAL		0.06			28 m3/ha/day			2.00	0.02								
				2.99					**TOTAL**	4.03	0.86	4.88						
PHASE 4	APARTMENTS				248	1.8	446	446	4.00	5.27								
	COMMERCIAL		0.06			28 m3/ha/day			2.00	0.02								
				3.57					**TOTAL**	5.29	1.02	6.31						
PHASE 5	APARTMENTS				372	1.8	670	670	3.91	7.72								
	COMMERCIAL		0.06			28 m3/ha/day			2.00	0.02								
				4.31					**TOTAL**	7.74	1.23	8.97	200	73.2	0.40	0.67	21.64	41.5%

UPPER CANADA CONSULTANTS
3-30 HANNOVER DRIVE
ST.CATHARINES, ONTARIO
L2W 1A3

SANITARY SEWER DESIGN SHEET
STEELE STREET SPS OVERALL SANITARY SEWER ANALYSIS
EXISTING CONDITIONS

DESIGN FLOWS
RESIDENTIAL: 255 LITRES/PERSON/DAY
COMMERCIAL 28 m^3 / HA / DAY PER MECP
COM/INST. PEAKING FACTO 1.5

INFILTRATION RATE: 0.286 L / s / ha (RESIDENTIAL)
0.286 L / s / ha (COMMERCIAL/INSTITUTIONAL)
POPULATION DENSITY: 2.4 PERSONS / UNIT (EXISTING DEVELOPMENT)
2.4 PERSONS / UNIT (NEW DVLPMT - NON APTMT)
1.8 PERSONS / UNIT (NEW DVLPMT - APARTMENT)

SEWER DESIGN
PIPE ROUGHNESS: 0.013 FOR MANNING'S EQUATION
PIPE SIZES: 1.016 IMPERIAL EQUIVALENT FACTOR
PERCENT FULL: TOTAL PEAK FLOW / CAPACITY

MUNICIPALITY: CITY OF PORT COLBORNE
PROJECT : BARRICK DUNSIRE
PROJECT NO: 26029

$$M = 1 + \frac{14}{4 + P^{0.5}}$$ Where P = design population in thousands

LOCATION			AREA		RESIDENTIAL						COMMERCIAL/ INSTITUTIONAL				Accumulated	DESIGN FLOW					
Location and Description	From M.H	To M.H.	Increment (hectares)	Accumulated (hectares)	Number of Units	Population Density (pph)	Population Increment	Total Population	Peaking Factor	Total Flow (L/s)	Area	Flow (L/s)	Dry Weather Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)	Pipe Diameter (mm)	Pipe Length (m)	Pipe Slope (%)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Percent Full
~~*BSX - Barrick Road*~~		~~*660*~~	~~*7.69*~~																		
~~*B1a - Barrick Road*~~		~~*660*~~	~~*0.41*~~	~~*0.41*~~	~~*16*~~	~~*93.7*~~	~~*38*~~	~~*38*~~	~~*4.34*~~	~~*0.49*~~			~~*0.49*~~	~~*0.12*~~	~~*0.61*~~	~~*200*~~	~~*90.0*~~	~~*0.40*~~	~~*0.67*~~	~~*21.64*~~	~~*2.8%*~~
~~*B1b - Barrick Road*~~		~~*660*~~	~~*0.56*~~	~~*0.56*~~	~~*12*~~	~~*51.4*~~	~~*29*~~	~~*29*~~	~~*4.36*~~	~~*0.37*~~			~~*0.37*~~	~~*0.16*~~	~~*0.53*~~	~~*200*~~	~~*90.0*~~	~~*0.40*~~	~~*0.67*~~	~~*21.64*~~	~~*2.5%*~~
B1 - Barrick Road	660	662	1.83	1.83	16	21.0	38	38	4.34	0.49			0.49	0.52	1.01	250	111.5	0.28	0.65	32.83	3.1%
B2 - Barrick Road	662	661	1.17	3.00	10	20.5	24	62	4.29	0.79			0.79	0.86	1.65	250	130.4	0.24	0.60	30.39	5.4%
B3 - Barrick Road	661	663	1.05	4.05	8	18.3	19	82	4.27	1.03			1.03	1.16	2.19	250	119.2	0.58	0.93	47.25	4.6%
B4 - West Side Road	663	664	0.65	4.70	1	3.7	2	84	4.26	1.06			1.06	1.34	2.40	200	81.8	0.22	0.49	16.05	15.0%
B5 - West Side Road	664	650	0.57	5.27	6	25.3	14	98	4.25	1.23			1.23	1.51	2.74	200	91.7	0.61	0.82	26.72	10.3%
X2 - Dunsire PH 1	**TO WSR**		**1.92**		**124**	**116.3**	**223**	**223**	**4.13**	**2.72**	**0.06**	**0.03**	**2.75**	**0.55**	**3.30**	**200**	**10.0**	**0.61**	**0.82**	**26.72**	**12.3%**
~~*X2 - Dunsire PH 2*~~	~~*TO WSR*~~		~~*2.18*~~		~~*124*~~	~~*102.4*~~	~~*223*~~	~~*223*~~	~~*4.13*~~	~~*2.72*~~	~~*0.06*~~	~~*0*~~	~~*2.72*~~	~~*0.62*~~	~~*3.34*~~	~~*200*~~	~~*10.0*~~	~~*0.61*~~	~~*0.82*~~	~~*26.72*~~	~~*12.5%*~~
~~*X2 - Dunsire PH 3*~~	~~*TO WSR*~~		~~*2.99*~~		~~*186*~~	~~*112.0*~~	~~*335*~~	~~*335*~~	~~*4.06*~~	~~*4.01*~~	~~*0.06*~~	~~*0*~~	~~*4.01*~~	~~*0.86*~~	~~*4.86*~~	~~*200*~~	~~*10.0*~~	~~*0.61*~~	~~*0.82*~~	~~*26.72*~~	~~*18.2%*~~
~~*X2 - Dunsire PH 4*~~	~~*TO WSR*~~		~~*3.57*~~		~~*248*~~	~~*125.0*~~	~~*446*~~	~~*446*~~	~~*4.00*~~	~~*5.27*~~	~~*0.06*~~	~~*0*~~	~~*5.27*~~	~~*1.02*~~	~~*6.29*~~	~~*200*~~	~~*10.0*~~	~~*0.61*~~	~~*0.82*~~	~~*26.72*~~	~~*23.5%*~~
~~*X2 - Dunsire PH 5*~~	~~*TO WSR*~~		~~*4.31*~~		~~*372*~~	~~*155.4*~~	~~*670*~~	~~*670*~~	~~*3.91*~~	~~*7.72*~~	~~*0.06*~~	~~*0*~~	~~*7.72*~~	~~*1.23*~~	~~*8.95*~~	~~*200*~~	~~*10.0*~~	~~*0.61*~~	~~*0.82*~~	~~*26.72*~~	~~*33.5%*~~
B6 - West Side Road	650	651	0.66	7.85	5	18.2	12	334	4.06	4.00			4.02	2.25	6.27	200	91.9	0.36	0.63	20.53	30.5%
B7 - West Side Road	651	646	0.47	8.32	1	5.1	2	336	4.06	4.02			4.05	2.38	6.43	200	90.9	0.40	0.67	21.64	29.7%
B8 - West Side Road	646	619	0.24	8.56	0	0	0	336	4.06	4.02			4.05	2.45	6.50	200	91.1	***0.50***	0.75	24.19	26.9%
X1 - Port Colborne Mall	EX	620	4.13	4.13							4.13	2.01	2.04	1.18	3.19	200					
~~*EX - External Northland Est.*~~		~~*PROP*~~	~~*4.24*~~																		
NEC - Northland Est. Condo (Mixed Us		PROP	0.69	0.69	50	173.9	120	120	4.22	1.49	0.69	0.34	1.83	0.20	2.03						
NE - Northland Estates Sub	PROP	620	8.89	9.58	233	62.9	559	679	3.90	7.82			8.16	2.74	10.90	200	100.0	0.40	0.67	21.64	50.4%
Northland Avenue	620	619		13.71				679					2.34	3.92	6.26	200	19.0	*0.40*	0.67	21.64	28.9%
S1 - Northland Avenue	619	621	0.17	22.44				1015	3.80	11.37			13.75	6.42	20.16	200	66.1	*0.50*	0.75	24.19	83.3%
S2 - Northland Avenue	621	622	1.21	23.65	19	37.7	46	1061	3.78	11.84			14.22	6.76	20.98	200	23.8	0.50	0.75	24.19	86.7%
S3 - Northland Avenue	622	623	0.53	24.18	8	36.2	19	1080	3.78	12.04			14.42	6.92	21.33	200	26.5	0.45	0.71	22.95	92.9%
S4 - Northland Avenue	623	624	2.08	26.26	93	107.3	223	1303	3.72	14.32			16.69	7.51	24.20	200	70.8	0.51	0.75	24.44	99.0%
S5 - Northland Avenue	624	626	1.04	27.30	1	2.3	2	1306	3.72	14.34			16.72	7.81	24.52	200	81.5	0.93	1.02	33.00	74.3%
S6 - Northland Avenue	626	625	1.20	28.50	4	8.0	10	1315	3.72	14.44			16.81	8.15	24.96	200	90.9	*0.50*	0.75	24.19	**103.2%**
S7 - Northland Avenue	625	627	0.17	28.67	1	14.1	2	1318	3.72	14.46			16.84	8.20	25.04	200	60.4	1.80	1.42	45.91	54.5%
C1 - Steele Street	671	659	0.97	0.97	6	14.8	14	14	4.40	0.19			0.19	0.28	0.46	250	79.9	0.80	1.10	55.49	0.8%
C2 - Steele Street	659	654	1.69	2.66	7	9.9	17	31	4.35	0.40			0.40	0.76	1.16	250	81.3	1.50	1.50	75.98	1.5%
C3 - Steele Street	654	649	1.88	4.54	7	8.9	17	48	4.32	0.61			0.61	1.30	1.91	250	93.9	0.66	0.99	50.40	3.8%
C4 - Steele Street	649	648	1.24	5.78	8	15.5	19	67	4.29	0.85			0.85	1.65	2.50	250	94.1	0.78	1.08	54.79	4.6%
C5 - Steele Street	648	627	1.29	7.07	8	14.9	19	86	4.26	1.09			1.09	2.02	3.11	300	97.4	0.15	0.54	39.07	8.0%
S8 - Steele Street	627	614	0.21	35.95	2	22.9	5	1409	3.70	15.38			17.75	10.28	28.03	300	44.7	0.49	0.97	70.62	39.7%
X4 - Royal Road		614	2.15	2.15	22	24.6	53	53	4.31	0.67			0.67	0.61	1.29	200					
S9 - Steele Street	614	813	0.35	38.45	3	20.6	7	1469	3.69	15.98			18.35	11.00	29.35	300	50.3	0.54	1.02	74.13	39.6%
S10 - Steele Street	813	810	0.77	39.22	10	31.2	24	1493	3.68	16.22		2.37	18.59	11.22	29.81	300	96.4	0.48	0.96	69.89	42.6%

** Analysis terminates at Steele Street Pumping Station **
** All sewer lengths and slopes taken from City provided GIS **
** If cells are ~~stricken~~, values have not been included in peak flows of downstream sewers

UPPER CANADA CONSULTANTS
3-30 HANNOVER DRIVE
ST.CATHARINES, ONTARIO
L2W 1A3

SANITARY SEWER DESIGN SHEET
STEELE STREET SPS OVERALL SANITARY SEWER ANALYSIS
EXISTING CONDITIONS

DESIGN FLOWS
RESIDENTIAL: 255 LITRES/PERSON/DAY
COMMERCIAL 28 m^3 / HA / DAY PER MECP
COM/INST. PEAKING FACTO 1.5

INFILTRATION RATE: 0.286 L / s / ha (RESIDENTIAL)
0.286 L / s / ha (COMMERCIAL/INSTITUTIONAL)
POPULATION DENSITY: 2.4 PERSONS / UNIT (EXISTING DEVELOPMENT)
2.4 PERSONS / UNIT (NEW DVLPMT - NON APTMT)
1.8 PERSONS / UNIT (NEW DVLPMT - APARTMENT)

SEWER DESIGN
PIPE ROUGHNESS: 0.013 FOR MANNING'S EQUATION
PIPE SIZES: 1.016 IMPERIAL EQUIVALENT FACTOR
PERCENT FULL: TOTAL PEAK FLOW / CAPACITY

MUNICIPALITY: CITY OF PORT COLBORNE
PROJECT : BARRICK DUNSIRE
PROJECT NO: 26029

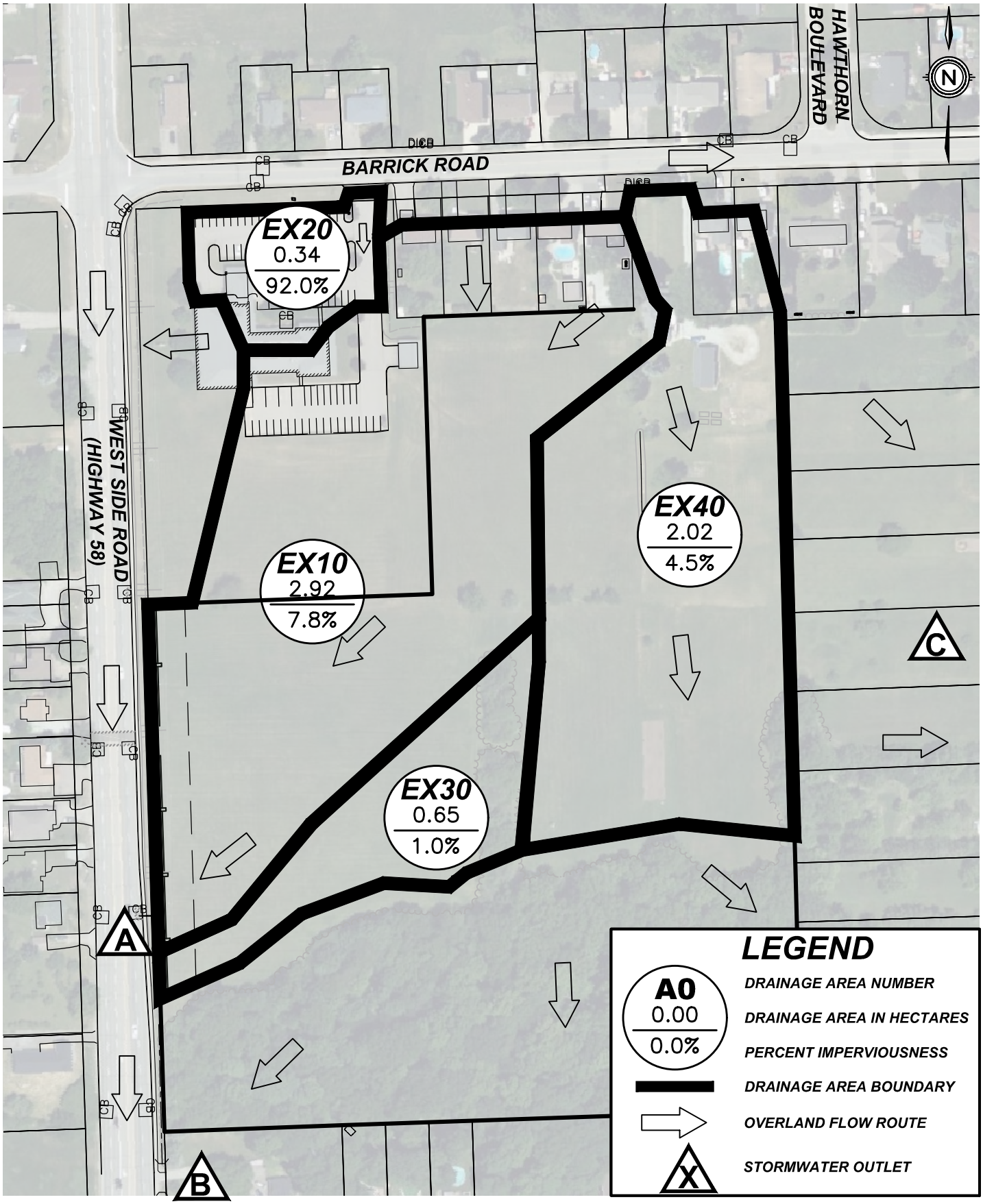
$$M = 1 + \frac{14}{4 + P^{0.5}}$$ Where P = design population in thousands

LOCATION			AREA		RESIDENTIAL						COMMERCIAL/ INSTITUTIONAL				Accumulated	DESIGN FLOW					
Location and Description	From M.H	To M.H.	Increment (hectares)	Accumulated (hectares)	Number of Units	Population Density (pph)	Population Increment	Total Population	Peaking Factor	Total Flow (L/s)	Area	Flow (L/s)	Dry Weather Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)	Pipe Diameter (mm)	Pipe Length (m)	Pipe Slope (%)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Percent Full
~~*BSX - Barrick Road*~~		~~*660*~~	~~*7.69*~~																		
~~*B1a - Barrick Road*~~		~~*660*~~	~~*0.41*~~	~~*0.41*~~	~~*16*~~	~~*93.7*~~	~~*38*~~	~~*38*~~	~~*4.34*~~	~~*0.49*~~			~~*0.49*~~	~~*0.12*~~	~~*0.61*~~	~~*200*~~	~~*90.0*~~	~~*0.40*~~	~~*0.67*~~	~~*21.64*~~	~~*2.8%*~~
~~*B1b - Barrick Road*~~		~~*660*~~	~~*0.56*~~	~~*0.56*~~	~~*12*~~	~~*51.4*~~	~~*29*~~	~~*29*~~	~~*4.36*~~	~~*0.37*~~			~~*0.37*~~	~~*0.16*~~	~~*0.53*~~	~~*200*~~	~~*90.0*~~	~~*0.40*~~	~~*0.67*~~	~~*21.64*~~	~~*2.5%*~~
B1 - Barrick Road	660	662	1.83	1.83	16	21.0	38	38	4.34	0.49			0.49	0.52	1.01	250	111.5	0.28	0.65	32.83	3.1%
B2 - Barrick Road	662	661	1.17	3.00	10	20.5	24	62	4.29	0.79			0.79	0.86	1.65	250	130.4	0.24	0.60	30.39	5.4%
B3 - Barrick Road	661	663	1.05	4.05	8	18.3	19	82	4.27	1.03			1.03	1.16	2.19	250	119.2	0.58	0.93	47.25	4.6%
B4 - West Side Road	663	664	0.65	4.70	1	3.7	2	84	4.26	1.06			1.06	1.34	2.40	200	81.8	0.22	0.49	16.05	15.0%
B5 - West Side Road	664	650	0.57	5.27	6	25.3	14	98	4.25	1.23			1.23	1.51	2.74	200	91.7	0.61	0.82	26.72	10.3%
~~*X2 - Dunsire PH 1*~~	~~*TO WSR*~~		~~*1.92*~~		~~*124*~~	~~*116.3*~~	~~*223*~~	~~*223*~~	~~*4.13*~~	~~*2.72*~~	~~*0.06*~~	~~*0*~~	~~*2.72*~~	~~*0.55*~~	~~*3.27*~~	~~*200*~~	~~*10.0*~~	~~*0.61*~~	~~*0.82*~~	~~*26.72*~~	~~*12.2%*~~
~~*X2 - Dunsire PH 2*~~	~~*TO WSR*~~		~~*2.18*~~		~~*124*~~	~~*102.4*~~	~~*223*~~	~~*223*~~	~~*4.13*~~	~~*2.72*~~	~~*0.06*~~	~~*0*~~	~~*2.72*~~	~~*0.62*~~	~~*3.34*~~	~~*200*~~	~~*10.0*~~	~~*0.61*~~	~~*0.82*~~	~~*26.72*~~	~~*12.5%*~~
~~*X2 - Dunsire PH 3*~~	~~*TO WSR*~~		~~*2.99*~~		~~*186*~~	~~*112.0*~~	~~*335*~~	~~*335*~~	~~*4.06*~~	~~*4.01*~~	~~*0.06*~~	~~*0*~~	~~*4.01*~~	~~*0.86*~~	~~*4.86*~~	~~*200*~~	~~*10.0*~~	~~*0.61*~~	~~*0.82*~~	~~*26.72*~~	~~*18.2%*~~
~~*X2 - Dunsire PH 4*~~	~~*TO WSR*~~		~~*3.57*~~		~~*248*~~	~~*125.0*~~	~~*446*~~	~~*446*~~	~~*4.00*~~	~~*5.27*~~	~~*0.06*~~	~~*0*~~	~~*5.27*~~	~~*1.02*~~	~~*6.29*~~	~~*200*~~	~~*10.0*~~	~~*0.61*~~	~~*0.82*~~	~~*26.72*~~	~~*23.5%*~~
X2 - Dunsire PH 5	**TO WSR**		**4.31**		**372**	**155.4**	**670**	**670**	**3.91**	**7.72**	**0.06**	**0.03**	**7.75**	**1.23**	**8.98**	**200**	**10.0**	**0.61**	**0.82**	**26.72**	**33.6%**
B6 - West Side Road	650	651	0.66	10.24	5	18.2	12	780	3.87	8.90			8.93	2.93	11.86	200	91.9	0.36	0.63	20.53	57.8%
B7 - West Side Road	651	646	0.47	10.71	1	5.1	2	782	3.87	8.93			8.96	3.06	12.02	200	90.9	0.40	0.67	21.64	55.5%
B8 - West Side Road	646	619	0.24	10.95	0	0	0	782	3.87	8.93			8.96	3.13	12.09	200	91.1	***0.50***	0.75	24.19	50.0%
X1 - Port Colborne Mall	EX	620	4.13	4.13							4.13	2.01	2.04	1.18	3.19	200					
~~*EX - External Northland Est.*~~		~~*PROP*~~	~~*4.24*~~																		
NEC - Northland Est. Condo (Mixed Us	PROP	0.69	0.69	50	173.9	120	120	4.22	1.49	0.69	0.34	1.83	0.20	2.03							
NE - Northland Estates Sub	PROP	620	8.89	9.58	233	62.9	559	679	3.90	7.82			8.16	2.74	10.90	200	100.0	0.40	0.67	21.64	50.4%
Northland Avenue	620	619		13.71				679					2.34	3.92	6.26	200	19.0	*0.40*	0.67	21.64	28.9%
S1 - Northland Avenue	619	621	0.17	24.83				1462	3.69	15.91			18.28	7.10	25.38	200	66.1	*0.50*	0.75	24.19	104.9%
S2 - Northland Avenue	621	622	1.21	26.04	19	37.7	46	1507	3.68	16.36			18.73	7.45	26.18	200	23.8	0.50	0.75	24.19	108.2%
S3 - Northland Avenue	622	623	0.53	26.57	8	36.2	19	1526	3.67	16.55			18.92	7.60	26.52	200	26.5	0.45	0.71	22.95	115.6%
S4 - Northland Avenue	623	624	2.08	28.65	93	107.3	223	1750	3.63	18.75			21.12	8.19	29.31	200	70.8	0.51	0.75	24.44	120.0%
S5 - Northland Avenue	624	626	1.04	29.69	1	2.3	2	1752	3.63	18.77			21.14	8.49	29.63	200	81.5	0.93	1.02	33.00	89.8%
S6 - Northland Avenue	626	625	1.20	30.89	4	8.0	10	1762	3.63	18.86			21.23	8.83	30.07	200	90.9	*0.50*	0.75	24.19	**124.3%**
S7 - Northland Avenue	625	627	0.17	31.06	1	14.1	2	1764	3.63	18.89			21.26	8.88	30.14	200	60.4	1.80	1.42	45.91	65.7%
C1 - Steele Street	671	659	0.97	0.97	6	14.8	14	14	4.40	0.19			0.19	0.28	0.46	250	79.9	0.80	1.10	55.49	0.8%
C2 - Steele Street	659	654	1.69	2.66	7	9.9	17	31	4.35	0.40			0.40	0.76	1.16	250	81.3	1.50	1.50	75.98	1.5%
C3 - Steele Street	654	649	1.88	4.54	7	8.9	17	48	4.32	0.61			0.61	1.30	1.91	250	93.9	0.66	0.99	50.40	3.8%
C4 - Steele Street	649	648	1.24	5.78	8	15.5	19	67	4.29	0.85			0.85	1.65	2.50	250	94.1	0.78	1.08	54.79	4.6%
C5 - Steele Street	648	627	1.29	7.07	8	14.9	19	86	4.26	1.09			1.09	2.02	3.11	300	97.4	0.15	0.54	39.07	8.0%
S8 - Steele Street	627	614	0.21	38.34	2	22.9	5	1855	3.61	19.77			22.14	10.97	33.11	300	44.7	0.49	0.97	70.62	46.9%
X4 - Royal Road		614	2.15	2.15	22	24.6	53	53	4.31	0.67			0.67	0.61	1.29	200					
S9 - Steele Street	614	813	0.35	40.84	3	20.6	7	1915	3.60	20.35			22.72	11.68	34.40	300	50.3	0.54	1.02	74.13	46.4%
S10 - Steele Street	813	810	0.77	41.61	10	31.2	24	1939	3.60	20.58		2.37	22.95	11.90	34.85	300	96.4	0.48	0.96	69.89	49.9%

** Analysis terminates at Steele Street Pumping Station **
** All sewer lengths and slopes taken from City provided GIS **
** If cells are ~~stricken~~, values have not been included in peak flows of downstream sewers

APPENDIX C

Figure 1 – Existing Overall Storm Drainage Area Plan
Figure 2 – Future Overall Storm Drainage Area Plan
Weighted Percent Impervious Calculation Sheet
Stage-Storage-Discharge Calculation Sheet – Dry Pond
Stage-Storage-Discharge Calculation Sheet – Rooftop Storage
MIDUSS Output Files



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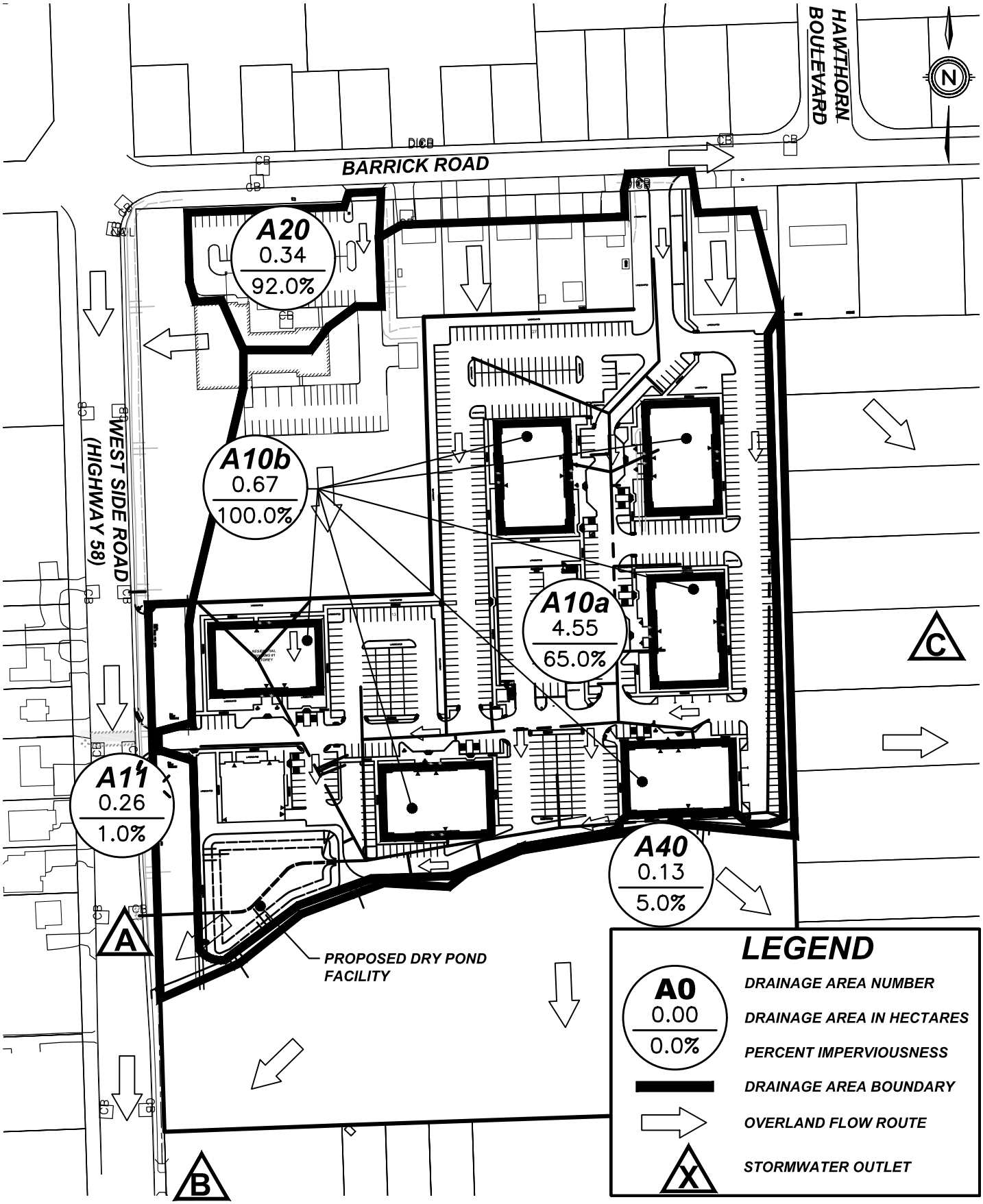
BARRICK DUNSIRE APARTMENTS

CITY OF PORT COLBORNE

EXISTING STORM DRAINAGE AREA PLAN

DATE	2026-06-03
SCALE	1:2,000 m
REF No.	26029
DWG No.	FIGURE 1

DRAWING FILE: F:\26029\Engineering\26029 – BASE 2.dwg PLOTTED: Jun 03, 2026 – 11:55am PLOTTED BY: kurt



UPPER CANADA CONSULTANTS
ENGINEERS / PLANNERS

BARRICK DUNSIRE APARTMENTS

CITY OF PORT COLBORNE

FUTURE STORM DRAINAGE AREA PLAN

DATE	2026-09-14
SCALE	1:2,000 m
REF No.	26029
DWG No.	FIGURE 2

DRAWING FILE: F:\26029\Engineering\26029-BASE.dwg PLOTTED: Sep 14, 2026 - 4:23pm PLOTTED BY: kurt

Weighted Imperviousness Percentage Calculation Worksheet

Project Name:	Barrick - Dunsire Apartments
Project Number:	26029
Date:	September 2026
Person:	K.Tiessen, P.Eng.

EX10 - EXISTING CONDITIONS

	Footprint	*Runoff Coefficient*	*Effective Impervious Area*
Parking Lot, Rooftop & Driveways	2282.0 m^2	0.90	2053.8 m^2
Landscape/Vacant Lands	26914.0 m^2	0.20	5382.8 m^2
TOTAL CATCHMENT IMPERVIOUS AREAS			7,437 m^2
TOTAL CATCHMENT AREA			29,196 m^2
		EFFECTIVE RUNOFF COEFFICIENT	**0.25**
		EFFECTIVE PERCENT IMPERVIOUSNESS	**7.8%**

EX20/A20 - EXISTING & FUTURE CONDITIONS

	Footprint	*Runoff Coefficient*	*Effective Impervious Area*
Parking Lot, Rooftop & Driveways	3138.2 m^2	0.90	2824.4 m^2
Landscape/Vacant Lands	297.1 m^2	0.20	59.4 m^2
TOTAL CATCHMENT IMPERVIOUS AREAS			2,884 m^2
TOTAL CATCHMENT AREA			3,435 m^2
		EFFECTIVE RUNOFF COEFFICIENT	**0.84**
		EFFECTIVE PERCENT IMPERVIOUSNESS	**91.4%**

EX40 - EXISTING CONDITIONS

	Footprint	*Runoff Coefficient*	*Effective Impervious Area*
Parking Lot, Rooftop	535.0 m^2	0.90	481.5 m^2
Gravel Driveway	538.0 m^2	0.70	376.6 m^2
Landscape/Vacant Lands	19160.0 m^2	0.20	3832.0 m^2
TOTAL CATCHMENT IMPERVIOUS AREAS			4,690 m^2
TOTAL CATCHMENT AREA			20,233 m^2
		EFFECTIVE RUNOFF COEFFICIENT	**0.23**
		EFFECTIVE PERCENT IMPERVIOUSNESS	**4.5%**

A10a - PROPOSED CONDITIONS

	Footprint	*Runoff Coefficient*	*Effective Impervious Area*
Internal Landscape Area	6765.0 m^2	0.25	1691.3 m^2
External Rearyard/Landscape Area	9666.0 m^2	0.20	1933.2 m^2
External Rooftop, Parking Lot Area	3074.0 m^2	0.90	2766.6 m^2
Dry Pond	1881.0 m^2	0.25	470.3 m^2
Internal Building (Commercial - not including apartments)	565.0 m^2	0.90	508.5 m^2
Internal Asphalt, Concrete	23527.0 m^2	0.90	21174.3 m^2
TOTAL CATCHMENT IMPERVIOUS AREAS			28,544 m^2
TOTAL CATCHMENT AREA			45,478 m^2
		EFFECTIVE RUNOFF COEFFICIENT	**0.63**
		EFFECTIVE PERCENT IMPERVIOUSNESS	**61.1%**

Stage Storage Discharge Calculation Sheet

Weir Wall and Dry Pond/Storm Sewer Stormwater Controls

Project Name: Barrick Dunsire Apartments
Project No.: 26029
Date: June 2026

Controlling Rim Elev:	**184.00**	**MH's AND PIPE's**	**DRY POND VOLUME**	**TOTAL STORAGE VOLUME**	**Base Orifice** Dia (m) = 0.127 Cd = 0.60 Invert (m) = 182.23	**Upper Orifice** Dia (m) = 0.100 Cd = 0.60 Invert (m) = 183.00	**Slot Weir** Width (m) = 1.500 Invert (m) = 183.50	***Control Structure - Total Outflow***	**Trapezoidal Overflow Weir** Side Slopes Z = 0.50 Base Width = 0.50 Cd = 1.84 Invert (m) = 183.70	**Total Outflow**
Invert:										
Pipe Diameter:										
Structure/Pipe Length:										**DISCHARGE**
Elevation (m)		(m^3)	(m^3)	Total (m^3)	Orifice (m^3/s)	Orifice (m^3/s)	Slot Weir (m^3/s)	(m^3/s)	(m^3/s)	(L/s)
184.00		**186.9**	**2418.0**	**2604.9**	**0.044**	**0.020**	**0.976**	**0.055**	**0.554**	**608.5**
183.90		180.0	2235.0	2415.0	0.042	0.019	0.698	0.055	0.282	336.9
183.80		**172.1**	**2056.0**	**2228.1**	**0.041**	**0.018**	**0.454**	**0.055**	**0.093**	**147.8**
183.70	**100 Yr**	**163.2**	**1882.0**	**2045.2**	**0.040**	**0.017**	**0.247**	**0.055**	**0.000**	**55.0**
183.60	25 Yr	152.8	1713.0	1865.8	0.038	0.015	0.087	0.055	-	55.0
183.50		141.9	1549.0	1690.9	0.037	0.014	-	0.050	-	50.4
183.40	10 Yr	131.1	1389.0	1520.1	0.035	0.012	-	0.047	-	47.1
183.30	**5 Yr**	**120.0**	**1234.0**	**1354.0**	**0.033**	**0.010**	**-**	**0.044**	**-**	**43.5**
183.20		107.8	1084.0	1191.8	0.032	0.008	-	0.039	-	39.3
183.10		94.0	939.0	1033.0	0.030	0.004	-	0.034	-	33.7
183.00	**2 Yr**	**76.7**	**799.0**	**875.7**	**0.028**	**-**	**-**	**0.028**	**-**	**27.9**
182.90		57.3	663.0	720.3	0.026	-	-	0.026	-	25.8
182.80		38.1	534.0	572.1	0.023	-	-	0.023	-	23.5
182.70		22.0	413.0	435.0	0.021	-	-	0.021	-	20.9
182.60		10.9	299.0	309.9	0.018	-	-	0.018	-	18.0
182.50		5.1	192.0	197.1	0.014	-	-	0.014	-	14.5
182.40		**1.9**	**93.0**	**94.9**	**0.010**	**-**	**-**	**0.010**	**-**	**9.8**
182.30		0.2	0.0	0.2	0.003	-	-	0.003	-	3.1
182.23		**0.0**		**0.0**	**-**	**-**	**-**	**0.000**	**-**	**0.0**

Stage Storage Discharge Calculation Sheet

Project Name: Barrick Dunsire Apartments
Project No.: 26029
Date: May 2026

		Rooftop Storage	*Control Structure - Total Outflow*	Total Outflow
				DISCHARGE
Elevation (m)		(m^3)	(m^3/s)	(L/s)
0.100		637.2	**0.046**	46.0
0.075		477.9	**0.035**	34.5
0.050		318.6	**0.023**	**23.0**
0.025		159.3	0.012	11.5
0.000			**0.000**	**0.0**

Calculation assumes use of the Zurn - ZCF130.
Each building (6) has 5 rooftop drains. Each 'Control-Flo' Weir is linear functioning with a flow rate of 5GPM (23LPM) per inch of water buildup.

MIDUSS OUTPUT FILE – EXISTING CONDITIONS

```
       Output File (4.7) EX.OUT       opened 2026-05-07  13:12
       Units used are defined by G =    9.810
          144   288    10.000        are MAXDT MAXHYD & DTMIN values
       Licensee: UPPER CANADA CONSULTANTS
35     COMMENT
      4     line(s) of comment
       BARRICK DUNSIRE APARTMENTS - PORT COLBORNE
       STORMWATER MANAGEMENT PLAN
       EXISTING CONDITIONS
       MAY 2026
14     START
      1     1=Zero; 2=Define
35     COMMENT
      3     line(s) of comment
       ************************************************
       ** 2 YEAR DESIGN STORM EVENT *********************
       ************************************************
 2     STORM
          1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
    397.149     Coefficient  a
       .000     Constant  b    (min)
       .699     Exponent  c
       .450     Fraction to peak  r
    240.000     Duration   1440 min
           34.451 mm     Total depth
 3     IMPERVIOUS
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .015     Manning "n"
     98.000     SCS Curve No or C
       .100     Ia/S Coefficient
       .518     Initial Abstraction
35     COMMENT
      1     line(s) of comment
       ** EX10 - AREA TO WEST SIDE ROAD **
 4     CATCHMENT
     10.000     ID No.  99999
      3.060     Area in hectares
    145.000     Length (PERV) metres
      1.000     Gradient (%)
      7.500     Per cent Impervious
    145.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .032       .000       .000       .000 c.m/s
          .165       .839       .215     C perv/imperv/total
27     HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .2269322E+03 c.m
35     COMMENT
      1     line(s) of comment
       ** EX30 - AREA TO SOUTHERLY WEST SIDE ROAD **
 4     CATCHMENT
     30.000     ID No.  99999
       .650     Area in hectares
     65.000     Length (PERV) metres
      1.000     Gradient (%)
      1.000     Per cent Impervious
     65.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .005       .000       .000       .000 c.m/s
          .165       .849       .171     C perv/imperv/total
27     HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .3838188E+02 c.m
35     COMMENT
      1     line(s) of comment
       ** EX40 - AREA TO STEELE STREET **
 4     CATCHMENT
     40.000     ID No.  99999
      2.020     Area in hectares
    115.000     Length (PERV) metres
      1.000     Gradient (%)
      4.500     Per cent Impervious
    115.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .014       .000       .000       .000 c.m/s
          .165       .831       .195     C perv/imperv/total
27     HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .1355093E+03 c.m
14     START
      1     1=Zero; 2=Define
35     COMMENT
      3     line(s) of comment
       ************************************************
       ** 5YR DESIGN STORM EVENT *************************
       ************************************************
 2     STORM
          1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
    524.867     Coefficient  a
       .000     Constant  b    (min)
       .699     Exponent  c
       .450     Fraction to peak  r
    240.000     Duration   1440 min
           45.530 mm     Total depth
 3     IMPERVIOUS
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .015     Manning "n"
     98.000     SCS Curve No or C
       .100     Ia/S Coefficient
       .518     Initial Abstraction
35     COMMENT
      1     line(s) of comment
       ** EX10 - AREA TO WEST SIDE ROAD **
 4     CATCHMENT
     10.000     ID No.  99999
      3.060     Area in hectares
    145.000     Length (PERV) metres
      1.000     Gradient (%)
      7.500     Per cent Impervious
    145.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .049       .000       .000       .000 c.m/s
          .234       .861       .281     C perv/imperv/total
27     HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .3912048E+03 c.m
35     COMMENT
      1     line(s) of comment
       ** EX30 - AREA TO SOUTHERLY WEST SIDE ROAD **
 4     CATCHMENT
     30.000     ID No.  99999
       .650     Area in hectares
     65.000     Length (PERV) metres
      1.000     Gradient (%)
      1.000     Per cent Impervious
     65.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .011       .000       .000       .000 c.m/s
          .234       .880       .240     C perv/imperv/total
27     HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .7110220E+02 c.m
35     COMMENT
      1     line(s) of comment
       ** EX40 - AREA TO STEELE STREET **
 4     CATCHMENT
     40.000     ID No.  99999
      2.020     Area in hectares
    115.000     Length (PERV) metres
      1.000     Gradient (%)
      4.500     Per cent Impervious
    115.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
```

```
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .028       .000       .000       .000 c.m/s
              .234       .872       .263     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .2414468E+03 c.m
35     COMMENT
       1     line(s) of comment
        ** EX20/A20 - CHURCH PARKING LOT **
 4     CATCHMENT
       20.000     ID No.  99999
        .340     Area in hectares
       50.000     Length (PERV) metres
        1.000     Gradient (%)
       92.000     Per cent Impervious
       50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
       74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .064       .000       .000       .000 c.m/s
              .234       .874       .822     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .1272984E+03 c.m
14     START
       1     1=Zero; 2=Define
35     COMMENT
       3     line(s) of comment
        ****************************************************
        ** 10YR DESIGN STORM EVENT **************************
        ****************************************************
 2     STORM
           1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
      608.845     Coefficient  a
        .000     Constant  b    (min)
        .699     Exponent  c
        .450     Fraction to peak  r
      240.000     Duration   1440 min
                 52.815 mm     Total depth
 3     IMPERVIOUS
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .015     Manning "n"
       98.000     SCS Curve No or C
        .100     Ia/S Coefficient
        .518     Initial Abstraction
35     COMMENT
       1     line(s) of comment
        ** EX20 - CHURCH PARKING LOT MINUS 5 YEAR FLOWS **
 4     CATCHMENT
       20.000     ID No.  99999
        .340     Area in hectares
       50.000     Length (PERV) metres
        1.000     Gradient (%)
       92.000     Per cent Impervious
       50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
       74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .076       .000       .000       .000 c.m/s
              .273       .887       .838     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .1505184E+03 c.m
15     ADD RUNOFF
              .076       .076       .000       .000 c.m/s
35     COMMENT
       1     line(s) of comment
        ** DIVERSION  OF 5YR FLOW   **
12     DIVERT
           1     U/S Node No.  99999
        .064     Threshold Discharge
        .064     Max. Outflow reqd.
            Qmax & Vol.Diverted =      .012 c.m/s         7.3 c.m
            No flow diverted
              .076       .076       .064       .000 c.m/s
22     FILE HYDROGRAPH
       1     1=READ: 2=WRITE
      12     DIV00001.010        is Filename
       2     1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary
              .076       .012       .064       .000 c.m/s
27     HYDROGRAPH DISPLAY
       5     is # of Hyeto/Hydrograph chosen
        Volume  =  .7339458E+01 c.m
35     COMMENT
       1     line(s) of comment
        ** EX10 - AREA TO WEST SIDE ROAD **
 4     CATCHMENT
       10.000     ID No.  99999
        3.060     Area in hectares
      145.000     Length (PERV) metres
        1.000     Gradient (%)
        7.500     Per cent Impervious
      145.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
       74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .063       .012       .064       .000 c.m/s
              .274       .880       .319     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .5159803E+03 c.m
15     ADD RUNOFF
              .063       .063       .064       .000 c.m/s
27     HYDROGRAPH DISPLAY
       5     is # of Hyeto/Hydrograph chosen
        Volume  =  .5233198E+03 c.m
35     COMMENT
       1     line(s) of comment
        ** EX30 - AREA TO SOUTHERLY WEST SIDE ROAD **
 4     CATCHMENT
       30.000     ID No.  99999
        .650     Area in hectares
       65.000     Length (PERV) metres
        1.000     Gradient (%)
        1.000     Per cent Impervious
       65.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
       74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .017       .063       .064       .000 c.m/s
              .274       .891       .280     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .9607172E+02 c.m
35     COMMENT
       1     line(s) of comment
        ** EX40 - AREA TO STEELE STREET **
 4     CATCHMENT
       40.000     ID No.  99999
        2.020     Area in hectares
      115.000     Length (PERV) metres
        1.000     Gradient (%)
        4.500     Per cent Impervious
      115.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
       74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .043       .063       .064       .000 c.m/s
              .274       .890       .301     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .3214242E+03 c.m
14     START
       1     1=Zero; 2=Define
35     COMMENT
       3     line(s) of comment
        ****************************************************
        ** 25YR DESIGN STORM EVENT **************************
        ****************************************************
 2     STORM
           1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
      715.568     Coefficient  a
        .000     Constant  b    (min)
        .699     Exponent  c
        .450     Fraction to peak  r
      240.000     Duration   1440 min
                 62.073 mm     Total depth
 3     IMPERVIOUS
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .015     Manning "n"
       98.000     SCS Curve No or C
        .100     Ia/S Coefficient
        .518     Initial Abstraction
35     COMMENT
       1     line(s) of comment
        ** EX20 - CHURCH PARKING LOT MINUS 5 YEAR FLOWS **
 4     CATCHMENT
       20.000     ID No.  99999
        .340     Area in hectares
```

```
      50.000     Length (PERV) metres
       1.000     Gradient (%)
      92.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .092       .000       .064       .000 c.m/s
              .319       .900       .853     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .1801081E+03 c.m
15    ADD RUNOFF
              .092       .092       .064       .000 c.m/s
35    COMMENT
      1     line(s) of comment
       ** DIVERSION  OF 5YR FLOW   **
12    DIVERT
           1     U/S Node No.  99999
        .064     Threshold Discharge
        .064     Max. Outflow reqd.
           Qmax & Vol.Diverted =      .028 c.m/s        16.7 c.m
           No flow diverted
              .092       .092       .064       .000 c.m/s
22    FILE HYDROGRAPH
      1     1=READ: 2=WRITE
      12    DIV00001.025         is Filename
      2     1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary
              .092       .028       .064       .000 c.m/s
27    HYDROGRAPH DISPLAY
      5     is # of Hyeto/Hydrograph chosen
       Volume  =  .1668661E+02 c.m
35    COMMENT
      1     line(s) of comment
       ** EX10 - AREA TO WEST SIDE ROAD **
 4    CATCHMENT
      10.000     ID No.  99999
       3.060     Area in hectares
      145.000    Length (PERV) metres
       1.000     Gradient (%)
       7.500     Per cent Impervious
      145.000    Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .091       .028       .064       .000 c.m/s
              .319       .899       .363     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .6888351E+03 c.m
15    ADD RUNOFF
              .091       .093       .064       .000 c.m/s
27    HYDROGRAPH DISPLAY
      5     is # of Hyeto/Hydrograph chosen
       Volume  =  .7055217E+03 c.m
35    COMMENT
      1     line(s) of comment
       ** EX30 - AREA TO SOUTHERLY WEST SIDE ROAD **
 4    CATCHMENT
      30.000     ID No.  99999
        .650     Area in hectares
      65.000     Length (PERV) metres
       1.000     Gradient (%)
       1.000     Per cent Impervious
      65.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .028       .093       .064       .000 c.m/s
              .318       .902       .324     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .1308428E+03 c.m
35    COMMENT
      1     line(s) of comment
       ** EX40 - AREA TO STEELE STREET **
 4    CATCHMENT
      40.000     ID No.  99999
       2.020     Area in hectares
      115.000    Length (PERV) metres
       1.000     Gradient (%)
       4.500     Per cent Impervious
      115.000    Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .068       .093       .064       .000 c.m/s
              .319       .906       .345     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .4329594E+03 c.m
14    START
      1     1=Zero; 2=Define
35    COMMENT
      3     line(s) of comment
       ********************************
       ** 100 YEAR DESIGN STORM EVENT **
       ********************************
 2    STORM
           1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
      980.000    Coefficient  a
       3.700     Constant  b    (min)
        .732     Exponent  c
        .450     Fraction to peak  r
      240.000    Duration   1440 min
               70.157 mm     Total depth
 3    IMPERVIOUS
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .015     Manning "n"
      98.000     SCS Curve No or C
        .100     Ia/S Coefficient
        .518     Initial Abstraction
35    COMMENT
      1     line(s) of comment
       ** EX20 - CHURCH PARKING LOT MINUS 5 YEAR FLOWS **
 4    CATCHMENT
      20.000     ID No.  99999
        .340     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
      92.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .096       .000       .064       .000 c.m/s
              .353       .909       .865     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .2062546E+03 c.m
15    ADD RUNOFF
              .096       .096       .064       .000 c.m/s
35    COMMENT
      1     line(s) of comment
       ** DIVERSION  OF 5YR FLOW   **
12    DIVERT
           1     U/S Node No.  99999
        .064     Threshold Discharge
        .064     Max. Outflow reqd.
           Qmax & Vol.Diverted =      .032 c.m/s        19.5 c.m
           No flow diverted
              .096       .096       .064       .000 c.m/s
22    FILE HYDROGRAPH
      1     1=READ: 2=WRITE
      12    DIV00001.100         is Filename
      2     1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary
              .096       .032       .064       .000 c.m/s
27    HYDROGRAPH DISPLAY
      5     is # of Hyeto/Hydrograph chosen
       Volume  =  .1948349E+02 c.m
35    COMMENT
      1     line(s) of comment
       ** EX10 - AREA TO WEST SIDE ROAD **
 4    CATCHMENT
      10.000     ID No.  99999
       3.060     Area in hectares
      145.000    Length (PERV) metres
       1.000     Gradient (%)
       7.500     Per cent Impervious
      145.000    Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .124       .032       .064       .000 c.m/s
              .355       .910       .397     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .8512994E+03 c.m
```

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15     ADD RUNOFF
              .124       .124       .064       .000 c.m/s
27     HYDROGRAPH DISPLAY
       5     is # of Hyeto/Hydrograph chosen
        Volume  =  .8707829E+03 c.m
35     COMMENT
       1     line(s) of comment
        ** EX30 - AREA TO SOUTHERLY WEST SIDE ROAD **
 4     CATCHMENT
       30.000     ID No.  99999
         .650     Area in hectares
       65.000     Length (PERV) metres
        1.000     Gradient (%)
        1.000     Per cent Impervious
       65.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .250     Manning "n"
       74.000     SCS Curve No or C
         .100     Ia/S Coefficient
        8.924     Initial Abstraction
            1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
               .036       .124       .064       .000 c.m/s
               .355       .911       .360     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .1643306E+03 c.m
35     COMMENT
       1     line(s) of comment
        ** EX40 - AREA TO STEELE STREET **
 4     CATCHMENT
       40.000     ID No.  99999
        2.020     Area in hectares
      115.000     Length (PERV) metres
        1.000     Gradient (%)
        4.500     Per cent Impervious
      115.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .250     Manning "n"
       74.000     SCS Curve No or C
         .100     Ia/S Coefficient
        8.924     Initial Abstraction
            1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
               .087       .124       .064       .000 c.m/s
               .355       .914       .380     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .5386716E+03 c.m
20     MANUAL
```

MIDUSS OUTPUT FILE – FUTURE CONDITIONS – NO SWM

```
      Output File (4.7) NOSWM.OUT    opened 2026-05-01   9:24
      Units used are defined by G =    9.810
         144   288    10.000        are MAXDT MAXHYD & DTMIN values
      Licensee: UPPER CANADA CONSULTANTS
 35   COMMENT
      4     line(s) of comment
      BARRICK DUNSIRE APARTMENTS - PORT COLBORNE
      STORMWATER MANAGEMENT PLAN
      FUTURE CONDITIONS
      MAY 2026
 14   START
      1     1=Zero; 2=Define
 35   COMMENT
      3     line(s) of comment
      ************************************************
      ** 2 YEAR DESIGN STORM EVENT **********************
      ************************************************
  2   STORM
          1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
    397.149     Coefficient  a
       .000     Constant  b    (min)
       .699     Exponent  c
       .450     Fraction to peak  r
    240.000     Duration   1440 min
              34.451 mm     Total depth
  3   IMPERVIOUS
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .015     Manning "n"
     98.000     SCS Curve No or C
       .100     Ia/S Coefficient
       .518     Initial Abstraction
 35   COMMENT
      1     line(s) of comment
      ** A10 - INTERNAL SITE AREA TO DRY POND **
  4   CATCHMENT
     10.000     ID No.  99999
      5.260     Area in hectares
    190.000     Length (PERV) metres
      1.000     Gradient (%)
     75.000     Per cent Impervious
    190.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             .527       .000       .000       .000 c.m/s
             .165       .850       .679     C perv/imperv/total
 15   ADD RUNOFF
             .527       .527       .000       .000 c.m/s
  9   ROUTE
       .000     Conduit Length
       .000     No Conduit defined
       .000     Zero lag
       .000     Beta weighting factor
       .000     Routing timestep
          0     No. of sub-reaches
             .527       .527       .527       .000 c.m/s
 17   COMBINE
      1     Junction Node No.
             .527       .527       .527       .527 c.m/s
 14   START
      1     1=Zero; 2=Define
 35   COMMENT
      1     line(s) of comment
      ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
  4   CATCHMENT
     11.000     ID No.  99999
       .400     Area in hectares
     50.000     Length (PERV) metres
      1.000     Gradient (%)
      5.000     Per cent Impervious
     50.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             .003       .000       .527       .527 c.m/s
             .165       .847       .199     C perv/imperv/total
 15   ADD RUNOFF
             .003       .003       .527       .527 c.m/s
  9   ROUTE
       .000     Conduit Length
       .000     No Conduit defined
       .000     Zero lag
       .000     Beta weighting factor
       .000     Routing timestep
          0     No. of sub-reaches
             .003       .003       .003       .527 c.m/s
 17   COMBINE
      1     Junction Node No.
             .003       .003       .003       .530 c.m/s
 18   CONFLUENCE
      1     Junction Node No.
             .003       .530       .003       .000 c.m/s
 27   HYDROGRAPH DISPLAY
      5     is # of Hyeto/Hydrograph chosen
      Volume  =  .1254600E+04 c.m
 14   START
      1     1=Zero; 2=Define
 35   COMMENT
      1     line(s) of comment
      ** A30 - EAST PERIMETER LANDS TO STEELE ST **
  4   CATCHMENT
     30.000     ID No.  99999
       .080     Area in hectares
     10.000     Length (PERV) metres
      2.000     Gradient (%)
      5.000     Per cent Impervious
     10.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             .001       .000       .003       .000 c.m/s
             .164       .796       .196     C perv/imperv/total
 27   HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
      Volume  =  .5391175E+01 c.m
 14   START
      1     1=Zero; 2=Define
 35   COMMENT
      3     line(s) of comment
      ************************************************
      ** 5YR DESIGN STORM EVENT **************************
      ************************************************
  2   STORM
          1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
    524.867     Coefficient  a
       .000     Constant  b    (min)
       .699     Exponent  c
       .450     Fraction to peak  r
    240.000     Duration   1440 min
             45.530 mm     Total depth
  3   IMPERVIOUS
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .015     Manning "n"
     98.000     SCS Curve No or C
       .100     Ia/S Coefficient
       .518     Initial Abstraction
 35   COMMENT
      1     line(s) of comment
      ** A10 - INTERNAL SITE AREA TO DRY POND **
  4   CATCHMENT
     10.000     ID No.  99999
      5.260     Area in hectares
    190.000     Length (PERV) metres
      1.000     Gradient (%)
     75.000     Per cent Impervious
    190.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             .692       .000       .003       .000 c.m/s
             .234       .875       .714     C perv/imperv/total
 27   HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
      Volume  =  .1710142E+04 c.m
 15   ADD RUNOFF
             .692       .692       .003       .000 c.m/s
  9   ROUTE
       .000     Conduit Length
       .000     No Conduit defined
       .000     Zero lag
       .000     Beta weighting factor
       .000     Routing timestep
          0     No. of sub-reaches
             .692       .692       .692       .000 c.m/s
 17   COMBINE
      1     Junction Node No.
             .692       .692       .692       .692 c.m/s
 14   START
      1     1=Zero; 2=Define
 35   COMMENT
      1     line(s) of comment
      ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
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 4     CATCHMENT
      11.000     ID No.  99999
        .400     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
       5.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             .008       .000       .692       .692 c.m/s
             .234       .874       .266     C perv/imperv/total
15     ADD RUNOFF
             .008       .008       .692       .692 c.m/s
 9     ROUTE
        .000     Conduit Length
        .000     No Conduit defined
        .000     Zero lag
        .000     Beta weighting factor
        .000     Routing timestep
           0     No. of sub-reaches
             .008       .008       .008       .692 c.m/s
17     COMBINE
       1     Junction Node No.
             .008       .008       .008       .699 c.m/s
18     CONFLUENCE
       1     Junction Node No.
             .008       .699       .008       .000 c.m/s
27     HYDROGRAPH DISPLAY
       5     is # of Hyeto/Hydrograph chosen
        Volume  =  .1755600E+04 c.m
14     START
       1     1=Zero; 2=Define
35     COMMENT
       1     line(s) of comment
        ** A30 - EAST PERIMETER LANDS TO STEELE ST **
 4     CATCHMENT
      30.000     ID No.  99999
        .080     Area in hectares
      10.000     Length (PERV) metres
       2.000     Gradient (%)
       5.000     Per cent Impervious
      10.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             .003       .000       .008       .000 c.m/s
             .233       .815       .262     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .9551249E+01 c.m
35     COMMENT
       1     line(s) of comment
        ** EX20/A20 - CHURCH PARKING LOT **
 4     CATCHMENT
      20.000     ID No.  99999
        .340     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
      92.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             .064       .000       .008       .000 c.m/s
             .234       .874       .822     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .1272984E+03 c.m
14     START
       1     1=Zero; 2=Define
35     COMMENT
       3     line(s) of comment
        ****************************************************
        ** 10YR DESIGN STORM EVENT **************************
        ****************************************************
 2     STORM
          1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
     608.845     Coefficient  a
        .000     Constant  b    (min)
        .699     Exponent  c
        .450     Fraction to peak  r
     240.000     Duration   1440 min
               52.815 mm     Total depth
 3     IMPERVIOUS
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .015     Manning "n"
      98.000     SCS Curve No or C
        .100     Ia/S Coefficient
        .518     Initial Abstraction
35     COMMENT
       1     line(s) of comment
        ** A20 - CHURCH PARKING LOT MINUS 5 YEAR FLOWS **
 4     CATCHMENT
      20.000     ID No.  99999
        .340     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
      92.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             .076       .000       .008       .000 c.m/s
             .273       .887       .838     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .1505184E+03 c.m
15     ADD RUNOFF
             .076       .076       .008       .000 c.m/s
35     COMMENT
       1     line(s) of comment
        ** DIVERSION  OF 5YR FLOW   **
12     DIVERT
          1     U/S Node No.  99999
        .064     Threshold Discharge
        .064     Max. Outflow reqd.
           Qmax & Vol.Diverted =      .012 c.m/s         7.3 c.m
           No flow diverted
             .076       .076       .064       .000 c.m/s
22     FILE HYDROGRAPH
       1     1=READ: 2=WRITE
      12     DIV00001.010         is Filename
       2     1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary
             .076       .012       .064       .000 c.m/s
27     HYDROGRAPH DISPLAY
       5     is # of Hyeto/Hydrograph chosen
        Volume  =  .7339458E+01 c.m
35     COMMENT
       1     line(s) of comment
        ** A10 - INTERNAL SITE AREA TO DRY POND **
 4     CATCHMENT
      10.000     ID No.  99999
       5.260     Area in hectares
     190.000     Length (PERV) metres
       1.000     Gradient (%)
      75.000     Per cent Impervious
     190.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             .805       .012       .064       .000 c.m/s
             .274       .881       .729     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .2025624E+04 c.m
15     ADD RUNOFF
             .805       .805       .064       .000 c.m/s
 9     ROUTE
        .000     Conduit Length
        .000     No Conduit defined
        .000     Zero lag
        .000     Beta weighting factor
        .000     Routing timestep
           0     No. of sub-reaches
             .805       .805       .805       .000 c.m/s
17     COMBINE
       1     Junction Node No.
             .805       .805       .805       .805 c.m/s
14     START
       1     1=Zero; 2=Define
35     COMMENT
       1     line(s) of comment
        ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
 4     CATCHMENT
      11.000     ID No.  99999
        .400     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
       5.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
```

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          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .013       .000       .805       .805 c.m/s
          .273       .887       .304     C perv/imperv/total
15   ADD RUNOFF
          .013       .013       .805       .805 c.m/s
 9   ROUTE
       .000     Conduit Length
       .000     No Conduit defined
       .000     Zero lag
       .000     Beta weighting factor
       .000     Routing timestep
          0     No. of sub-reaches
          .013       .013       .013       .805 c.m/s
17   COMBINE
     1     Junction Node No.
          .013       .013       .013       .815 c.m/s
18   CONFLUENCE
     1     Junction Node No.
          .013       .815       .013       .000 c.m/s
27   HYDROGRAPH DISPLAY
     5     is # of Hyeto/Hydrograph chosen
      Volume  =  .2096400E+04 c.m
14   START
     1     1=Zero; 2=Define
35   COMMENT
     1     line(s) of comment
      ** A30 - EAST PERIMETER LANDS TO STEELE ST **
 4   CATCHMENT
     30.000     ID No.  99999
       .080     Area in hectares
     10.000     Length (PERV) metres
      2.000     Gradient (%)
      5.000     Per cent Impervious
     10.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .004       .000       .013       .000 c.m/s
          .273       .822       .300     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .1268716E+02 c.m
14   START
     1     1=Zero; 2=Define
35   COMMENT
     3     line(s) of comment
      ******************************************************
      ** 25YR DESIGN STORM EVENT ***************************
      ******************************************************
 2   STORM
          1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
     715.568     Coefficient  a
       .000     Constant  b    (min)
       .699     Exponent  c
       .450     Fraction to peak  r
     240.000     Duration   1440 min
           62.073 mm     Total depth
 3   IMPERVIOUS
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .015     Manning "n"
     98.000     SCS Curve No or C
       .100     Ia/S Coefficient
       .518     Initial Abstraction
35   COMMENT
     1     line(s) of comment
      ** A20 - CHURCH PARKING LOT MINUS 5 YEAR FLOWS **
 4   CATCHMENT
     20.000     ID No.  99999
       .340     Area in hectares
     50.000     Length (PERV) metres
      1.000     Gradient (%)
     92.000     Per cent Impervious
     50.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .092       .000       .013       .000 c.m/s
          .319       .900       .853     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .1801078E+03 c.m
15   ADD RUNOFF
          .092       .092       .013       .000 c.m/s
35   COMMENT
     1     line(s) of comment
      ** DIVERSION  OF 5YR FLOW   **
12   DIVERT
          1     U/S Node No.  99999
       .064     Threshold Discharge
       .064     Max. Outflow reqd.
          Qmax & Vol.Diverted =      .028 c.m/s        16.7 c.m
          No flow diverted
          .092       .092       .064       .000 c.m/s
22   FILE HYDROGRAPH
     1     1=READ: 2=WRITE
     12    DIV00001.025         is Filename
     2     1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary
          .092       .028       .064       .000 c.m/s
27   HYDROGRAPH DISPLAY
     5     is # of Hyeto/Hydrograph chosen
      Volume  =  .1668661E+02 c.m
35   COMMENT
     1     line(s) of comment
      ** A10 - INTERNAL SITE AREA TO DRY POND **
 4   CATCHMENT
     10.000     ID No.  99999
      5.260     Area in hectares
     190.000     Length (PERV) metres
      1.000     Gradient (%)
     75.000     Per cent Impervious
     190.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .946       .028       .064       .000 c.m/s
          .320       .886       .744     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .2430131E+04 c.m
15   ADD RUNOFF
          .946       .946       .064       .000 c.m/s
 9   ROUTE
       .000     Conduit Length
       .000     No Conduit defined
       .000     Zero lag
       .000     Beta weighting factor
       .000     Routing timestep
          0     No. of sub-reaches
          .946       .946       .946       .000 c.m/s
17   COMBINE
     1     Junction Node No.
          .946       .946       .946       .946 c.m/s
14   START
     1     1=Zero; 2=Define
35   COMMENT
     1     line(s) of comment
      ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
 4   CATCHMENT
     11.000     ID No.  99999
       .400     Area in hectares
     50.000     Length (PERV) metres
      1.000     Gradient (%)
      5.000     Per cent Impervious
     50.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .019       .000       .946       .946 c.m/s
          .319       .900       .348     C perv/imperv/total
15   ADD RUNOFF
          .019       .019       .946       .946 c.m/s
 9   ROUTE
       .000     Conduit Length
       .000     No Conduit defined
       .000     Zero lag
       .000     Beta weighting factor
       .000     Routing timestep
          0     No. of sub-reaches
          .019       .019       .019       .946 c.m/s
17   COMBINE
     1     Junction Node No.
          .019       .019       .019       .962 c.m/s
18   CONFLUENCE
     1     Junction Node No.
          .019       .962       .019       .000 c.m/s
27   HYDROGRAPH DISPLAY
     5     is # of Hyeto/Hydrograph chosen
      Volume  =  .2530800E+04 c.m
14   START
     1     1=Zero; 2=Define
35   COMMENT
```

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      1     line(s) of comment
       ** A30 - EAST PERIMETER LANDS TO STEELE ST **
 4     CATCHMENT
      30.000     ID No.  99999
        .080     Area in hectares
      10.000     Length (PERV) metres
       2.000     Gradient (%)
       5.000     Per cent Impervious
      10.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .006       .000       .019       .000 c.m/s
              .315       .831       .341     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
       Volume  =  .1692225E+02 c.m
14     START
       1     1=Zero; 2=Define
35     COMMENT
       3     line(s) of comment
       *********************************
       ** 100 YEAR DESIGN STORM EVENT **
       *********************************
 2     STORM
           1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
     980.000     Coefficient  a
       3.700     Constant  b    (min)
        .732     Exponent  c
        .450     Fraction to peak  r
     240.000     Duration   1440 min
               70.157 mm     Total depth
 3     IMPERVIOUS
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .015     Manning "n"
      98.000     SCS Curve No or C
        .100     Ia/S Coefficient
        .518     Initial Abstraction
35     COMMENT
       1     line(s) of comment
       ** A20 - CHURCH PARKING LOT MINUS 5 YEAR FLOWS **
 4     CATCHMENT
      20.000     ID No.  99999
        .340     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
      92.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .096       .000       .019       .000 c.m/s
              .353       .909       .865     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
       Volume  =  .2062546E+03 c.m
15     ADD RUNOFF
              .096       .096       .019       .000 c.m/s
35     COMMENT
       1     line(s) of comment
       ** DIVERSION  OF 5YR FLOW   **
12     DIVERT
           1     U/S Node No.  99999
        .064     Threshold Discharge
        .064     Max. Outflow reqd.
            Qmax & Vol.Diverted =      .032 c.m/s        19.5 c.m
            No flow diverted
              .096       .096       .064       .000 c.m/s
22     FILE HYDROGRAPH
       1     1=READ: 2=WRITE
      12     DIV00001.100         is Filename
       2     1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary
              .096       .032       .064       .000 c.m/s
27     HYDROGRAPH DISPLAY
       5     is # of Hyeto/Hydrograph chosen
       Volume  =  .1948349E+02 c.m
35     COMMENT
       1     line(s) of comment
       ** A10 - INTERNAL SITE AREA TO DRY POND **
 4     CATCHMENT
      10.000     ID No.  99999
       5.260     Area in hectares
     190.000     Length (PERV) metres
       1.000     Gradient (%)
      75.000     Per cent Impervious
     190.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             1.024       .032       .064       .000 c.m/s
              .355       .899       .763     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
       Volume  =  .2815627E+04 c.m
15     ADD RUNOFF
             1.024      1.024       .064       .000 c.m/s
 9     ROUTE
        .000     Conduit Length
        .000     No Conduit defined
        .000     Zero lag
        .000     Beta weighting factor
        .000     Routing timestep
           0     No. of sub-reaches
             1.024      1.024      1.024       .000 c.m/s
17     COMBINE
       1     Junction Node No.
             1.024      1.024      1.024      1.024 c.m/s
14     START
       1     1=Zero; 2=Define
35     COMMENT
       1     line(s) of comment
       ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
 4     CATCHMENT
      11.000     ID No.  99999
        .400     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
       5.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .024       .000      1.024      1.024 c.m/s
              .353       .909       .381     C perv/imperv/total
15     ADD RUNOFF
              .024       .024      1.024      1.024 c.m/s
 9     ROUTE
        .000     Conduit Length
        .000     No Conduit defined
        .000     Zero lag
        .000     Beta weighting factor
        .000     Routing timestep
           0     No. of sub-reaches
              .024       .024       .024      1.024 c.m/s
17     COMBINE
       1     Junction Node No.
              .024       .024       .024      1.045 c.m/s
18     CONFLUENCE
       1     Junction Node No.
              .024      1.045       .024       .000 c.m/s
27     HYDROGRAPH DISPLAY
       5     is # of Hyeto/Hydrograph chosen
       Volume  =  .2941199E+04 c.m
14     START
       1     1=Zero; 2=Define
35     COMMENT
       1     line(s) of comment
       ** A30 - EAST PERIMETER LANDS TO STEELE ST **
 4     CATCHMENT
      30.000     ID No.  99999
        .080     Area in hectares
      10.000     Length (PERV) metres
       2.000     Gradient (%)
       5.000     Per cent Impervious
      10.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .008       .000       .024       .000 c.m/s
              .349       .837       .374     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
       Volume  =  .2097069E+02 c.m
```

MIDUSS OUTPUT FILE – FUTURE CONDITIONS – with SWM

```
        Output File (4.7) SWM1.OUT     opened 2026-09-14  16:12
        Units used are defined by G =    9.810
           144   288    10.000        are MAXDT MAXHYD & DTMIN values
        Licensee: UPPER CANADA CONSULTANTS
 35     COMMENT
       4     line(s) of comment
        BARRICK DUNSIRE APARTMENTS - PORT COLBORNE
        STORMWATER MANAGEMENT PLAN
        FUTURE CONDITIONS
        SEPTEMBER 2026
 35     COMMENT
       3     line(s) of comment
        **********************************
        ** 25MM STORM EVENT ***************
        **********************************
  2     STORM
            1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
      512.000     Coefficient  a
        6.000     Constant  b    (min)
         .800     Exponent  c
         .450     Fraction to peak  r
      240.000     Duration   1440 min
                 25.035 mm     Total depth
  3     IMPERVIOUS
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .015     Manning "n"
       98.000     SCS Curve No or C
         .100     Ia/S Coefficient
         .518     Initial Abstraction
 35     COMMENT
       1     line(s) of comment
        ** A10 - INTERNAL SITE AREA TO DRY POND **
  4     CATCHMENT
       10.000     ID No.  99999
        4.550     Area in hectares
      190.000     Length (PERV) metres
        1.000     Gradient (%)
       65.000     Per cent Impervious
      190.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .250     Manning "n"
       74.000     SCS Curve No or C
         .100     Ia/S Coefficient
        8.924     Initial Abstraction
            1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
                .281       .000       .000       .000 c.m/s
                .098       .806       .558     C perv/imperv/total
 27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .6343415E+03 c.m
 15     ADD RUNOFF
                .281       .281       .000       .000 c.m/s
  9     ROUTE
         .000     Conduit Length
         .000     No Conduit defined
         .000     Zero lag
         .000     Beta weighting factor
         .000     Routing timestep
            0     No. of sub-reaches
                .281       .281       .281       .000 c.m/s
 17     COMBINE
       1     Junction Node No.
                .281       .281       .281       .281 c.m/s
 14     START
       1     1=Zero; 2=Define
 35     COMMENT
       1     line(s) of comment
        ** A10b - APARTMENT ROOFTOP CONTROLS **
  4     CATCHMENT
       10.000     ID No.  99999
         .670     Area in hectares
       20.000     Length (PERV) metres
        1.000     Gradient (%)
      100.000     Per cent Impervious
       20.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .250     Manning "n"
       74.000     SCS Curve No or C
         .100     Ia/S Coefficient
        8.924     Initial Abstraction
            1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
                .073       .000       .281       .281 c.m/s
                .098       .793       .793     C perv/imperv/total
 27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .1330463E+03 c.m
 15     ADD RUNOFF
                .073       .073       .281       .281 c.m/s
 10     POND
       5 Depth - Discharge - Volume sets
            .000       .000          .0
            .025       .0115       159.3
            .050       .0230       318.6
            .075       .0345       477.9
            .100       .0460       637.2
        Peak Outflow    =      .007 c.m/s
        Maximum Depth   =      .015 metres
        Maximum Storage =       93. c.m
                .073       .073       .007       .281 c.m/s
 17     COMBINE
       1     Junction Node No.
                .073       .073       .007       .286 c.m/s
 18     CONFLUENCE
       1     Junction Node No.
                .073       .286       .007       .000 c.m/s
 10     POND
       7 Depth - Discharge - Volume sets
        182.230        .000          .0
        182.400      .00100        95.0
        183.000       .0280       876.0
        183.300       .0440      1354.0
        183.700       .0560      2045.0
        183.800        .149      2228.0
        184.000        .610      2605.0
        Peak Outflow    =      .016 c.m/s
        Maximum Depth   =   182.736 metres
        Maximum Storage =      532. c.m
                .073       .286       .016       .000 c.m/s
 14     START
       1     1=Zero; 2=Define
 35     COMMENT
       3     line(s) of comment
        **************************************************
        ** 2 YEAR DESIGN STORM EVENT ********************
        **************************************************
  2     STORM
            1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
      397.149     Coefficient  a
         .000     Constant  b    (min)
         .699     Exponent  c
         .450     Fraction to peak  r
      240.000     Duration   1440 min
                 34.451 mm     Total depth
  3     IMPERVIOUS
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .015     Manning "n"
       98.000     SCS Curve No or C
         .100     Ia/S Coefficient
         .518     Initial Abstraction
 35     COMMENT
       1     line(s) of comment
        ** A10 - INTERNAL SITE AREA TO DRY POND **
  4     CATCHMENT
       10.000     ID No.  99999
        4.550     Area in hectares
      190.000     Length (PERV) metres
        1.000     Gradient (%)
       65.000     Per cent Impervious
      190.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .250     Manning "n"
       74.000     SCS Curve No or C
         .100     Ia/S Coefficient
        8.924     Initial Abstraction
            1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
                .396       .000       .016       .000 c.m/s
                .165       .850       .610     C perv/imperv/total
 27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .9564549E+03 c.m
 15     ADD RUNOFF
                .396       .396       .016       .000 c.m/s
  9     ROUTE
         .000     Conduit Length
         .000     No Conduit defined
         .000     Zero lag
         .000     Beta weighting factor
         .000     Routing timestep
            0     No. of sub-reaches
                .396       .396       .396       .000 c.m/s
 17     COMBINE
       1     Junction Node No.
                .396       .396       .396       .396 c.m/s
 14     START
       1     1=Zero; 2=Define
 35     COMMENT
       1     line(s) of comment
        ** A10b - APARTMENT ROOFTOP CONTROLS **
  4     CATCHMENT
       10.000     ID No.  99999
         .670     Area in hectares
       20.000     Length (PERV) metres
        1.000     Gradient (%)
      100.000     Per cent Impervious
       20.000     Length (IMPERV)
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      .000     %Imp. with Zero Dpth
         1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
      .250     Manning "n"
    74.000     SCS Curve No or C
      .100     Ia/S Coefficient
     8.924     Initial Abstraction
         1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
            .109       .000       .396       .396 c.m/s
            .165       .828       .828     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .1911015E+03 c.m
15   ADD RUNOFF
            .109       .109       .396       .396 c.m/s
10   POND
     5 Depth - Discharge - Volume sets
        .000       .000          .0
        .025      .0115       159.3
        .050      .0230       318.6
        .075      .0345       477.9
        .100      .0460       637.2
      Peak Outflow    =      .009 c.m/s
      Maximum Depth   =      .020 metres
      Maximum Storage =      128. c.m
            .109       .109       .009       .396 c.m/s
17   COMBINE
     1     Junction Node No.
            .109       .109       .009       .403 c.m/s
18   CONFLUENCE
     1     Junction Node No.
            .109       .403       .009       .000 c.m/s
10   POND
     7 Depth - Discharge - Volume sets
      182.230       .000          .0
      182.400      .00100        95.0
      183.000       .0280       876.0
      183.300       .0440      1354.0
      183.700       .0560      2045.0
      183.800        .149      2228.0
      184.000        .610      2605.0
      Peak Outflow    =      .025 c.m/s
      Maximum Depth   =   182.933 metres
      Maximum Storage =      789. c.m
            .109       .403       .025       .000 c.m/s
17   COMBINE
     1     Junction Node No.
            .109       .403       .025       .025 c.m/s
14   START
     1     1=Zero; 2=Define
35   COMMENT
     1     line(s) of comment
      ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
 4   CATCHMENT
    11.000     ID No.  99999
      .260     Area in hectares
    50.000     Length (PERV) metres
     1.000     Gradient (%)
     1.000     Per cent Impervious
    50.000     Length (IMPERV)
      .000     %Imp. with Zero Dpth
         1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
      .250     Manning "n"
    74.000     SCS Curve No or C
      .100     Ia/S Coefficient
     8.924     Initial Abstraction
         1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
            .002       .000       .025       .025 c.m/s
            .165       .847       .172     C perv/imperv/total
15   ADD RUNOFF
            .002       .002       .025       .025 c.m/s
 9   ROUTE
      .000     Conduit Length
      .000     No Conduit defined
      .000     Zero lag
      .000     Beta weighting factor
      .000     Routing timestep
         0     No. of sub-reaches
            .002       .002       .002       .025 c.m/s
17   COMBINE
     1     Junction Node No.
            .002       .002       .002       .026 c.m/s
18   CONFLUENCE
     1     Junction Node No.
            .002       .026       .002       .000 c.m/s
14   START
     1     1=Zero; 2=Define
35   COMMENT
     3     line(s) of comment
      ****************************************************
      ** 5YR DESIGN STORM EVENT **************************
      ****************************************************
 2   STORM
         1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
   524.867     Coefficient  a
      .000     Constant  b    (min)
      .699     Exponent  c
      .450     Fraction to peak  r
   240.000     Duration   1440 min
         45.530 mm     Total depth
 3   IMPERVIOUS
         1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
      .015     Manning "n"
    98.000     SCS Curve No or C
      .100     Ia/S Coefficient
      .518     Initial Abstraction
35   COMMENT
     1     line(s) of comment
      ** A10 - INTERNAL SITE AREA TO DRY POND **
 4   CATCHMENT
    10.000     ID No.  99999
     4.550     Area in hectares
   190.000     Length (PERV) metres
     1.000     Gradient (%)
    65.000     Per cent Impervious
   190.000     Length (IMPERV)
      .000     %Imp. with Zero Dpth
         1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
      .250     Manning "n"
    74.000     SCS Curve No or C
      .100     Ia/S Coefficient
     8.924     Initial Abstraction
         1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
            .521       .000       .002       .000 c.m/s
            .234       .875       .650     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .1347109E+04 c.m
15   ADD RUNOFF
            .521       .521       .002       .000 c.m/s
 9   ROUTE
      .000     Conduit Length
      .000     No Conduit defined
      .000     Zero lag
      .000     Beta weighting factor
      .000     Routing timestep
         0     No. of sub-reaches
            .521       .521       .521       .000 c.m/s
17   COMBINE
     1     Junction Node No.
            .521       .521       .521       .521 c.m/s
14   START
     1     1=Zero; 2=Define
35   COMMENT
     1     line(s) of comment
      ** A10b - APARTMENT ROOFTOP CONTROLS **
 4   CATCHMENT
    10.000     ID No.  99999
      .670     Area in hectares
    20.000     Length (PERV) metres
     1.000     Gradient (%)
   100.000     Per cent Impervious
    20.000     Length (IMPERV)
      .000     %Imp. with Zero Dpth
         1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
      .250     Manning "n"
    74.000     SCS Curve No or C
      .100     Ia/S Coefficient
     8.924     Initial Abstraction
         1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
            .151       .000       .521       .521 c.m/s
            .233       .853       .853     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .2602338E+03 c.m
15   ADD RUNOFF
            .151       .151       .521       .521 c.m/s
10   POND
     5 Depth - Discharge - Volume sets
        .000       .000          .0
        .025      .0115       159.3
        .050      .0230       318.6
        .075      .0345       477.9
        .100      .0460       637.2
      Peak Outflow    =      .013 c.m/s
      Maximum Depth   =      .027 metres
      Maximum Storage =      175. c.m
            .151       .151       .013       .521 c.m/s
17   COMBINE
     1     Junction Node No.
            .151       .151       .013       .531 c.m/s
18   CONFLUENCE
     1     Junction Node No.
            .151       .531       .013       .000 c.m/s
10   POND
     7 Depth - Discharge - Volume sets
      182.230       .000          .0
      182.400      .00100        95.0
      183.000       .0280       876.0
      183.300       .0440      1354.0
      183.700       .0560      2045.0
      183.800        .149      2228.0
      184.000        .610      2605.0
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      Peak Outflow    =      .036 c.m/s
      Maximum Depth   =   183.144 metres
      Maximum Storage =     1105. c.m
            .151       .531       .036       .000 c.m/s
17    COMBINE
      1     Junction Node No.
            .151       .531       .036       .036 c.m/s
14    START
      1     1=Zero; 2=Define
35    COMMENT
      1     line(s) of comment
       ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
 4    CATCHMENT
      11.000     ID No.  99999
        .260     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
       1.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1      Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1      Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
            .005       .000       .036       .036 c.m/s
            .234       .874       .240     C perv/imperv/total
15    ADD RUNOFF
            .005       .005       .036       .036 c.m/s
 9    ROUTE
        .000     Conduit Length
        .000     No Conduit defined
        .000     Zero lag
        .000     Beta weighting factor
        .000     Routing timestep
          0      No. of sub-reaches
            .005       .005       .005       .036 c.m/s
17    COMBINE
      1     Junction Node No.
            .005       .005       .005       .037 c.m/s
18    CONFLUENCE
      1     Junction Node No.
            .005       .037       .005       .000 c.m/s
35    COMMENT
      1     line(s) of comment
       ** EX20/A20 - CHURCH PARKING LOT **
 4    CATCHMENT
      20.000     ID No.  99999
        .340     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
      92.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1      Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1      Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
            .064       .037       .005       .000 c.m/s
            .234       .874       .822     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .1272984E+03 c.m
14    START
      1     1=Zero; 2=Define
35    COMMENT
      3     line(s) of comment
       ****************************************************
       ** 10YR DESIGN STORM EVENT **************************
       ****************************************************
 2    STORM
          1      1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
    608.845      Coefficient  a
        .000     Constant  b    (min)
        .699     Exponent  c
        .450     Fraction to peak  r
    240.000      Duration   1440 min
             52.815 mm     Total depth
 3    IMPERVIOUS
          1      Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .015     Manning "n"
      98.000     SCS Curve No or C
        .100     Ia/S Coefficient
        .518     Initial Abstraction
35    COMMENT
      1     line(s) of comment
       ** A20 - CHURCH PARKING LOT MINUS 5 YEAR FLOWS **
 4    CATCHMENT
      20.000     ID No.  99999
        .340     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
      92.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1      Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1      Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
            .076       .000       .005       .000 c.m/s
            .273       .887       .838     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .1505184E+03 c.m
15    ADD RUNOFF
            .076       .076       .005       .000 c.m/s
35    COMMENT
      1     line(s) of comment
       ** DIVERSION  OF 5YR FLOW   **
12    DIVERT
          1      U/S Node No.  99999
        .064     Threshold Discharge
        .064     Max. Outflow reqd.
            Qmax & Vol.Diverted =      .012 c.m/s         7.3 c.m
            No flow diverted
            .076       .076       .064       .000 c.m/s
22    FILE HYDROGRAPH
      1     1=READ: 2=WRITE
     12     DIV00001.010         is Filename
      2     1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary
            .076       .012       .064       .000 c.m/s
27    HYDROGRAPH DISPLAY
      5     is # of Hyeto/Hydrograph chosen
       Volume  =  .7339458E+01 c.m
35    COMMENT
      1     line(s) of comment
       ** A10 - INTERNAL SITE AREA TO DRY POND **
 4    CATCHMENT
      10.000     ID No.  99999
       4.550     Area in hectares
     190.000     Length (PERV) metres
       1.000     Gradient (%)
      65.000     Per cent Impervious
     190.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1      Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1      Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
            .607       .012       .064       .000 c.m/s
            .274       .881       .669     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .1606395E+04 c.m
15    ADD RUNOFF
            .607       .607       .064       .000 c.m/s
 9    ROUTE
        .000     Conduit Length
        .000     No Conduit defined
        .000     Zero lag
        .000     Beta weighting factor
        .000     Routing timestep
          0      No. of sub-reaches
            .607       .607       .607       .000 c.m/s
17    COMBINE
      1     Junction Node No.
            .607       .607       .607       .607 c.m/s
14    START
      1     1=Zero; 2=Define
35    COMMENT
      1     line(s) of comment
       ** A10b - APARTMENT ROOFTOP CONTROLS **
 4    CATCHMENT
      10.000     ID No.  99999
        .670     Area in hectares
      20.000     Length (PERV) metres
       1.000     Gradient (%)
     100.000     Per cent Impervious
      20.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1      Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1      Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
            .179       .000       .607       .607 c.m/s
            .273       .864       .864     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
       Volume  =  .3057813E+03 c.m
15    ADD RUNOFF
            .179       .179       .607       .607 c.m/s
10    POND
      5 Depth - Discharge - Volume sets
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        .000       .000         .0
        .025      .0115       159.3
        .050      .0230       318.6
        .075      .0345       477.9
        .100      .0460       637.2
     Peak Outflow    =      .015 c.m/s
     Maximum Depth   =      .032 metres
     Maximum Storage =      206. c.m
           .179       .179       .015       .607 c.m/s
17   COMBINE
     1     Junction Node No.
           .179       .179       .015       .619 c.m/s
18   CONFLUENCE
     1     Junction Node No.
           .179       .619       .015       .000 c.m/s
10   POND
     7 Depth - Discharge - Volume sets
     182.230       .000         .0
     182.400      .00100       95.0
     183.000      .0280       876.0
     183.300      .0440      1354.0
     183.700      .0560      2045.0
     183.800       .149      2228.0
     184.000       .610      2605.0
     Peak Outflow    =      .043 c.m/s
     Maximum Depth   =   183.277 metres
     Maximum Storage =     1318. c.m
           .179       .619       .043       .000 c.m/s
17   COMBINE
     2     Junction Node No.
           .179       .619       .043       .043 c.m/s
14   START
     1     1=Zero; 2=Define
35   COMMENT
     1     line(s) of comment
      ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
 4   CATCHMENT
     11.000     ID No.  99999
       .260     Area in hectares
     50.000     Length (PERV) metres
      1.000     Gradient (%)
      1.000     Per cent Impervious
     50.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .008       .000       .043       .043 c.m/s
          .273       .887       .279     C perv/imperv/total
15   ADD RUNOFF
           .008       .008       .043       .043 c.m/s
 9   ROUTE
       .000     Conduit Length
       .000     No Conduit defined
       .000     Zero lag
       .000     Beta weighting factor
       .000     Routing timestep
          0     No. of sub-reaches
           .008       .008       .008       .043 c.m/s
17   COMBINE
     2     Junction Node No.
           .008       .008       .008       .045 c.m/s
18   CONFLUENCE
     2     Junction Node No.
           .008       .045       .008       .000 c.m/s
35   COMMENT
     3     line(s) of comment
      ****************************************************
      ** 25YR DESIGN STORM EVENT **************************
      ****************************************************
 2   STORM
          1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
    715.568     Coefficient  a
       .000     Constant  b    (min)
       .699     Exponent  c
       .450     Fraction to peak  r
    240.000     Duration   1440 min
              62.073 mm     Total depth
 3   IMPERVIOUS
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .015     Manning "n"
     98.000     SCS Curve No or C
       .100     Ia/S Coefficient
       .518     Initial Abstraction
35   COMMENT
     1     line(s) of comment
      ** A20 - CHURCH PARKING LOT MINUS 5 YEAR FLOWS **
 4   CATCHMENT
     20.000     ID No.  99999
       .340     Area in hectares
     50.000     Length (PERV) metres
      1.000     Gradient (%)
     92.000     Per cent Impervious
     50.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
           .092       .045       .008       .000 c.m/s
           .319       .900       .853     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .1801081E+03 c.m
15   ADD RUNOFF
           .092       .103       .008       .000 c.m/s
35   COMMENT
     1     line(s) of comment
      ** DIVERSION  OF 5YR FLOW   **
12   DIVERT
          1     U/S Node No.  99999
       .064     Threshold Discharge
       .064     Max. Outflow reqd.
          Qmax & Vol.Diverted =      .039 c.m/s        32.1 c.m
          No flow diverted
           .092       .103       .064       .000 c.m/s
22   FILE HYDROGRAPH
     1     1=READ: 2=WRITE
    12     DIV00001.025         is Filename
     2     1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary
           .092       .039       .064       .000 c.m/s
27   HYDROGRAPH DISPLAY
     5     is # of Hyeto/Hydrograph chosen
      Volume  =  .3210392E+02 c.m
35   COMMENT
     1     line(s) of comment
      ** A10 - INTERNAL SITE AREA TO DRY POND **
 4   CATCHMENT
     10.000     ID No.  99999
      4.550     Area in hectares
    190.000     Length (PERV) metres
      1.000     Gradient (%)
     65.000     Per cent Impervious
    190.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
           .715       .039       .064       .000 c.m/s
           .320       .886       .688     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .1942194E+04 c.m
15   ADD RUNOFF
           .715       .729       .064       .000 c.m/s
 9   ROUTE
       .000     Conduit Length
       .000     No Conduit defined
       .000     Zero lag
       .000     Beta weighting factor
       .000     Routing timestep
          0     No. of sub-reaches
           .715       .729       .729       .000 c.m/s
17   COMBINE
     1     Junction Node No.
           .715       .729       .729       .729 c.m/s
14   START
     1     1=Zero; 2=Define
35   COMMENT
     1     line(s) of comment
      ** A10b - APARTMENT ROOFTOP CONTROLS **
 4   CATCHMENT
     10.000     ID No.  99999
       .670     Area in hectares
     20.000     Length (PERV) metres
      1.000     Gradient (%)
    100.000     Per cent Impervious
     20.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
           .214       .000       .729       .729 c.m/s
           .319       .875       .875     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .3638598E+03 c.m
15   ADD RUNOFF
           .214       .214       .729       .729 c.m/s
10   POND
     5 Depth - Discharge - Volume sets
```

```
        .000        .000          .0
        .025       .0115       159.3
        .050       .0230       318.6
        .075       .0345       477.9
        .100       .0460       637.2
     Peak Outflow    =      .018 c.m/s
     Maximum Depth   =      .038 metres
     Maximum Storage =      245. c.m
           .214       .214       .018       .729 c.m/s
17   COMBINE
     1     Junction Node No.
           .214       .214       .018       .744 c.m/s
18   CONFLUENCE
     1     Junction Node No.
           .214       .744       .018       .000 c.m/s
10   POND
     7 Depth - Discharge - Volume sets
     182.230        .000          .0
     182.400      .00100        95.0
     183.000       .0280       876.0
     183.300       .0440      1354.0
     183.700       .0560      2045.0
     183.800        .149      2228.0
     184.000        .610      2605.0
     Peak Outflow    =      .049 c.m/s
     Maximum Depth   =   183.458 metres
     Maximum Storage =     1626. c.m
           .214       .744       .049       .000 c.m/s
17   COMBINE
     2     Junction Node No.
           .214       .744       .049       .049 c.m/s
14   START
     1     1=Zero; 2=Define
35   COMMENT
     1     line(s) of comment
      ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
 4   CATCHMENT
     11.000     ID No.  99999
       .260     Area in hectares
     50.000     Length (PERV) metres
      1.000     Gradient (%)
      1.000     Per cent Impervious
     50.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .012       .000       .049       .049 c.m/s
          .319       .900       .325     C perv/imperv/total
15   ADD RUNOFF
           .012       .012       .049       .049 c.m/s
 9   ROUTE
       .000     Conduit Length
       .000     No Conduit defined
       .000     Zero lag
       .000     Beta weighting factor
       .000     Routing timestep
          0     No. of sub-reaches
           .012       .012       .012       .049 c.m/s
17   COMBINE
     2     Junction Node No.
           .012       .012       .012       .051 c.m/s
18   CONFLUENCE
     2     Junction Node No.
           .012       .051       .012       .000 c.m/s
14   START
     1     1=Zero; 2=Define
35   COMMENT
     3     line(s) of comment
      *********************************
      ** 100 YEAR DESIGN STORM EVENT **
      *********************************
 2   STORM
          1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
    980.000     Coefficient  a
      3.700     Constant  b    (min)
       .732     Exponent  c
       .450     Fraction to peak  r
    240.000     Duration   1440 min
             70.157 mm     Total depth
 3   IMPERVIOUS
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .015     Manning "n"
     98.000     SCS Curve No or C
       .100     Ia/S Coefficient
       .518     Initial Abstraction
35   COMMENT
     1     line(s) of comment
      ** A20 - CHURCH PARKING LOT MINUS 5 YEAR FLOWS **
 4   CATCHMENT
     20.000     ID No.  99999
       .340     Area in hectares
     50.000     Length (PERV) metres
      1.000     Gradient (%)
     92.000     Per cent Impervious
     50.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .096       .000       .012       .000 c.m/s
          .353       .909       .865     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .2062546E+03 c.m
15   ADD RUNOFF
           .096       .096       .012       .000 c.m/s
35   COMMENT
     1     line(s) of comment
      ** DIVERSION  OF 5YR FLOW   **
12   DIVERT
          1     U/S Node No.  99999
       .064     Threshold Discharge
       .064     Max. Outflow reqd.
          Qmax & Vol.Diverted =      .032 c.m/s        19.5 c.m
          No flow diverted
            .096       .096       .064       .000 c.m/s
22   FILE HYDROGRAPH
     1     1=READ: 2=WRITE
    12     DIV00001.100         is Filename
     2     1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary
            .096       .032       .064       .000 c.m/s
27   HYDROGRAPH DISPLAY
     5     is # of Hyeto/Hydrograph chosen
      Volume  =  .1948349E+02 c.m
35   COMMENT
     1     line(s) of comment
      ** A10 - INTERNAL SITE AREA TO DRY POND **
 4   CATCHMENT
     10.000     ID No.  99999
      4.550     Area in hectares
    190.000     Length (PERV) metres
      1.000     Gradient (%)
     65.000     Per cent Impervious
    190.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .775       .032       .064       .000 c.m/s
          .355       .899       .709     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .2261829E+04 c.m
15   ADD RUNOFF
           .775       .775       .064       .000 c.m/s
 9   ROUTE
       .000     Conduit Length
       .000     No Conduit defined
       .000     Zero lag
       .000     Beta weighting factor
       .000     Routing timestep
          0     No. of sub-reaches
           .775       .775       .775       .000 c.m/s
17   COMBINE
     1     Junction Node No.
           .775       .775       .775       .775 c.m/s
14   START
     1     1=Zero; 2=Define
35   COMMENT
     1     line(s) of comment
      ** A10b - APARTMENT ROOFTOP CONTROLS **
 4   CATCHMENT
     10.000     ID No.  99999
       .670     Area in hectares
     20.000     Length (PERV) metres
      1.000     Gradient (%)
    100.000     Per cent Impervious
     20.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     74.000     SCS Curve No or C
       .100     Ia/S Coefficient
      8.924     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .222       .000       .775       .775 c.m/s
          .353       .887       .887     C perv/imperv/total
27   HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .4168698E+03 c.m
15   ADD RUNOFF
           .222       .222       .775       .775 c.m/s
```

```
10     POND
       5 Depth - Discharge - Volume sets
           .000        .000          .0
           .025       .0115       159.3
           .050       .0230       318.6
           .075       .0345       477.9
           .100       .0460       637.2
        Peak Outflow    =      .020 c.m/s
        Maximum Depth   =      .044 metres
        Maximum Storage =      283. c.m
              .222       .222       .020       .775 c.m/s
17     COMBINE
       1     Junction Node No.
              .222       .222       .020       .792 c.m/s
18     CONFLUENCE
       1     Junction Node No.
              .222       .792       .020       .000 c.m/s
10     POND
       7 Depth - Discharge - Volume sets
        182.230        .000          .0
        182.400      .00100         95.0
        183.000       .0280        876.0
        183.300       .0440       1354.0
        183.700       .0560       2045.0
        183.800        .149       2228.0
        184.000        .610       2605.0
        Peak Outflow    =      .054 c.m/s
        Maximum Depth   =   183.620 metres
        Maximum Storage =     1907. c.m
              .222       .792       .054       .000 c.m/s
17     COMBINE
       2     Junction Node No.
              .222       .792       .054       .054 c.m/s
14     START
       1     1=Zero; 2=Define
35     COMMENT
       1     line(s) of comment
        ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
 4     CATCHMENT
       11.000     ID No.  99999
         .260     Area in hectares
       50.000     Length (PERV) metres
        1.000     Gradient (%)
        1.000     Per cent Impervious
       50.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .250     Manning "n"
       74.000     SCS Curve No or C
         .100     Ia/S Coefficient
        8.924     Initial Abstraction
            1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .016       .000       .054       .054 c.m/s
              .353       .909       .359     C perv/imperv/total
15     ADD RUNOFF
              .016       .016       .054       .054 c.m/s
 9     ROUTE
         .000     Conduit Length
         .000     No Conduit defined
         .000     Zero lag
         .000     Beta weighting factor
         .000     Routing timestep
            0     No. of sub-reaches
              .016       .016       .016       .054 c.m/s
17     COMBINE
       2     Junction Node No.
              .016       .016       .016       .058 c.m/s
18     CONFLUENCE
       2     Junction Node No.
              .016       .058       .016       .000 c.m/s
14     START
       1     1=Zero; 2=Define
35     COMMENT
       3     line(s) of comment
        ************************************************
        ** 100 YEAR DESIGN STORM EVENT  - 24 HOUR ********
        ************************************************
 2     STORM
            1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
      980.000     Coefficient  a
        3.700     Constant  b    (min)
         .732     Exponent  c
         .450     Fraction to peak  r
     1440.000     Duration   1440 min
              114.472 mm     Total depth
 3     IMPERVIOUS
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .015     Manning "n"
       98.000     SCS Curve No or C
         .100     Ia/S Coefficient
         .518     Initial Abstraction
35     COMMENT
       1     line(s) of comment
        ** A20 - CHURCH PARKING LOT MINUS 5 YEAR FLOWS **
 4     CATCHMENT
       20.000     ID No.  99999
         .340     Area in hectares
       50.000     Length (PERV) metres
        1.000     Gradient (%)
       92.000     Per cent Impervious
       50.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .250     Manning "n"
       74.000     SCS Curve No or C
         .100     Ia/S Coefficient
        8.924     Initial Abstraction
            1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .099       .000       .016       .000 c.m/s
              .499       .939       .904     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .3514841E+03 c.m
15     ADD RUNOFF
              .099       .099       .016       .000 c.m/s
35     COMMENT
       1     line(s) of comment
        ** DIVERSION  OF 5YR FLOW   **
12     DIVERT
            1     U/S Node No.  99999
         .064     Threshold Discharge
         .064     Max. Outflow reqd.
            Qmax & Vol.Diverted =      .035 c.m/s        20.9 c.m
            No flow diverted
              .099       .099       .064       .000 c.m/s
22     FILE HYDROGRAPH
       1     1=READ: 2=WRITE
      12     DIV00001.101         is Filename
       2     1=Overland: 2=Inflow: 3=Outflow: 4=Temp'ary
              .099       .035       .064       .000 c.m/s
27     HYDROGRAPH DISPLAY
       5     is # of Hyeto/Hydrograph chosen
        Volume  =  .2085932E+02 c.m
35     COMMENT
       1     line(s) of comment
        ** A10 - INTERNAL SITE AREA TO DRY POND **
 4     CATCHMENT
       10.000     ID No.  99999
        4.550     Area in hectares
      190.000     Length (PERV) metres
        1.000     Gradient (%)
       65.000     Per cent Impervious
      190.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .250     Manning "n"
       74.000     SCS Curve No or C
         .100     Ia/S Coefficient
        8.924     Initial Abstraction
            1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .808       .035       .064       .000 c.m/s
              .499       .936       .783     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .4077495E+04 c.m
15     ADD RUNOFF
              .808       .808       .064       .000 c.m/s
 9     ROUTE
         .000     Conduit Length
         .000     No Conduit defined
         .000     Zero lag
         .000     Beta weighting factor
         .000     Routing timestep
            0     No. of sub-reaches
              .808       .808       .808       .000 c.m/s
17     COMBINE
       1     Junction Node No.
              .808       .808       .808       .808 c.m/s
14     START
       1     1=Zero; 2=Define
35     COMMENT
       1     line(s) of comment
        ** A10b - APARTMENT ROOFTOP CONTROLS **
 4     CATCHMENT
       10.000     ID No.  99999
         .670     Area in hectares
       20.000     Length (PERV) metres
        1.000     Gradient (%)
      100.000     Per cent Impervious
       20.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
            1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .250     Manning "n"
       74.000     SCS Curve No or C
         .100     Ia/S Coefficient
        8.924     Initial Abstraction
            1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .225       .000       .808       .808 c.m/s
              .496       .923       .923     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .7075698E+03 c.m
```

```
15     ADD RUNOFF
             .225       .225       .808       .808 c.m/s
10     POND
       5 Depth - Discharge - Volume sets
           .000        .000          .0
           .025       .0115       159.3
           .050       .0230       318.6
           .075       .0345       477.9
           .100       .0460       637.2
        Peak Outflow    =      .024 c.m/s
        Maximum Depth   =      .052 metres
        Maximum Storage =      332. c.m
             .225       .225       .024       .808 c.m/s
17     COMBINE
       1     Junction Node No.
             .225       .225       .024       .829 c.m/s
18     CONFLUENCE
       1     Junction Node No.
             .225       .829       .024       .000 c.m/s
10     POND
       7 Depth - Discharge - Volume sets
        182.230        .000          .0
        182.400      .00100        95.0
        183.000       .0280       876.0
        183.300       .0440      1354.0
        183.700       .0560      2045.0
        183.800        .149      2228.0
        184.000        .610      2605.0
        Peak Outflow    =      .144 c.m/s
        Maximum Depth   =   183.794 metres
        Maximum Storage =     2217. c.m
             .225       .829       .144       .000 c.m/s
17     COMBINE
       2     Junction Node No.
             .225       .829       .144       .144 c.m/s
14     START
       1     1=Zero; 2=Define
35     COMMENT
       1     line(s) of comment
        ** A11 - WEST SIDE ROAD FRONTAGE - UNCONTROLLED **
 4     CATCHMENT
      11.000     ID No.  99999
        .260     Area in hectares
      50.000     Length (PERV) metres
       1.000     Gradient (%)
       1.000     Per cent Impervious
      50.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          1      Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
      74.000     SCS Curve No or C
        .100     Ia/S Coefficient
       8.924     Initial Abstraction
          1      Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
           .027       .000       .144       .144 c.m/s
           .499       .939       .504     C perv/imperv/total
15     ADD RUNOFF
           .027       .027       .144       .144 c.m/s
 9     ROUTE
        .000     Conduit Length
        .000     No Conduit defined
        .000     Zero lag
        .000     Beta weighting factor
        .000     Routing timestep
          0      No. of sub-reaches
           .027       .027       .027       .144 c.m/s
17     COMBINE
       2     Junction Node No.
           .027       .027       .027       .149 c.m/s
18     CONFLUENCE
       2     Junction Node No.
           .027       .149       .027       .000 c.m/s
20     MANUAL
```

APPENDIX D

Hydroworks HD10 OGS – Modelling Output File
Sample Inspection Report

```
          ************************************************
          *      Storm Water Management Sizing Model     *
          *               Hydroworks, LLC                *
          *                Version 4.4                   *
          *                                              *
          *        Continuous Simulation Program         *
          *             Based on SWMM 4.4H               *
          *             Hydroworks, LLC                  *
          *              Graham Bryant                   *
          *              2003 - 2021                     *
          ************************************************
                          Developed by
          ************************************************
          *              Hydroworks, LLC                 *
          *            Metcalf & Eddy, Inc.              *
          *           University of Florida              *
          *       Water Resources Engineers, Inc.        *
          *      (Now Camp Dresser & McKee, Inc.)        *
          *              Modified SWMM 4.4               *
          ************************************************
                  Distributed and Maintained by
          ************************************************
          *                                              *
          *               Hydroworks, LLC                *
          *                888-290-7900                  *
          *             www.hydroworks.com               *
          *                                              *
          ************************************************
          ************************************************
          *     If any problems occur executing this     *
          *     model, contact Mr. Graham Bryant at      *
          *     Hydroworks, LLC by phone at 888-290-7900 *
          *     or by e-mail: support@hydroworks.com     *
          ************************************************
          ************************************************
          *     This model is based on EPA SWMM 4.4      *
          *  "Nature is full of infinite causes which    *
          *   have never occurred in experience" da Vinci *
          ************************************************
          ************************************************
          * Entry made to the Rain Block                 *
          * Created by the University of Florida - 1988  *
          * Updated by Oregon State University, March 2000 *
          ************************************************

          Barrick Dunsire Apartments, Port Colborne
          Copyright Hydroworks, LLC, 2024
          HydroDome Simulation

        ########################################
        #  Precipitation Block Input Commands  #
        ########################################
       Station Name.......................  St. Catherines A
       Station Location...................  Ontario
       Station, ISTA......................    7287
       Beginning date, IYBEG (Yr/Mo/Dy)......  1971/ 1/ 1
       Ending date, IYEND (Yr/Mo/Dy).........  2005/12/31
       Minimum interevent time, MIT..........     1
       Number of ranked storms, NPTS.........    10
       NWS format, IFORM (See text)..........     1
       Print storm summary, ISUM (O-No 1-Yes)     0
       Print all rainfall, IYEAR (O-No 1-Yes)     0
       Save storm event data on NSCRAT(1)....     0
       (IFILE =0 -Do not save, =1 -Save data)
       IDECID 0 - Create interface file
              1 - Create file and analyze
              2 - Synoptic analysis..........     2
       Plotting position parameter, A........  0.40
       Storm event statistics, NOSTAT........  1100

       KODEA (from optional group B0)........     2
        = 0, Do not include NCDC cumulative values.
        = 1, Average NCDC cumulative values.
        = 2, Use NCDC cumulative value as inst. rain.
       KODEPR (from optional group B0).......     0
        Print NCDC special codes in event summary:
        = 0, only on days with events.
        = 1, on all days with codes present.
        Codes: A = accumulated value, I = incomplete value,
               M = missing value,     O = other code present

*****************************************************
*  Precipitation output created using the Rain block   *
*  Number of precipitation stations...        1       *
*****************************************************
ocation Station Number
-------- --------------
       1.     7287

STATION ID ON PRECIP. DATA INPUT FILE = 7287
REQUESTED STATION ID =     7287  CHECK TO BE SURE THEY MATCH.
```

```
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
Note, 15-min. data are being processed, but hourly
print-out, summaries, and statistics are based on
hourly totals only.  Data placed on interface file
are at correct 15-min. intervals.
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
#####################################################
# Entry made to the Runoff Block, last updated by #
# Oregon State University, and Camp, Dresser and  #
# McKee, Inc., March 2002.                        #
#####################################################
# "And wherever water goes, amoebae go along for  #
#  the ride"                    Tom Robbins       #
#####################################################

                  Barrick Dunsire Apartments, Port Colborne
                  Copyright Hydroworks, LLC, 2024

Snowmelt parameter - ISNOW.....................          0
Number of rain gages - NRGAG...................          1
Horton infiltration equation used - INFILM.....          2
Maximum infiltration volume is limited to RMAXINF input on  subcatchment lines.
Infiltration volume regenerates during  non rainfall periods.
Quality is simulated - KWALTY..................          1
VAP is negative.  Evaporation will be set to zero
    during time steps with rainfall.
Read evaporation data on line(s) F1 (F2) - IVAP..          1
Hour of day at start of storm - NHR............          1
Minute of hour at start of storm - NMN.........          1
Time TZERO at start of storm (hours)...........      1.017
Use Metric units for I/O - METRIC..............          1
 ===> Ft-sec units used in all internal computations
Runoff input print control...                             0
Runoff graph plot control....                             1
Runoff output print control..                             0
Print headers every 50 lines - NOHEAD (0=yes, 1=no)       0
Print land use load percentages -LANDUPR (0=no, 1=yes)    0
Limit number of groundwater convergence messages to 10000 (if simulated)
Month, day, year of start of storm is:             1/ 1/1971
Wet time step length (seconds).......                 300.
Dry time step length (seconds).......                 900.
Wet/Dry time step length (seconds)...                 450.
Simulation length is......                      20051231.0 Yr/Mo/Dy
Percent of impervious area with zero detention depth    25.0
Horton infiltration model being used
Rate for regeneration of infiltration = REGEN * DECAY
DECAY is read in for each subcatchment
REGEN = ..........................................   0.01000
*********************************************************
*   Processed Precipitation will be read from file     *
*********************************************************

  ##############################
  #        Data Group F1       #
  # Evaporation Rate (mm/day) #
  ##############################

 JAN.  FEB.  MAR.  APR.  MAY   JUN.  JUL.  AUG.  SEP.  OCT.  NOV.  DEC.
 ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----
 0.00  0.00  0.00  2.54  2.54  3.81  3.81  3.81  2.54  2.54  0.00  0.00

*********************************************************
*         C H A N N E L  A N D  P I P E  D A T A         *
*********************************************************

Input   NAMEG:     Drains                          Invert  L Side   R Side  Intial     Max  Mann-   Full
equen  Channel      to     Channel  Width  Length    Slope   Slope    Slope   Depth   Depth   ings   Flow
umber    ID #      NGTO:    Type     (m)    (m)     (m/m)   (m/m)    (m/m)     (m)     (m)   "N"   (cms)
-----  ---------- -------- ------ ------- -------  ------- -------- ------- ------- ------- -----  -----
  1        201        200   Dummy     0.0     0.0    0.0000   0.0000  0.0000     0.0     0.0  0.0000 0.00E+00

 ***************************************************
 *          S U B C A T C H M E N T  D A T A       *
 ***************************************************

*NOTE. SEE LATER TABLE FOR OPTIONAL SUBCATCHMENT PARAMETERS*
      SUBCATCH-  CHANNEL      WIDTH    AREA  PERCENT    SLOPE    RESISTANCE  FACTOR    DEPRES. STORAGE(MM) INFILTRATION   DECAY RATE GAGE
MAXIMUM
       MENT NO.  OR INLET       (M)    (HA)  IMPERV.    (M/M)     IMPERV.     PERV.   IMPERV.    PERV.      RATE(MM/HR)    (1/SEC)    NO.
VOLUME
                                                                                                          MAXIMUM MINIMUM
(MM)
 ---  --------   -------- --------- --------  -----   -------    -------  --------    ------    ------     ----   -------  -------  ------ --
-----
  1        300        200    162.17     5.26  75.00    0.0200      0.015     0.250     0.510     5.080    63.50   10.16    0.00055     1
101.60000

TOTAL NUMBER OF SUBCATCHMENTS...              1
TOTAL TRIBUTARY AREA (HECTARES).           5.26
IMPERVIOUS AREA (HECTARES)......           3.95
PERVIOUS AREA (HECTARES)........           1.32
TOTAL WIDTH (METERS)............         162.17
```

```
PERCENT IMPERVIOUSNESS.........          75.00

*********************************************************
*     G R O U N D W A T E R   I N P U T   D A T A     *
*********************************************************

    SUB-     CHANNEL     ========== E L E V A T I O N S ========  =========== F L O W   C O N S T A N T S ============
    CATCH        OR      GROUND  BOTTOM   STAGE     BC      TW       A1         B1        A2         B2        A3
    NUMBER     INLET       (M)     (M)      (M)     (M)     (M) (MM/HR-M^B1)         (MM/HR-M^B2)         (MM/HR-M^2)
    ------     -----     -------  ------  ------  ------  ------ -----------  ------- -----------  ------- -----------
         0       602        3.05    0.00    0.00    0.61    0.61   3.484E-04    2.600   0.000E+00    1.000    0.00E+00

*********************************************************
* G R O U N D W A T E R   I N P U T   D A T A (CONTINUED) *
*********************************************************

              S O I L   P R O P E R T I E S
                    SATURATED                                        PERCOLATION     E T  P A R A M E T E R S
       SUBCAT.        HYDRAULIC  WILTING  FIELD   INITIAL     MAX. DEEP   PARAMETERS         DEPTH  FRACTION OF ET
       NO.   POROSITY CONDUCTIVITY  POINT  CAPACITY MOISTURE  PERCOLATION   HCO     PCO        OF ET  TO UPPER ZONE
                        (mm/hr)                               (mm/hr)                          (m)
      ----   ------     -------    ------  ------   ------    ----------  ------  ------     ------      ------
         0    .4000     127.000     .1500   .3000    .3000     5.080E-02   10.00    4.57       4.27       0.350

*********************************************************
*    Arrangement of Subcatchments and Channel/Pipes     *
*********************************************************
* See second subcatchment output table for connectivity *
* of subcatchment to subcatchment flows.                *
*********************************************************

   Channel
   or Pipe
       201     No Tributary Channel/Pipes
               No Tributary Subareas.....

    INLET
       200     Tributary Channel/Pipes...        201
               Tributary Subareas........        300

*********************************************************
* Hydrographs will be stored for the following   1 INLETS *
*********************************************************
          200

#####################################################
#              Quality Simulation                   #
#####################################################
#      General Quality Control Data Groups          #
#####################################################

 Description                              Variable       Value
 -----------                              --------       -----
 Number of quality constituents.....      NQS.......         1
 Number of land uses................    JLAND.......         1
 Standard catchbasin volume.........    CBVOL.......      1.22 cubic meters
 Erosion is not simulated.........      IROS........         0
 DRY DAYS PRIOR TO START OF STORM...  DRYDAY.......      3.00 DAYS
 DRY DAYS REQUIRED TO RECHARGE
 CATCHBASIN CONCENTRATION TO
INITIAL VALUES..................... DRYBSN.......      5.00 DAYS
 DUST AND DIRT
 STREET SWEEPING EFFICIENCY......... REFFDD.......     0.300
 DAY OF YEAR ON WHICH STREET
 SWEEPING BEGINS.................... KLNBGN.......       120
 DAY OF YEAR ON WHICH STREET
 SWEEPING ENDS...................... KLNEND.......       270

#############################################
#     Land use data on data group J2        #
#############################################

                                                                LIMITING                          CLEANING  AVAIL.    DAYS SINCE
                                                                BUILDUP    BUILDUP  BUILDUP       INTERVAL  FACTOR      LAST
AND USE   BUILDUP EQUATION TYPE   FUNCTIONAL DEPENDENCE OF     QUANTITY   POWER    COEFF.        IN DAYS   FRACTION    SWEEPING
LNAME)            (METHOD)        BUILDUP PARAMETER(JACGUT)  (DDLIM)    (DDPOW)  (DDFACT)      (CLFREQ)  (AVSWP)     (DSLCL)
-------   --------------------    -------------------------  --------   -------  --------      --------  -------     ---------
Urban De  EXPONENTIAL(1)                  AREA(1)           2.802E+01     0.500    67.250        30.000     0.300      30.000

#############################################
#     Constituent data on data group J3     #
#############################################

                            Total Su
                            --------
Constituent units........   mg/l
Type of units............        0
KALC.....................        2
Type of buildup calc.....  EXPONENTIAL(2)
KWASH....................        0
Type of washoff calc.....  POWER EXPONEN.(0)
KACGUT...................        1
```

```
Dependence of buildup....          AREA(1)
LINKUP...................           0
Linkage to snowmelt......   NO SNOW LINKAGE
Buildup param 1 (QFACT1).          28.020
Buildup param 2 (QFACT2).           0.500
Buildup param 3 (QFACT3).          67.250
Buildup param 4 (QFACT4).           0.000
Buildup param 5 (QFACT5).           0.000
Washoff power (WASHPO)...           1.100
Washoff coef. (RCOEF)....           0.086
Init catchb conc (CBFACT)         100.000
Precip. conc. (CONCRN)...           0.000
Street sweep effic (REFF)           0.300
Remove fraction (REMOVE).           0.000
1st order QDECAY, 1/day..           0.000
Land use number.........               1

************************************************
* Constant Groundwater Quality Concentration(s) *
************************************************

 Total Susp has a concentration of..    0.0000   mg/l

************************************************
* REMOVAL FRACTIONS FOR SELECTED CHANNEL/PIPES *
* FROM J7 LINES                                *
************************************************

  CHANNEL/   CONSTITUENT
     PIPE Total Susp
----------  --------
       201     0.000

******************************************************
*     Subcatchment surface quality on data group L1 *
******************************************************

                            Total   Number   Input
                     Land    Gutter     of    Loading
               Land   Use    Length   Catch-  load/ha
         No.  Usage   No.      Km     Basins   Total Su
       ------ -------- ----  -------- --------  -------
   1       300 Urban De  1        0.32     2.00  0.0E+00
   Totals (Loads in kg or other)    0.32     2.00  0.0E+00

    **********************
    *    DATA GROUP M1    *
    **********************

TOTAL NUMBER OF PRINTED GUTTERS/INLETS...NPRNT..        1
NUMBER OF TIME STEPS BETWEEN PRINTINGS..INTERV..        0
STARTING AND STOPPING PRINTOUT DATES............        0        0

    **********************
    *    DATA GROUP M3    *
    **********************

CHANNEL/INLET PRINT DATA GROUPS......       -200

          ****************************************
          * Rainfall from Nat. Weather Serv. file  *
          * in units of hundredths of an inch      *
          ****************************************

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Rainfall Station    St. Catherines A
State/Province      Ontario

Rainfall Depth Summary (mm)

Year     Jan   Feb   Mar   Apr   May   Jun   Jul   Aug   Sep   Oct   Nov   Dec    Total

1971.     31.    0.    0.    0.    0.    0.  126.   93.   52.   60.   29.    0.    391.
1972.      0.    0.    0.   47.   65.  100.   39.  115.   63.   90.    1.    0.    521.
1973.      0.    0.    0.  103.   77.   71.   53.   29.   63.  139.    0.    0.    534.
1974.      0.    0.    0.   67.  105.   62.   50.   31.   74.   37.  110.    0.    536.
1975.      0.    0.    0.    0.    0.   94.   78.   76.   73.   56.   59.    6.    442.
1976.      0.    0.    0.  119.  136.   87.  101.   60.   72.   73.   13.    1.    662.
1977.      0.    0.    0.   94.   29.   69.   57.  150.  230.   71.    0.    1.    701.
1978.      0.    0.    0.   72.   43.   72.   43.   86.  156.   95.    0.    0.    567.
1979.      0.    0.    0.   84.   92.   33.   91.   88.   84.  129.   71.    0.    673.
1980.      0.    0.    0.   81.   39.  122.   60.   32.   79.   96.   45.    0.    554.
1981.      0.    0.    0.   91.   71.  106.  122.   61.  123.   91.   84.    0.    749.
1982.      0.    0.    0.   28.   65.   97.   36.   66.   82.   25.  143.    0.    544.
1983.      0.    0.    0.   78.  100.   65.   55.  106.   75.  122.   92.    0.    694.
1984.      0.    0.    0.   31.  113.  136.   19.   51.  144.   24.   44.    0.    562.
1985.      0.    0.   67.   32.   52.   64.   40.   94.   42.  109.    0.    1.    501.
1986.      0.    0.    0.   93.  113.   60.   85.   83.   98.   80.   43.   65.    719.
1987.      0.    2.   11.   77.   42.   80.  122.   97.   99.   71.   94.   34.    730.
1988.      0.    0.   41.   71.   42.   21.  110.   82.   70.   68.   75.    5.    585.
```

1989.	0.	0.	13.	63.	137.	108.	36.	45.	89.	73.	84.	0.	647.
1990.	0.	2.	38.	99.	124.	44.	68.	95.	56.	112.	96.	0.	735.
1991.	0.	0.	86.	124.	67.	31.	85.	57.	79.	64.	61.	28.	682.
1992.	0.	0.	29.	127.	56.	92.	185.	116.	77.	47.	103.	38.	869.
1993.	3.	0.	7.	83.	56.	86.	32.	61.	71.	92.	80.	38.	610.
1994.	0.	0.	44.	88.	105.	124.	48.	77.	117.	15.	0.	15.	633.
1995.	112.	23.	16.	48.	37.	60.	123.	66.	8.	137.	94.	0.	724.
1998.	0.	0.	0.	0.	51.	54.	64.	29.	9.	0.	1.	0.	207.
1999.	0.	0.	0.	79.	59.	35.	61.	58.	116.	78.	0.	0.	487.
2000.	0.	0.	0.	123.	134.	216.	51.	0.	0.	0.	10.	0.	534.
2001.	0.	0.	0.	56.	88.	45.	25.	30.	81.	129.	0.	0.	454.
2002.	0.	0.	0.	73.	104.	64.	53.	49.	52.	65.	8.	0.	468.
2003.	0.	0.	0.	10.	163.	77.	81.	64.	67.	73.	2.	0.	537.
2004.	0.	0.	0.	131.	126.	99.	115.	40.	88.	17.	0.	0.	616.
2005.	0.	0.	0.	38.	42.	78.	53.	120.	112.	0.	0.	0.	443.

Total Rainfall Depth for Simulation Period 19310. (mm)

Rainfall Intensity Analysis (mm/hr)

(mm/hr)	(#)	(%)	(mm)	(%)
2.50	21481	74.6	6454.	33.4
5.00	3585	12.4	3088.	16.0
7.50	1973	6.8	2886.	14.9
10.00	575	2.0	1233.	6.4
12.50	389	1.4	1070.	5.5
15.00	194	0.7	660.	3.4
17.50	210	0.7	846.	4.4
20.00	66	0.2	306.	1.6
22.50	92	0.3	487.	2.5
25.00	39	0.1	232.	1.2
27.50	37	0.1	246.	1.3
30.00	34	0.1	245.	1.3
32.50	29	0.1	228.	1.2
35.00	5	0.0	42.	0.2
37.50	10	0.0	90.	0.5
40.00	10	0.0	97.	0.5
42.50	12	0.0	124.	0.6
45.00	9	0.0	99.	0.5
47.50	1	0.0	12.	0.1
50.00	3	0.0	37.	0.2
>50.00	49	0.2	829.	4.3

Total # of Intensities 28803

Daily Rainfall Depth Analysis (mm)

(mm)	(#)	(%)	(mm)	(%)
2.50	1077	38.9	1247.	6.5
5.00	507	18.3	1850.	9.6
7.50	326	11.8	2006.	10.4
10.00	226	8.2	1958.	10.1
12.50	150	5.4	1672.	8.7
15.00	111	4.0	1495.	7.7
17.50	100	3.6	1620.	8.4
20.00	67	2.4	1260.	6.5
22.50	45	1.6	958.	5.0
25.00	37	1.3	881.	4.6
27.50	23	0.8	609.	3.2
30.00	20	0.7	575.	3.0
32.50	20	0.7	631.	3.3
35.00	12	0.4	405.	2.1
37.50	8	0.3	290.	1.5
40.00	9	0.3	350.	1.8
42.50	4	0.1	165.	0.9
45.00	4	0.1	173.	0.9
47.50	2	0.1	91.	0.5
50.00	4	0.1	192.	1.0
>50.00	15	0.5	882.	4.6

Total # Days with Rain 2767

```
***********************************************
*      End of time step DO-loop in Runoff     *
***********************************************

Final Date (Mo/Day/Year)   =                  1/ 1/2006
Total number of time steps =                    2056995
Final Julian Date  =                            2006001
Final time of day  =                                 2. seconds.
Final time of day  =                               0.00   hours.
Final running time =                          306816.0000   hours.
Final running time =                           12784.0000    days.

***********************************************
*     Extrapolation Summary for Watersheds    *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of OVERLND Calls    *
```

```
************************************************

 Subcatch   # Steps   # Calls  Subcatch   # Steps   # Calls  Subcatch   # Steps   # Calls
 --------   -------   -------  --------   -------   -------  --------   -------   -------
      300   6288359   1677917

************************************************
*     Extrapolation Summary for Channel/Pipes    *
* # Steps ==> Total Number of Extrapolated Steps *
* # Calls ==> Total Number of GUTNR Calls        *
************************************************

Chan/Pipe   # Steps   # Calls Chan/Pipe   # Steps   # Calls Chan/Pipe   # Steps   # Calls
 --------   -------   -------  --------   -------   -------  --------   -------   -------
      201         0         0

*********************************************
*       Continuity Check for Surface Water   *
*********************************************

                                                          Millimeters over
                                              cubic meters  Total Basin
Total Precipitation (Rain plus Snow)             1013202.     19263.
Total Infiltration                                252548.      4801.
Total Evaporation                                  92298.      1755.
Surface Runoff from Watersheds                    670925.     12756.
Total Water remaining in Surface Storage               0.         0.
Infiltration over the Pervious Area...            252548.     19206.
                    --------
Infiltration + Evaporation +
Surface Runoff + Snow removal +
Water remaining in Surface Storage +
Water remaining in Snow Cover.........           1015771.     19312.
Total Precipitation + Initial Storage.           1013202.     19263.


The error in continuity is calculated as
************************************
* Precipitation + Initial Snow Cover  *
*      - Infiltration -               *
*Evaporation - Snow removal -         *
*Surface Runoff from Watersheds -     *
*Water in Surface Storage -           *
*Water remaining in Snow Cover        *
*-----------------------------------*
* Precipitation + Initial Snow Cover  *
************************************
Error.................................       -0.254 Percent

*********************************************
*       Continuity Check for Channel/Pipes   *
*********************************************

                                                          Millimeters over
                                              cubic meters  Total Basin
Initial Channel/Pipe Storage.................          0.         0.
Final Channel/Pipe Storage...................          0.         0.
Surface Runoff from Watersheds...............     670925.     12756.
Baseflow.....................................          0.
Groundwater Subsurface Inflow................          0.         0.
Evaporation Loss from Channels...............          0.         0.
Channel/Pipe/Inlet Outflow...................     670925.     12756.
Initial Storage + Inflow.....................     670925.     12756.
Final Storage + Outflow......................     670925.     12756.
*********************************************
* Final Storage + Outflow + Evaporation  - *
* Watershed Runoff - Groundwater Inflow  - *
*     Initial Channel/Pipe Storage         *
*     ---------------------------------    *
*  Final Storage + Outflow  + Evaporation  *
*********************************************
Error.........................................      0.000 Percent

************************************************
*     Continuity Check for Subsurface Water       *
************************************************

                                                 Millimeters over
                                    cubic meters  Subsurface Basin

Total Infiltration                             0.         0.
Total Upper Zone ET                            0.         0.
Total Lower Zone ET                            0.         0.
Total Groundwater flow                         0.         0.
Total Deep percolation                         0.         0.
Initial Subsurface Storage                 48096.       914.
Final Subsurface Storage                   48096.       914.
Upper Zone ET over Pervious Area               0.         0.
Lower Zone ET over Pervious Area               0.         0.


***************************************
* Infiltration + Initial Storage - Final *
* Storage - Upper and Lower Zone ET -    *
```

```
* Groundwater Flow - Deep Percolation    *
* ------------------------------------- *
*     Infiltration + Initial Storage     *
****************************************
Error ...................................     0.000 Percent
```

SUMMARY STATISTICS FOR SUBCATCHMENTS

SUBCATCHMENT NO.	GUTTER OR INLET NO.	AREA (HA)	PERCENT IMPER.	TOTAL SIMULATED RAINFALL (MM)	PERVIOUS AREA TOTAL RUNOFF DEPTH (MM)	PERVIOUS AREA TOTAL LOSSES (MM)	PERVIOUS AREA PEAK RUNOFF RATE (CMS)	IMPERVIOUS AREA RUNOFF DEPTH (MM)	IMPERVIOUS AREA PEAK RUNOFF RATE (CMS)	TOTAL SUBCATCHMENT AREA RUNOFF DEPTH (MM)	TOTAL SUBCATCHMENT AREA PEAK RUNOFF RATE (CMS)	TOTAL SUBCATCHMENT AREA PEAK UNIT RUNOFF (MM/HR)
300	200	5.26	75.01	9262.47	54.300********		0.213	16984.299	2.062	12751.800	2.275	157.005

*** NOTE *** IMPERVIOUS AREA STATISTICS AGGREGATE IMPERVIOUS AREAS WITH AND WITHOUT DEPRESSION STORAGE

SUMMARY STATISTICS FOR CHANNEL/PIPES

CHANNEL NUMBER	FULL FLOW (CMS)	FULL VELOCITY (M/S)	FULL DEPTH (M)	MAXIMUM COMPUTED INFLOW (CMS)	MAXIMUM COMPUTED OUTFLOW (CMS)	MAXIMUM COMPUTED DEPTH (M)	MAXIMUM COMPUTED VELOCITY (M/S)	TIME OF OCCURRENCE DAY	TIME OF OCCURRENCE HR.	LENGTH OF SURCHARGE (HOUR)	MAXIMUM SURCHARGE VOLUME (CU-M)	RATIO OF MAX. TO FULL FLOW	RATIO OF MAX. DEPTH TO FULL DEPTH
201				0.00				1/ 0/1900	0.00				
200				2.27				8/14/1972	14.25				

TOTAL NUMBER OF CHANNELS/PIPES = 2

*** NOTE *** THE MAXIMUM FLOWS AND DEPTHS ARE CALCULATED AT THE END OF THE TIME INTERVAL

```
 ########################################################
 #             Runoff Quality Summary Page              #
 # If NDIM = 0 Units for:   loads    mass rates         #
 #             METRIC = 1    lb        lb/sec           #
 #             METRIC = 2    kg        kg/sec           #
 # If NDIM = 1 Loads are in units of quantity           #
 #             and mass rates are quantity/sec          #
 # If NDIM = 2 loads are in units of concentration      #
 #             times volume and mass rates have units   #
 #             of concentration times volume/second     #
 ########################################################

Total Su NDIM =  0
METRIC =  2
```

	Total Su
Inputs	
1. INITIAL SURFACE LOAD	115.
2. TOTAL SURFACE BUILDUP	88338.
3. INITIAL CATCHBASIN LOAD	0.
4. TOTAL CATCHBASIN LOAD	0.
5. TOTAL CATCHBASIN AND SURFACE BUILDUP (2+4)	88338.
Remaining Loads	
6. LOAD REMAINING ON SURFACE	41.
7. REMAINING IN CATCHBASINS	0.
8. REMAINING IN CHANNEL/PIPES	0.
Removals	
9. STREET SWEEPING REMOVAL	7652.
10. NET SURFACE BUILDUP (2-9)	80685.
11. SURFACE WASHOFF	80619.
12. CATCHBASIN WASHOFF	0.
13. TOTAL WASHOFF (11+12)	80619.
14. LOAD FROM OTHER CONSTITUENTS	0.
15. PRECIPITATION LOAD	0.
15a. SUM SURFACE LOAD (13+14+15)	80619.
16. TOTAL GROUNDWATER LOAD	0.
16a. TOTAL I/I LOAD	0.
17. NET SUBCATCHMENT LOAD (15a-15b-15c-15d+16+16a)	80619.
>>Removal in channel/pipes (17a, 17b):	
17a. REMOVE BY BMP FRACTION	0.
17b. REMOVE BY 1st ORDER DECAY	0.
18. TOTAL LOAD TO INLETS	80618.
19. FLOW WT'D AVE.CONCENTRATION mg/l (INLET LOAD/TOTAL FLOW)	120.
Percentages	
20. STREET SWEEPING (9/2)	9.
21. SURFACE WASHOFF (11/2)	91.

```
22. NET SURFACE WASHOFF(11/10)..      100.
23. WASHOFF/SUBCAT LOAD(11/17)..      100.
24. SURFACE WASHOFF/INLET LOAD
    (11/18).....                      100.
25. CATCHBASIN WASHOFF/
    SUBCATCHMENT LOAD (12/17)...        0.
26. CATCHBASIN WASHOFF/
    INLET LOAD (12/18).....             0.
27. OTHER CONSTITUENT LOAD/
    SUBCATCHMENT LOAD (14/17)...        0.
28. INSOLUBLE FRACTION/
    INLET LOAD (14/18).....             0.
29. PRECIPITATION/
    SUBCATCHMENT LOAD (15/17)...        0.
30. PRECIPITATION/
    INLET LOAD (15/18).....             0.
31. GROUNDWATER LOAD/
    SUBCATCHMENT LOAD (16/17)...        0.
32. GROUNDWATER LOAD/
    INLET LOAD (16/18).....             0.
32a.INFILTRATION/INFLOW LOAD/
    SUBCATCHMENT LOAD (16a/17)..        0.
32b.INFILTRATION/INFLOW LOAD/
    INLET LOAD (16a/18).....            0.
32c.CH/PIPE BMP FRACTION REMOVAL/
    SUBCATCHMENT LOAD (17a/17)..        0.
32d.CH/PIPE 1st ORDER DECAY REMOVAL/
    SUBCATCHMENT LOAD (17b/17)..        0.
33. INLET LOAD SUMMATION ERROR
    (18+8+6a+17a+17b-17)/17.....        0.

CAUTION. Due to method of quality routing (Users Manual, Appendix IX)
quality routing through channel/pipes is sensitive to the time step.
Large "Inlet Load Summation Errors" may result.
These can be reduced by adjusting the time step(s).
Note: surface accumulation during dry time steps at end of simulation is
not included in totals.  Buildup is only performed at beginning of
wet steps or for street cleaning.


*****************************************************
*            TSS Particle Size Distribution         *
*****************************************************
   Diameter    %     Specific    Settling Velocity   Critical Peclet
     (um)            Gravity        (m/s)                Number


      2.     5.0      2.65         0.000003            0.054484
      5.     5.0      2.65         0.000017            0.061150
      8.    10.0      2.65         0.000043            0.067744
     20.    15.0      2.65         0.000267            0.093400
     50.    10.0      2.65         0.001629            0.152500
     75.     5.0      2.65         0.003548            0.196250
    100.    10.0      2.65         0.006044            0.235000
    150.    15.0      2.65         0.012234            0.297500
    250.    15.0      2.65         0.026615            0.391296
    500.     5.0      2.65         0.060604            0.602917
   1000.     5.0      2.65         0.111334            0.928988

*****************************************************
*                                                   *
*              Summary of TSS Removal               *
*                                                   *
*****************************************************

TSS Removal based on Lab Performance Curve

 Model      Low Q Treated  High Q Treated     Runoff Treated        TSS Removed
   #           (cms)          (cms)               (%)                 (%)

 Unavailabl   0.380          0.380               98.7                36.3
 HD 4         0.380          0.380               98.7                45.9
 HD 5         0.380          0.380               98.7                53.0
 HD 6         0.380          0.380               98.7                58.9
 HD 7         0.380          0.380               98.7                63.3
 HD 8         0.380          0.380               98.7                67.1
 HD 10        0.380          0.380               98.7                73.2
 HD 12        0.380          0.380               98.7                77.8

*****************************************************
*                                                   *
*  Summary of Annual Flow Treatmnet & TSS Removal   *
*                                                   *
*****************************************************

 HD 8
 Year       Flow Vol       Flow Treated     TSS In     TSS Rem      TSS Out     TSS Byp     Flow Treated    TSS Removal
              (m3)           (m3)           (kg)       (kg)         (kg)        (kg)          (%)             (%)

 1971.        153087.          143696.       1571.       1013.        559.         30.          93.9            63.2
 1972.        195787.          180492.       2088.       1431.        657.         88.          92.2            65.8
 1973.        195772.          195669.       2257.       1514.        743.          2.          99.9            67.0
```

1974.	199891.	196817.	2335.	1676.	660.	31.	98.5	70.8
1975.	170381.	166184.	2038.	1349.	689.	30.	97.5	65.2
1976.	253465.	248184.	2588.	1758.	830.	49.	97.9	66.7
1977.	271251.	265157.	2489.	1554.	935.	48.	97.8	61.3
1978.	216896.	216854.	2423.	1570.	854.	1.	100.0	64.8
1979.	259511.	254625.	2664.	1798.	866.	37.	98.1	66.6
1980.	208240.	206384.	2579.	1738.	841.	13.	99.1	67.0
1981.	289009.	287090.	2847.	1987.	860.	10.	99.3	69.5
1982.	203746.	203492.	2328.	1636.	692.	2.	99.9	70.2
1983.	269032.	266354.	2967.	2007.	960.	37.	99.0	66.8
1984.	215973.	215973.	2304.	1530.	775.	0.	100.0	66.4
1985.	187695.	187695.	2259.	1554.	706.	0.	100.0	68.8
1986.	274830.	274277.	3106.	2147.	958.	8.	99.8	69.0
1987.	284402.	281344.	3112.	2112.	1000.	16.	98.9	67.5
1988.	227045.	224631.	2585.	1805.	780.	4.	98.9	69.7
1989.	251920.	247282.	2474.	1724.	750.	28.	98.2	68.9
1990.	285405.	284196.	3209.	2263.	946.	18.	99.6	70.1
1991.	267379.	264473.	2931.	2021.	910.	24.	98.9	68.4
1992.	340045.	338674.	3476.	2285.	1191.	14.	99.6	65.5
1993.	229999.	229999.	2881.	2054.	827.	0.	100.0	71.3
1994.	245979.	234807.	2318.	1511.	807.	83.	95.5	62.9
1995.	287553.	283636.	2822.	1856.	966.	60.	98.6	64.4
1998.	71986.	71986.	1092.	734.	358.	0.	100.0	67.2
1999.	179876.	178939.	2236.	1501.	735.	6.	99.5	67.0
2000.	209791.	208675.	1945.	1188.	757.	10.	99.5	60.7
2001.	164283.	164283.	1809.	1304.	504.	0.	100.0	72.1
2002.	170947.	170947.	2133.	1484.	649.	0.	100.0	69.6
2003.	194964.	194537.	2179.	1449.	730.	3.	99.8	66.4
2004.	234580.	234580.	2257.	1495.	762.	0.	100.0	66.2
2005.	168467.	161417.	1683.	1039.	644.	43.	95.8	60.2

HD 10

Year	Flow Vol (m3)	Flow Treated (m3)	TSS In (kg)	TSS Rem (kg)	TSS Out (kg)	TSS Byp (kg)	Flow Treated (%)	TSS Removal (%)
1971.	153087.	143696.	1571.	1124.	447.	30.	93.9	70.2
1972.	195787.	180492.	2088.	1555.	533.	88.	92.2	71.5
1973.	195772.	195669.	2257.	1651.	606.	2.	99.9	73.1
1974.	199891.	196817.	2335.	1807.	528.	31.	98.5	76.4
1975.	170381.	166184.	2038.	1475.	563.	30.	97.5	71.3
1976.	253465.	248184.	2588.	1920.	668.	49.	97.9	72.8
1977.	271251.	265157.	2489.	1716.	773.	48.	97.8	67.7
1978.	216896.	216854.	2423.	1724.	700.	1.	100.0	71.1
1979.	259511.	254625.	2664.	1964.	701.	37.	98.1	72.7
1980.	208240.	206384.	2579.	1901.	678.	13.	99.1	73.3
1981.	289009.	287090.	2847.	2156.	691.	10.	99.3	75.5
1982.	203746.	203492.	2328.	1766.	563.	2.	99.9	75.8
1983.	269032.	266354.	2967.	2186.	780.	37.	99.0	72.8
1984.	215973.	215973.	2304.	1673.	631.	0.	100.0	72.6
1985.	187695.	187695.	2259.	1686.	573.	0.	100.0	74.6
1986.	274830.	274277.	3106.	2331.	775.	8.	99.8	74.9
1987.	284402.	281344.	3112.	2303.	809.	16.	98.9	73.6
1988.	227045.	224631.	2585.	1954.	631.	4.	98.9	75.5
1989.	251920.	247282.	2474.	1874.	601.	28.	98.2	74.9
1990.	285405.	284196.	3209.	2441.	768.	18.	99.6	75.6
1991.	267379.	264473.	2931.	2194.	737.	24.	98.9	74.2
1992.	340045.	338674.	3476.	2512.	964.	14.	99.6	72.0
1993.	229999.	229999.	2881.	2221.	660.	0.	100.0	77.1
1994.	245979.	234807.	2318.	1669.	649.	83.	95.5	69.5
1995.	287553.	283636.	2822.	2034.	789.	60.	98.6	70.6
1998.	71986.	71986.	1092.	808.	284.	0.	100.0	74.0
1999.	179876.	178939.	2236.	1634.	602.	6.	99.5	72.9
2000.	209791.	208675.	1945.	1328.	617.	10.	99.5	67.9
2001.	164283.	164283.	1809.	1407.	402.	0.	100.0	77.8
2002.	170947.	170947.	2133.	1607.	526.	0.	100.0	75.3
2003.	194964.	194537.	2179.	1590.	589.	3.	99.8	72.8
2004.	234580.	234580.	2257.	1636.	620.	0.	100.0	72.5
2005.	168467.	161417.	1683.	1158.	525.	43.	95.8	67.1

HD 12

Year	Flow Vol (m3)	Flow Treated (m3)	TSS In (kg)	TSS Rem (kg)	TSS Out (kg)	TSS Byp (kg)	Flow Treated (%)	TSS Removal (%)
1971.	153087.	143696.	1571.	1200.	371.	30.	93.9	74.9
1972.	195787.	180492.	2088.	1646.	442.	88.	92.2	75.7
1973.	195772.	195669.	2257.	1766.	491.	2.	99.9	78.2
1974.	199891.	196817.	2335.	1913.	422.	31.	98.5	80.8
1975.	170381.	166184.	2038.	1580.	458.	30.	97.5	76.4
1976.	253465.	248184.	2588.	2042.	546.	49.	97.9	77.4
1977.	271251.	265157.	2489.	1845.	644.	48.	97.8	72.7
1978.	216896.	216854.	2423.	1841.	582.	1.	100.0	76.0
1979.	259511.	254625.	2664.	2081.	583.	37.	98.1	77.1
1980.	208240.	206384.	2579.	2019.	560.	13.	99.1	77.9
1981.	289009.	287090.	2847.	2285.	562.	10.	99.3	80.0
1982.	203746.	203492.	2328.	1871.	458.	2.	99.9	80.3
1983.	269032.	266354.	2967.	2323.	643.	37.	99.0	77.4
1984.	215973.	215973.	2304.	1785.	519.	0.	100.0	77.5
1985.	187695.	187695.	2259.	1792.	468.	0.	100.0	79.3
1986.	274830.	274277.	3106.	2474.	632.	8.	99.8	79.5
1987.	284402.	281344.	3112.	2451.	662.	16.	98.9	78.3
1988.	227045.	224631.	2585.	2077.	508.	4.	98.9	80.2
1989.	251920.	247282.	2474.	1986.	488.	28.	98.2	79.4

1990.	285405.	284196.	3209.	2593.	615.	18.	99.6	80.4
1991.	267379.	264473.	2931.	2335.	596.	24.	98.9	79.0
1992.	340045.	338674.	3476.	2676.	800.	14.	99.6	76.7
1993.	229999.	229999.	2881.	2349.	532.	0.	100.0	81.5
1994.	245979.	234807.	2318.	1779.	538.	83.	95.5	74.1
1995.	287553.	283636.	2822.	2166.	657.	60.	98.6	75.1
1998.	71986.	71986.	1092.	864.	228.	0.	100.0	79.1
1999.	179876.	178939.	2236.	1737.	499.	6.	99.5	77.5
2000.	209791.	208675.	1945.	1415.	530.	10.	99.5	72.3
2001.	164283.	164283.	1809.	1490.	319.	0.	100.0	82.4
2002.	170947.	170947.	2133.	1703.	430.	0.	100.0	79.8
2003.	194964.	194537.	2179.	1687.	492.	3.	99.8	77.3
2004.	234580.	234580.	2257.	1739.	518.	0.	100.0	77.0
2005.	168467.	161417.	1683.	1231.	451.	43.	95.8	71.4

```
**************************************************
*                                                *
*      Summary of Toronto Rainfall Intensities   *
*                                                *
**************************************************
```

Rainfall Intensity (mm/h)	Flow (L/s)	Percentage %
1.50	16.7	NaN
2.25	25.1	NaN
3.00	33.4	NaN
3.75	41.8	NaN
4.75	52.9	NaN
5.75	64.1	NaN
8.00	89.1	NaN
10.00	111.4	NaN
15.50	172.7	NaN
23.25	259.0	NaN

```
**************************************************
*  Summary of Quantity and Quality Results at    *
*  Location        200  INFlow in cms.            *
*  Values are instantaneous at indicated time step *
**************************************************

  Barrick Dunsire Apartments, Port Colborne
 Copyright Hydroworks, LLC, 2024
```

Date Mo/Da/Year	Time Hr:Min	Flow cum/s	Total Su mg/l
Flow wtd means.....		0.002	120.
Flow wtd std devs..		0.012	65.
Maximum value.....		2.275	293.
Minimum value.....		0.000	0.
Total loads.....		670742.	80666.
		Cub-Met	KILOGRAM

```
===> Runoff simulation ended normally.

===> SWMM 4.4    simulation ended normally.
     Always check output file for possible warning messages.

**************************************************
*       SWMM 4.4    Simulation Date and Time Summary  *
**************************************************
* Starting Date... May         8, 2026              *
*          Time...          14: 8:10.992             *
*   Ending Date... May         8, 2026              *
*          Time...          14: 8:14. 40             *
*  Elapsed Time...               0.051 minutes.     *
*  Elapsed Time...               3.048 seconds.     *
**************************************************
```

SAMPLE INSPECTION REPORT

Owner:

Location:

Manhole Oil/Grit Separator:

Type of Inspection ☐ Monthly ☐ Annually ☐ Special

Inlet/Outlet Information

	Inlet		Outlet	
Clear of Debris	☐ Yes	☐ No	☐ Yes	☐ No
Build Up of Sediment	☐ Yes	☐ No	☐ Yes	☐ No

Action Taken:

Sediment Tank Information

A. Manhole Sump Depth: ± m from cover rim (to be as-constructed verified)

B. Measurement from Rim to Sediment Level: m

C. Depth of Sediment: m (A - B)

Note: If the measured depth of sediment is greater than **200mm** then sediment removal is required.

Presence of Contaminants

Oil	☐ Yes	☐ No	Depth	m
Foam	☐ Yes	☐ No	Depth	m

Action Taken:

Name of Regulatory Agency Telephone No.:

Transaction No.:

Name of Licensed Waste Management Collector Telephone No.:

Transaction No.:

Owner Notification ☐ Yes ☐ No Other:

Time: Date:

Name of Inspector:

Signed: Date: