

STORM WATER
POLLUTION
PREVENTION PLAN

FOR

COVINGTON ESTATES

NYS ROUTE 300 (TEMPLE HILL ROAD)

**TOWN OF NEW WINDSOR
ORANGE COUNTY, NEW YORK**

PREPARED BY

EP

Engineering Properties, PC

110 Orange Avenue
Walden, NY 12586

**FEBRUARY 2003
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**STORMWATER POLLUTION PREVENTION PLAN
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1.0 INTRODUCTION

Engineering Properties, PC is pleased to submit this report addressing the potential impact on downstream properties and receiving waters for the proposed site plan for the Covington Estates residential siteplan.

1.1 PURPOSE

The purpose of the Stormwater Pollution Prevention Plan is to:

- a. Maintain existing drainage patterns as much as possible and continue the conveyance of upland watershed runoff;
- b. Direct increases in storm water runoff resulting from the proposed development without adversely affecting downstream conditions;
- c. Mitigate potential storm water impacts, and prevent soil erosion and sedimentation resulting from storm water runoff.

1.2 SCOPE

The scope of the Stormwater Pollution Prevention Plan described herein is as follows:

- a. Describe and estimate existing storm water runoff conditions;
- b. Describe and estimate proposed storm water runoff conditions;
- c. Describe and evaluate storm water management facilities planned as part of the proposed development.

2.0 PROJECT DESCRIPTION

The project site is 21.66 acres in size and is located in the Town of New Windsor in Orange County, New York. The parcels are identified as Section 65 Block 2 Lots 1.1, 1.2 & 3.0. The three parcels create a triangular area, which is located on N.Y.S. Route 300 (Temple Hill Road), 3,000 feet north of the 'Five Corners' (intersection of N.Y.S. Route 94 and 32). The site is bordered to the east by N.Y.S. Route 300 and to the west by the Consolidated Railroad tracks. A site location map is attached as Figure 1.

As proposed, the project includes the development of approximately 16.94 acres of existing woodlands into a townhome style residential community. Approximately 7.82 acres will be developed as roadway, buildings and drives and the remaining 9.12 acres will be preserved as open space (lawn areas) and landscaping.

3.0 METHODOLOGY

The methodology utilized for this analysis is based upon the U.S.D.A. Soil Conservation Service's Technical Release No. 20 and Technical Release No. 55, as utilized by the software entitled Hydraflow Hydrographs version 2004.

Hydraflow Hydrographs, developed by Intelisolve of Alpharetta, Georgia, is a Microsoft Windows based program for analyzing the hydrology and hydraulics of storm water runoff. It utilizes the latest techniques to predict the stormwater flows from any given storm event.

Hydraflow Hydrographs is a computer model that has the capability of computing hydrographs (representing discharge rates characteristic of specific watershed conditions, precipitation and geologic factors), combining hydrographs, and routing flows through pipes, streams and ponds.

For this analysis, the watershed and drainage system was broken into a network consisting of three types of components - subareas, combinations and reservoirs.

A subarea consists of a relatively homogeneous area of land, which produces a volume and rate of runoff unique to that watershed. A subarea combination is the hydrologic addition of two subareas in order to determine the peak runoff at a design point. A reservoir consists of a natural or man-made impoundment which temporarily stores storm water runoff and that empties in a manner determined by various hydraulic structures located at its outlet.

This Stormwater Pollution Prevention Plan was based upon the New York State Stormwater Management Design Manual published by the New York State Department of Environmental Conservation. Criteria set forth by this manual, requires analysis and determination of the required Water Quality Volume (Wqv), to provide extended detention of the 1-year storm event for Stream Channel Protection (Cpv), to control the

peak discharge of the 10-year storm event also known as Overbank Flood Protection Criteria (Qp), and to control the peak discharge and safely pass the 100-year storm event otherwise known as Extreme Flood Control Criteria (Qf).

Existing and proposed watershed boundaries depicted in Figures 2 and 3 were delineated on the Boundary/Topographic survey and the site plan. The drainage patterns shown in Figures 2 and 3 were determined utilizing the design plans; USGS 2000 scale topographic maps; and field inspection methods.

4.0 TOPOGRAPHY AND SOILS

The study area is covered predominantly by woodlands. There is a ridge line that runs approximately north to south through the site. The terrain slopes generally eastward and westward from this dividing line.

Information assembled by the U.S. Department of Agriculture Soil Conservation Service printed in the Soil Survey of Orange County on Page 42 identifies the presence of Bath-Nassau (BnC), Erie (ESB), Mardin (MdB) and Rock Outcrop-Nassau (RSB) soil complexes within the limits of the project area. An Existing Soil Map is attached as Figure 4. Each of these soils is considered to be a part of the "C" hydrologic group.

5.0 HYDROLOGIC AND HYDRAULIC ANALYSIS

The analysis was performed by dividing the tributary watershed into relatively homogeneous subareas. The separation of the watershed into subareas was dictated by watershed conditions, methods of collection, conveyance and points of discharge. Watershed characteristics for each subarea were then assessed from topographical maps, soil surveys, site investigations and land use maps.

5.1 EXISTING CONDITION

The watershed analyzed in this study is depicted in Figure 2. The characteristics of each existing subarea of this watershed are detailed in Table 1 below. Figure 2 identifies each subarea and corresponding Design Point. Each Design Point represents the point at which storm water, generated within the project area, will concentrate and exits the project site. The site is broken up into four drainage areas and four distinct drainage design points. These areas were delineated and

a Curve Number (CN) and Time of Concentration (Tc) was determined for each. Calculations for the CN's and Tc's are included in the Appendices 2 and 3.

The southern half of the site, detailed as subarea Existing Area A, sheet flows to the east and west respectively, where it is carried by a swale along Temple Hill Road and a swale along the railroad south towards the stream that bisects the property and discharges through Design Point 1. The mid-portion of the site, labeled as subarea Existing Area B, flows to a roadside swale along Temple Hill Road where it collects at Design Point 2 which is an existing culvert under Temple Hill Road. The north east portion of the site, called out as subarea Existing Area C, sheet flows to a swale that runs parallel to the railroad and discharges at Design Point 3. The northwest portion of the site shown as subarea Existing Area D, sheet flows to an existing depression located adjacent to Temple Hill Road, where runoff collects and then discharges through a culvert at Design Point 4.

TABLE 1: EXISTING DRAINAGE AREA CHARACTERISTICS

DRAINAGE AREA	AREA (AC)	CN	Tc (min)
EXISTING AREA A	15.53	75	20.40
EXISTING AREA B	2.63	76	13.80
EXISTING AREA C	7.14	73	18.00
EXISTING AREA D	2.01	76	14.40

The watershed responses to the 1, 10 and 100 year - 24 hour storm events were computed and evaluated at each of the design points. The peak rates of runoff realized at the design points are presented in Table 4. Storm water computations are attached at the end of this report in Appendices 6, 7, and 8.

5.2 PROPOSED CONDITION

The subareas under the proposed development are identified in Figure 3. The characteristics of each proposed subarea is detailed in Table 2 below.

TABLE 2: PROPOSED DRAINAGE AREA CHARACTERISTICS

DRAINAGE AREA	AREA (AC)	CN	Tc (min)
POND 1	4.86	88	5.70
POND 1 BYPASS	9.15	75	19.20
POND 2	5.85	88	5.80
POND 2 BYPASS	2.37	76	14.4
TO DESIGN PT 2	1.81	80	17.4
TO DESIGN PT 4	1.78	77	25.2

The watershed responses to the 1, 10 and 100 year - 24 hour storm events were computed and evaluated at the aforementioned discharge points. The peak rates of runoff realized at the design points are presented in Table 4. Storm water computations are attached at the end of this report.

Two onsite detention ponds are proposed to mitigate the storm water quality volume (WQv), provide 24 hour detention of the Channel Protection Volume (Cpv) and to reduce peak runoff from the proposed site improvements. With drainage areas of 4.86 acres and 5.85 acres, respectively, both practices are proposed to be Pocket Ponds.

The required WQv was calculated using the 90% Rule as defined by NYSDEC. The 90% Rule equates to $WQv = [(P)(R_v)(A)] / 12$, where P is the 90% Rainfall Event Number, R_v is equal to $0.05 + 0.009 \cdot I$ where I is the Impervious Cover in percent, and A is the subarea total acreage. Required water quality volumes are

shown in Appendix 4 and Figures 5 and 6 depict the elevations at which the WQv, Cpv, Qp, and the Qf are obtained.

The required extended detention of the 1-year storm event (Cpv) was achieved through the use of a low flow orifice. Table 3 provides results taken from the hydrographs (included in Appendix 6) for runoff and reservoir routings to indicate the retention of the 1-year storm even for a period of 24 hours.

TABLE 3: EXTENDED DETENTION RESULTS

POND	TIME OF STORM ONSET (Hrs)	TIME OF ZERO OUTFLOW (Hrs)	TOTAL TIME (Hrs)
1	8.33	32.33	24.00
2	9.57	44.00+	34.43+

5.3 COMPARISON OF EXISTING AND PROPOSED CONDITIONS

The total peak runoff rates at all four discharge points (DP-1 through DP-4) have been calculated and are shown below in Table 4. The peak runoff rates have been reduced in the proposed condition during the 1, 10, and 100 year design storms for all of the major drainage areas on site. Since the runoff rates are all decreased in the post-development condition, there will be no adverse impact to the downstream receiving waters. Therefore the stormwater management plan designed for the Covington Estates subdivision will accomplish the intent of its design.

TABLE 4: SUMMARY OF RESULTS AT THE DESIGN POINTS

Criteria	1 – YEAR (Cpv)		10 – YEAR (Qp)		100 – YEAR (Qf)	
	Existing (cfs)	Proposed (cfs)	Existing (cfs)	Proposed (cfs)	Existing (cfs)	Proposed (cfs)
Discharge Point 1	10.16	10.09	34.66	33.89	58.82	56.76
Discharge Point 2	2.06	1.72	6.75	4.95	11.35	8.00
Discharge Point 3	4.25	4.20	15.67	15.50	27.14	26.95
Discharge Point 4	1.57	1.24	5.16	3.94	8.67	6.54

6.0 STORM WATER MANAGEMENT PLAN

The implemented stormwater pollution prevention plan will also incorporate the following water and natural resource management objectives.

- a. Prevent increases in flooding and flood damage through the reduction of the rate of runoff from all areas.
- b. Reduce the erosion potential from the site through the reduction of the rate of runoff from the project site and through the implementation of the soil and erosion control measures outlined on the project plans and as highlighted herein.
- c. Increase water recharge into the ground through the construction of Ponds with permanent pools.
- d. Decreases non-point source pollution and water quality degradation through the use of extended detention.

Those portions of the site which do not directly runoff into stormwater quality basins will continue to sheet flow through existing vegetation as it currently does, before it discharges from the site. The vegetative buffer will mitigate the small amount of roof and driveway areas that are not tributary to the stormwater ponds.

7.0 EROSION AND SEDIMENT CONTROL MEASURES

Soil erosion and sediment control measures have been detailed on the plans and outlined herein. The following are general measures that should be implemented:

- a. Damage to surface waters resulting from erosion and sedimentation shall be minimized by stabilizing disturbed areas and by removing sediment from construction site discharges.
- b. As much as practical, existing vegetation shall be preserved. Following the completion of construction activities in any portion of the site, permanent vegetation shall be established on all exposed soils within 14 days. Also, in areas where construction will temporarily cease for 21 days or more, the site shall be stabilized within 14 days of the last construction activity.
- c. Site preparation activities shall be planned to minimize the area and duration of soil disturbance. The project shall be phased so that the maximum area of site disturbance at any one time shall be five acres or less.
- d. Permanent traffic corridors shall be established and "routes of convenience" shall be avoided. Stabilized construction entrances shall be installed and maintained at all points of entry onto the project site. Off site sediment tracking shall be minimized through regularly scheduled sweeping and good housekeeping of construction vehicles.
- e. A qualified professional shall inspect and log the erosion and sediment control measures once every seven days and within 24 hours of $\frac{1}{2}$ " or greater of rainfall. The professional shall make recommendations to the operator on how to maintain the integrity and function of all temporary erosion control measures throughout the duration of the development process. Any deficiencies in the measures shall be corrected as soon as possible by the operator.

- f. An up to date Construction Site Log Book which includes this Stormwater Pollution Plan shall be maintained on site at all times. The Construction Site Log Book shall also include all of the items in Appendix 10 or those found in most recent version of the New York Standards and Specifications for Erosion and Sediment Control.

In particular, the following measures will be implemented:

- a. Pre-Construction Installation: Prior to any disturbance on site, silt fence shall be installed in accordance with the approved plans in all areas bordering the property. In addition, the silt fence shall be installed in areas of proposed phased work. A stabilized construction entrance shall be installed in accordance with approved plans in all areas where construction traffic will exit the site.
- b. Stone Check Dams: Until such time as final site stabilization is completed, ditches shall receive treatment with stone check dams so as to effectively trap sediment and minimize its release off-site. Stone check dams shall be constructed within each ditch beginning at its downstream terminus and should be placed at intervals of less than 250 feet.
- c. In no case shall erodible materials be stockpiled within 25 feet of any ditch, stream or other surface water body.
- d. Permanent vegetative cover: Immediately following the completion of construction activity in any portion of the site, permanent vegetation shall be established on all exposed soils with one of the following options.
 - 1. Properly seeded at a coverage rate as noted on the approved plans and covered with straw.
 - 2. Installation of straw mat to promote growth and limit erosion.Water shall be applied to newly seeded areas as needed until grass cover is well established.
- e. All unnecessary removal of healthy trees shall be avoided. Materials shall not be stored nor machinery operated within the drip-line of the trees to remain.

- f. All slopes 2:1 or steeper are to be stabilized with stone rip-rap or soil stabilization fabric as needed.
- g. Washouts shall be immediately repaired, re-seeded and protected from further erosion. All accumulated sediment shall be removed and contained in appropriate spoil areas. To effectively control wind erosion, water shall be applied to all exposed soils as necessary.

A qualified professional shall inspect and make recommendations to the operator on how to maintain the integrity and function of all temporary erosion control measures throughout the duration of the development process. To assure proper function, siltation barriers shall be maintained in good condition and reinforced, extended, repaired or replaced as necessary. Washouts shall be immediately repaired, re-seeded and protected from further erosion. All accumulated sediment shall be removed and contained in appropriate spoil areas. Water shall be applied to newly seeded areas as needed until grass cover is well established. To effectively control wind erosion, water shall be applied to all exposed soils as necessary.

8.0 LONG TERM MAINTENANCE OF WATER QUALITY FACILITIES

The water quality facility shall be owned and maintained by the Home Owner's Association. Regular inspection and maintenance of the proposed micropool extended detention pond is required to ensure its long term water quality function.

Sediment must be removed from the forebay every five to six years or when 50% full. A removable trash rack is to be provided on the principal spillway. There will be a non-clogging low flow orifice for outflow from the pond. A riser will also be present in the embankment. A pond drain will be included to allow for the drawing down of the pond in 24 hours. An adjustable gate valve will be provided on both the WQV-ED pipe and the pond drain. All side slopes are a maximum of 3:1.

The vegetation planted shall be properly maintained as required.

Street sweeping and catch basin sump debris removal is also required to prevent sediment from reaching and deteriorating the detention pond.

9.0 SUMMARY OF FINDINGS AND CONCLUSIONS

Based on the analysis of the pre and post development stormwater conditions, and the implementation of stormwater quality and sediment and erosion control measures, the construction of the Meadowbrook Estates Subdivision will be mitigated to the greatest extent practical.

- a. All criteria set forth in the New York State Stormwater Management Design Manual have been met.
- b. Post-development peak discharge rates will be reduced below pre-development peak discharge rates or their impacts minimized.
- c. Sediment and erosion control measures are designed to minimize erosion loss and downstream sediment deposits.

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APPENDIX 1 - FIGURES

APPENDIX 2 – CURVE NUMBER
CALCULATIONS

APPENDIX 3 – TIME OF
CONCENTRATION
CALCULATIONS



**ENGINEERING
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110 Orange Ave
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**TIME OF CONCENTRATION
WORKSHEET**

WO. NO. 101.01	DATE 2/26/2003	SHEET 1 OF 4
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PROJECT TITLE Covington Estates	LOCATION Town of New Windsor/Cornwall
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ESTIMATED BY JS	APPROVED BY	REF DRAWING(S) SWM Figures
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Present Developed Area: **AREA A**

1. Sheet Flow

- Surface Description (table 3-1)
- Manning's roughness coeff., 'n' (table 3-1)
- Flow length, L (total L ≤ 300 ft)
- Two-year 24-hour rainfall, P₂
- Land Slope, s

6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$

Segment ID	A-B			
	Woods			
	0.4			
ft	100			
in	3.5			
ft/ft	0.055			
hr	0.228			0.228

2. Shallow Concentrated Flow

- Surface description (paved or unpaved)
- Flow length, L
- Watercourse slope, s
- Average velocity, V (figure 3-1)

11. $T_t = \frac{L}{3600 V}$

Segment ID	B-C			
	Unpaved			
ft	260			
ft/ft	0.156			
ft/s	6.373			
hr	0.011			0.011

3. Channel Flow

- Cross sectional flow area, a
- Wetted perimeter, p_w
- Hydraulic radius, r = a/p_w
- Channel slope, s
- Manning's roughness coefficient, n

17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$

18. Flow Length, L

19. $T_t = \frac{L}{3600 V}$

Segment ID	C-D	D-E	E-F	
ft ²	4.5	22	13	
ft	7.82	17.65	16.32	
ft	0.575	1.246	0.797	
ft/ft	0.012	0.029	0.002	
	0.027	0.027	0.030	
ft/s	4.182	10.884	1.811	
ft	750	320	280	
hr	0.050	0.008	0.043	0.101

20. Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) **hr = 0.34**

min = 20.40



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**TIME OF CONCENTRATION
WORKSHEET**

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PROJECT TITLE Covington Estates	LOCATION Town of New Windsor
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ESTIMATED BY JS	APPROVED BY	REF DRAWING(S) SWM Figures
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Present	Developed	Area: AREA B
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1. Sheet Flow

1. Surface Description (table 3-1)
2. Manning's roughness coeff., 'n' (table 3-1)
3. Flow length, L (total L ≤ 300 ft)
4. Two-year 24-hour rainfall, P₂
5. Land Slope, s

6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$

Segment ID	A-B			
	WOODS			
	0.4			
ft	100			
in	3.5			
ft/ft	0.060			
hr	0.221			0.221

2. Shallow Concentrated Flow

7. Surface description (paved or unpaved)
8. Flow length, L
9. Watercourse slope, s
10. Average velocity, V (figure 3-1)

11. $T_t = \frac{L}{3600 V}$

Segment ID	B-C			
	UNPAVED			
ft	220			
ft/ft	0.112			
ft/s	5.400			
hr	0.011			0.011

3. Channel Flow

12. Cross sectional flow area, a
13. Wetted perimeter, p_w
14. Hydraulic radius, r = a/p_w
15. Channel slope, s
16. Manning's roughness coefficient, n

17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$

18. Flow Length, L

19. $T_t = \frac{L}{3600 V}$

Segment ID				
ft ²				
ft				
ft				
ft/ft				
ft/s				
ft				
hr				0.000

20. Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19)	hr =	0.23
	min =	13.80



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2/26/2003

SHEET
3 OF 4

PROJECT TITLE
Covington Estates

LOCATION
Town of New Windsor

ESTIMATED BY
JS

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REF DRAWING(S)
SWM Figures

Present Developed Area: AREA C

1. Sheet Flow

1. Surface Description (table 3-1)
2. Manning's roughness coeff., 'n' (table 3-1)
3. Flow length, L (total L ≤ 300 ft)
4. Two-year 24-hour rainfall, P₂
5. Land Slope, s

6. $T_1 = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$

Segment ID

A-B			
WOODS			
0.4			
ft	100		
in	3.5		
ft/ft	0.040		
hr	0.259		0.259

2. Shallow Concentrated Flow

7. Surface description (paved or unpaved)
8. Flow length, L
9. Watercourse slope, s
10. Average velocity, V (figure 3-1)

11. $T_1 = \frac{L}{3600 V}$

Segment ID

B-C			
UNPAVED			
200			
ft			
ft/ft	0.12		
ft/s	5.589		
hr	0.010		0.010

3. Channel Flow

12. Cross sectional flow area, a
13. Wetted perimeter, p_w
14. Hydraulic radius, r = a/p_w
15. Channel slope, s
16. Manning's roughness coefficient, n

17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$

18. Flow Length, L

19. $T_1 = \frac{L}{3600 V}$

Segment ID

C-D			
4.5			
ft ²			
ft	7.82		
ft	0.575		
ft/ft	0.011		
	0.027		
ft/s	4.004		
ft	450		
hr	0.031		0.031

20. Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19)

hr = **0.30**

min = **18.00**



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**TIME OF CONCENTRATION
WORKSHEET**

WO. NO. 101.01	DATE 2/26/2003	SHEET 4 OF 4
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PROJECT TITLE Covington Estates	LOCATION Town of New Windsor
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ESTIMATED BY JS	APPROVED BY	REF DRAWING(S) SWM Figures
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Present Developed Area: **AREA D**

1. Sheet Flow

- Surface Description (table 3-1)
- Manning's roughness coeff., 'n' (table 3-1)
- Flow length, L (total L < 300 ft)
- Two-year 24-hour rainfall, P₂
- Land Slope, s

6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$

Segment ID	A-B			
	WOODS			
	0.4			
ft	100			
in	3.5			
ft/ft	0.070			
hr	0.207			0.207

2. Shallow Concentrated Flow

- Surface description (paved or unpaved)
- Flow length, L
- Watercourse slope, s
- Average velocity, V (figure 3-1)

11. $T_t = \frac{L}{3600 V}$

Segment ID	B-C			
	UNPAVED			
ft	210			
ft/ft	0.071			
ft/s	4.299			
hr	0.014			0.014

3. Channel Flow

- Cross sectional flow area, a
- Wetted perimeter, p_w
- Hydraulic radius, r = a/p_w
- Channel slope, s
- Manning's roughness coefficient, n

17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$

18. Flow Length, L

19. $T_t = \frac{L}{3600 V}$

Segment ID	C-D			
ft ²	4.5			
ft	7.82			
ft	0.575			
ft/ft	0.009			
	0.027			
ft/s	3.682			
ft	290			
hr	0.022			0.022

20. Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) hr = **0.24**
min = **14.40**



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**TIME OF CONCENTRATION
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WO. NO. 101.01	DATE 2/26/2003	SHEET 1 OF 6
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PROJECT TITLE Covington Estates	LOCATION Town of New Windsor/Cornwall
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ESTIMATED BY JS	APPROVED BY	REF DRAWING(S) SWM Figures
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Present **Developed** Area: POND 1

1. Sheet Flow

1. Surface Description (table 3-1)
2. Manning's roughness coeff., 'n' (table 3-1)
3. Flow length, L (total L ≤ 300 ft)
4. Two-year 24-hour rainfall, P₂
5. Land Slope, s
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$

Segment ID

ft
in
ft/ft
hr

			0.000

2. Shallow Concentrated Flow

7. Surface description (paved or unpaved)
8. Flow length, L
9. Watercourse slope, s
10. Average velocity, V (figure 3-1)
11. $T_t = \frac{L}{3600 V}$

Segment ID

ft
ft/ft
ft/s
hr

			0.000

3. Channel Flow

12. Cross sectional flow area, a
13. Wetted perimeter, p_w
14. Hydraulic radius, r = a/p_w
15. Channel slope, s
16. Manning's roughness coefficient, n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$
18. Flow Length, L
19. $T_t = \frac{L}{3600 V}$

Segment ID

ft²
ft
ft
ft/ft
ft/s
ft
hr

			0.000

20. Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) hr = 0.00

Assumed time from Proposed storm pipe calcs. **min = 5.70**



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**TIME OF CONCENTRATION
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WO. NO. 101.01	DATE 2/26/2003	SHEET 2 OF 6
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PROJECT TITLE Covington Estates	LOCATION Town of New Windsor
ESTIMATED BY JS	APPROVED BY
REF DRAWING(S) SWM Figures	

Present **Developed** Area: **POND 1 BYPASS**

1. Sheet Flow

1. Surface Description (table 3-1)
2. Manning's roughness coeff., 'n' (table 3-1)
3. Flow length, L (total L ≤ 300 ft)
4. Two-year 24-hour rainfall, P₂
5. Land Slope, s

6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$

Segment ID	A-B		
	Woods		
	0.8		
	ft	76	
	in	3.5	
	ft/ft	0.184	
	hr	0.197	0.197

2. Shallow Concentrated Flow

7. Surface description (paved or unpaved)
8. Flow length, L
9. Watercourse slope, s
10. Average velocity, V (figure 3-1)

11. $T_t = \frac{L}{3600 V}$

Segment ID	B-C		
	Unpaved		
	ft	175	
	ft/ft	0.0142857	
	ft/s	1.928	
	hr	0.025	0.025

3. Channel Flow

12. Cross sectional flow area, a
13. Wetted perimeter, p_w
14. Hydraulic radius, r = a/p_w
15. Channel slope, s
16. Manning's roughness coefficient, n

17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$

18. Flow Length, L

19. $T_t = \frac{L}{3600 V}$

Segment ID	C-D	D-E	E-F		
	ft ²	4.5	22	13	
	ft	7.82	17.65	16.32	
	ft	0.575	1.246	0.797	
	ft/ft	0.012	0.029	0.002	
		0.027	0.027	0.030	
	ft/s	4.182	10.884	1.811	
	ft	750	320	280	
	hr	0.050	0.008	0.043	0.101

20. Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19)

hr = **0.32**

min = **19.20**



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110 Orange Ave
Walden, NY 12586

**TIME OF CONCENTRATION
WORKSHEET**

WO. NO. 101.01	DATE 2/26/2003	SHEET 3 OF 6
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PROJECT TITLE Covington Estates	LOCATION Town of New Windsor
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ESTIMATED BY JS	APPROVED BY	REF DRAWING(S) SWM Figures
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Present Developed Area: POND 2

1. Sheet Flow

1. Surface Description (table 3-1)
2. Manning's roughness coeff., 'n' (table 3-1)
3. Flow length, L (total L ≤ 300 ft)
4. Two-year 24-hour rainfall, P₂
5. Land Slope, s
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$

Segment ID

ft
in
ft/ft
hr

			0.000

2. Shallow Concentrated Flow

7. Surface description (paved or unpaved)
8. Flow length, L
9. Watercourse slope, s
10. Average velocity, V (figure 3-1)
11. $T_t = \frac{L}{3600 V}$

Segment ID

ft
ft/ft
ft/s
hr

			0.000

3. Channel Flow

12. Cross sectional flow area, a
13. Wetted perimeter, p_w
14. Hydraulic radius, r = a/p_w
15. Channel slope, s
16. Manning's roughness coefficient, n
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$
18. Flow Length, L
19. $T_t = \frac{L}{3600 V}$

Segment ID

ft²
ft
ft
ft/ft
ft/s
ft
hr

			0.000

20. Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) **hr = 0.00**

Assumed time from Proposed storm pipe calcs. **min = 5.80**



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**TIME OF CONCENTRATION
WORKSHEET**

WO. NO. 101.01	DATE 2/26/2003	SHEET 5 OF 6
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PROJECT TITLE Covington Estates	LOCATION Town of New Windsor
ESTIMATED BY JS	APPROVED BY
REF DRAWING(S) SWM Figures	

Present **Developed** Area: TO DESIGN PT 2

1. Sheet Flow

- Surface Description (table 3-1)
- Manning's roughness coeff., 'n' (table 3-1)
- Flow length, L (total L ≤ 300 ft)
- Two-year 24-hour rainfall, P₂
- Land Slope, s
- T_i = $\frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$

Segment ID

Segment ID	A-B			
	Woods			
	0.8			
	100	ft		
	3.5	in		
	0.130	ft/ft		
	0.282	hr		0.282

2. Shallow Concentrated Flow

- Surface description (paved or unpaved)
- Flow length, L
- Watercourse slope, s
- Average velocity, V (figure 3-1)
- T_i = $\frac{L}{3600 V}$

Segment ID

Segment ID	B-C			
	Unpaved			
	33	ft		
	0.0757576	ft/ft		
	4.441	ft/s		
	0.002	hr		0.002

3. Channel Flow

- Cross sectional flow area, a
- Wetted perimeter, p_w
- Hydraulic radius, r = a/p_w
- Channel slope, s
- Manning's roughness coefficient, n
- V = $\frac{1.49 r^{2/3} s^{1/2}}{n}$
- Flow Length, L
- T_i = $\frac{L}{3600 V}$

Segment ID

Segment ID	C-D	D-E		
	0.785	1.767	ft ²	
	3.1415927	4.712389	ft	
	0.250	0.375	ft	
	0.02	0.057	ft/ft	
	0.013	0.013		
	6.430	14.229	ft/s	
	42	68	ft	
	0.002	0.001	hr	0.003

20. Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19)

hr = **0.29**

min = **17.40**



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**TIME OF CONCENTRATION
WORKSHEET**

WO. NO. 101.01	DATE 2/26/2003	SHEET 6 OF 6
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PROJECT TITLE
Covington Estates

LOCATION
Town of New Windsor

ESTIMATED BY
JS

APPROVED BY

REF DRAWING(S)
SWM Figures

Present **Developed** Area: **TO DESIGN PT 4**

1. Sheet Flow

1. Surface Description (table 3-1)
2. Manning's roughness coeff., 'n' (table 3-1)
3. Flow length, L (total L ≤ 300 ft)
4. Two-year 24-hour rainfall, P₂
5. Land Slope, s

6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$

Segment ID

A-B			
Woods			
0.8			
ft	100		
in	3.5		
ft/ft	0.060		
hr	0.384		0.384

2. Shallow Concentrated Flow

7. Surface description (paved or unpaved)
8. Flow length, L
9. Watercourse slope, s
10. Average velocity, V (figure 3-1)

11. $T_t = \frac{L}{3600 V}$

Segment ID

B-C			
Unpaved			
ft	429		
ft/ft	0.0342657		
ft/s	2.987		
hr	0.040		0.040

3. Channel Flow

12. Cross sectional flow area, a
13. Wetted perimeter, p_w
14. Hydraulic radius, r = a/p_w
15. Channel slope, s
16. Manning's roughness coefficient, n

17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$

18. Flow Length, L

19. $T_t = \frac{L}{3600 V}$

Segment ID

ft ²			
ft			
ft			
ft/ft			
ft/s			
ft			
hr			0.000

20. Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19)

hr = **0.42**

min = **25.20**

APPENDIX 4 – WATER QUALITY

VOLUME CALCULATION



**ENGINEERING
PROPERTIES, PC**
110 Orange Ave
Walden, NY 12586

**WATER QUALITY
VOLUME CALCULATIONS**

WO. NO.
101.01

DATE
2/26/2003

SHEET
1 OF 1

PROJECT TITLE
Covington Estates

LOCATION
Town of New Windsor

ESTIMATED BY
JRS

APPROVED BY

REF DRAWING(S)
SWM Figures

$$WQ_v = (P * R_v * A) / (12)$$

Pond	90% Rainfall Event Number (P)	Impervious Area (Ac.)	Impervious Area (I) (%)	Contributory Area (A)	R _v (0.05 + 0.009*I)	WQ _v (Ac-ft)	WQ _v (ft ³)
Pond 1	1.2	2.77	57.00	4.86	0.563	0.274	11,918.0
Pond 2	1.2	3.44	58.80	5.85	0.579	0.339	14,760.3

* If the Impervious cover is less than 17% then the WQv shall be a minimum of 0.2 inches per acre

APPENDIX 5 – HYDROGRAPH

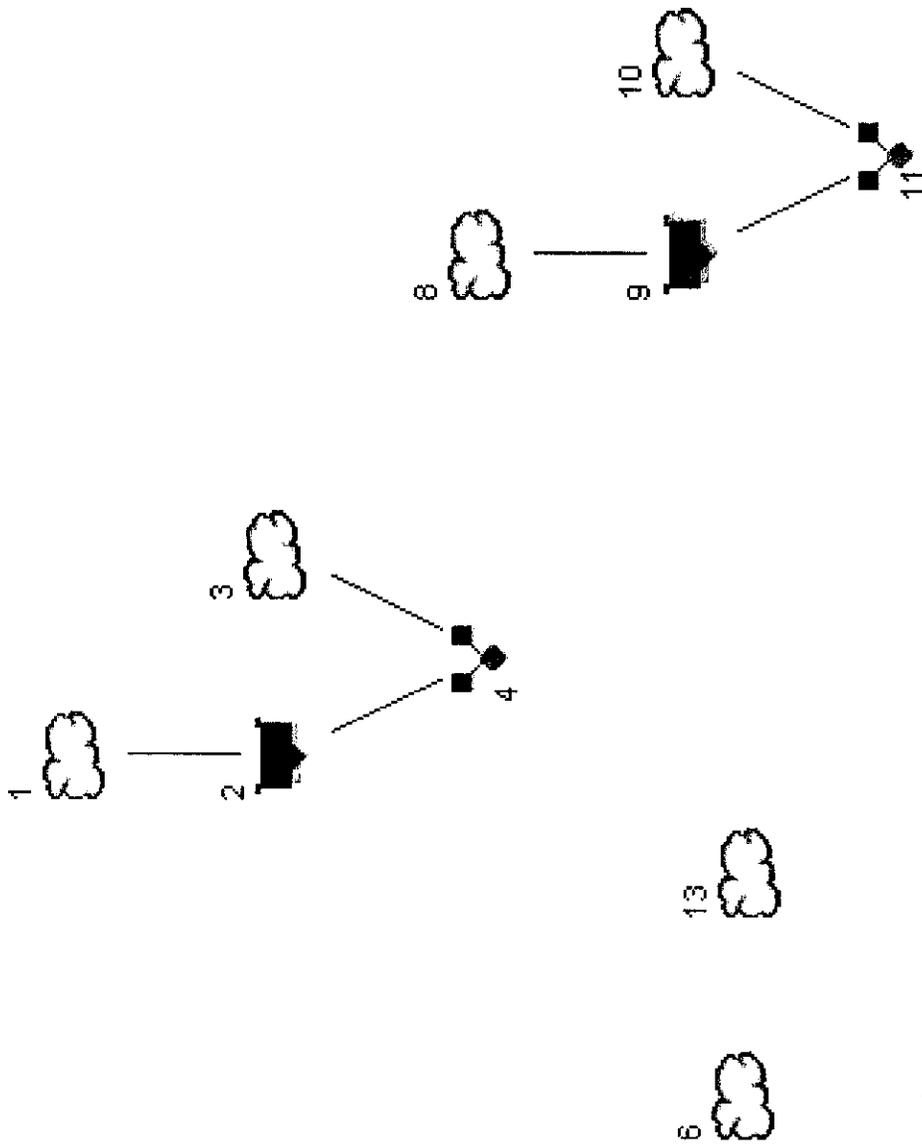
SUMMARIES AND DIAGRAMS

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-----	10.16	-----	-----	-----	34.66	-----	-----	58.82	Existing Area A (Design PT 1)
2	SCS Runoff	-----	2.06	-----	-----	-----	6.75	-----	-----	11.35	Existing Area B (Design PT 2)
3	SCS Runoff	-----	4.25	-----	-----	-----	15.67	-----	-----	27.14	Existing Area C (Design PT 3)
4	SCS Runoff	-----	1.57	-----	-----	-----	5.16	-----	-----	8.67	Existing Area D (Design PT 4)

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-----	9.55	-----	-----	-----	22.19	-----	-----	33.30	Area A1 - Pond 1 Inflow
2	Reservoir	1	3.79	-----	-----	-----	12.75	-----	-----	21.28	Pond 1 Outflow
3	SCS Runoff	-----	6.31	-----	-----	-----	21.50	-----	-----	36.45	Area A2 - Pond 1 Bypass
4	Combine	2, 3	10.09	-----	-----	-----	33.89	-----	-----	56.76	Area A - Discharge Point 1
6	SCS Runoff	-----	1.72	-----	-----	-----	4.95	-----	-----	8.00	Area B - Discharge Point 2
8	SCS Runoff	-----	11.50	-----	-----	-----	26.71	-----	-----	40.08	Area C1 - Pond 2 Inflow
9	Reservoir	8	2.62	-----	-----	-----	9.73	-----	-----	16.90	Pond 2 Outflow
10	SCS Runoff	-----	1.86	-----	-----	-----	6.08	-----	-----	10.23	Area C2 - Pond 2 Bypass
11	Combine	9, 10	4.20	-----	-----	-----	15.50	-----	-----	26.95	Area C - Discharge Point 3
13	SCS Runoff	-----	1.24	-----	-----	-----	3.94	-----	-----	6.54	Area D - Discharge Point 4



Legend

Hvd.	Origin	Description
1	SCS Runoff	Area A1 - Pond 1 Inflow
2	Reservoir	Pond 1 Outflow
3	SCS Runoff	Area A2 - Pond 1 Bypass
4	Combine	Area A - Discharge Point 1
6	SCS Runoff	Area B - Discharge Point 2
8	SCS Runoff	Area C1 - Pond 2 Inflow
9	Reservoir	Pond 2 Outflow
10	SCS Runoff	Area C2 - Pond 2 Bypass
11	Combine	Area C - Discharge Point 3
13	SCS Runoff	Area D - Discharge Point 4

APPENDIX 6 – 1-YEAR DESIGN

STORM HYDROGRAPHS

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	10.16	2	738	51,413	---	-----	-----	Existing Area A (Design PT 1)
2	SCS Runoff	2.06	2	732	8,827	---	-----	-----	Existing Area B (Design PT 2)
3	SCS Runoff	4.25	2	736	20,645	---	-----	-----	Existing Area C (Design PT 3)
4	SCS Runoff	1.57	2	732	6,746	---	-----	-----	Existing Area D (Design PT 4)

Covington Existing - rev 2-06.gpw	Return Period: 1 Year	Wednesday, Mar 8 2006, 2:22 PM
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Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:22 PM

Hyd. No. 1

Existing Area A (Design PT 1)

Hydrograph type	= SCS Runoff	Peak discharge	= 10.16 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 15.53 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.4 min
Total precip.	= 2.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 51,413 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.20	9.19
12.23	9.80
12.27	10.10
12.30	10.16 <<
12.33	10.06
12.37	9.86
12.40	9.55
12.43	9.15

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:22 PM

Hyd. No. 2

Existing Area B (Design PT 2)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.06 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 2.63 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.8 min
Total precip.	= 2.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 8,827 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.13	1.89
12.17	2.02
12.20	2.06 <<
12.23	2.02
12.27	1.93

...End

Hydrograph Report

Hydraflow Hydrographs by Intellisolve

Wednesday, Mar 8 2006, 2:22 PM

Hyd. No. 3

Existing Area C (Design PT 3)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.25 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 7.14 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 18.0 min
Total precip.	= 2.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 20,645 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.20	4.10
12.23	4.24
12.27	4.25 <<
12.30	4.19
12.33	4.07
12.37	3.90

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:22 PM

Hyd. No. 4

Existing Area D (Design PT 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.57 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 2.01 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 14.4 min
Total precip.	= 2.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 6,746 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.13	1.44
12.17	1.55
12.20	1.57 <<
12.23	1.54
12.27	1.47

...End

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	9.55	2	724	28,606	---	-----	-----	Area A1 - Pond 1 Inflow
2	Reservoir	3.79	2	736	28,593	1	273.01	13,048	Pond 1 Outflow
3	SCS Runoff	6.31	2	734	29,760	---	-----	-----	Area A2 - Pond 1 Bypass
4	Combine	10.09	2	734	58,353	2, 3	-----	-----	Area A - Discharge Point 1
6	SCS Runoff	1.72	2	734	7,723	---	-----	-----	Area B - Discharge Point 2
8	SCS Runoff	11.50	2	724	34,433	---	-----	-----	Area C1 - Pond 2 Inflow
9	Reservoir	2.62	2	748	34,182	8	287.45	32,185	Pond 2 Outflow
10	SCS Runoff	1.86	2	732	7,954	---	-----	-----	Area C2 - Pond 2 Bypass
11	Combine	4.20	2	734	42,136	9, 10	-----	-----	Area C - Discharge Point 3
13	SCS Runoff	1.24	2	740	6,375	---	-----	-----	Area D - Discharge Point 4
Covington Proposed-rev 2 2-06.GPW Return Period: 1 Year								Wednesday, Mar 8 2006, 2:26 PM	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:26 PM

Hyd. No. 1

Area A1 - Pond 1 Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 9.55 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 4.86 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.7 min
Total precip.	= 2.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 28,606 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.03	8.85
12.07	9.55 <<
12.10	8.66

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:26 PM

Hyd. No. 2

Pond 1 Outflow

Hydrograph type	= Reservoir	Peak discharge	= 3.79 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Inflow hyd. No.	= 1	Reservoir name	= POND 1
Max. Elevation	= 273.01 ft	Max. Storage	= 13,048 cuft

Storage Indication method used. Wet pond routing start elevation = 271.40 ft.

Outflow hydrograph volume = 28,593 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.13	6.93	272.89	3.62	3.57	----	----	----	----	----	----	----	3.57
12.17	5.44	272.95	3.72	3.69	----	----	----	----	----	----	----	3.69
12.20	4.62	272.98	3.76	3.75	----	----	----	----	----	----	----	3.75
12.23	4.21	273.00	3.79	3.78	----	----	----	----	----	----	----	3.78
12.27	3.93	273.01	3.80	3.79	----	----	----	----	----	----	----	3.79 <<
12.30	3.65	273.01	3.80	3.79	----	----	----	----	----	----	----	3.79
12.33	3.36	273.00	3.79	3.78	----	----	----	----	----	----	----	3.78
12.37	3.07	272.99	3.77	3.75	----	----	----	----	----	----	----	3.75
12.40	2.77	272.97	3.74	3.72	----	----	----	----	----	----	----	3.72
12.43	2.47	272.94	3.70	3.67	----	----	----	----	----	----	----	3.67
12.47	2.16	272.91	3.65	3.60	----	----	----	----	----	----	----	3.60
12.50	1.86	272.87	3.60	3.53	----	----	----	----	----	----	----	3.53
12.53	1.57	272.83	3.53	3.45	----	----	----	----	----	----	----	3.45

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:26 PM

Hyd. No. 3

Area A2 - Pond 1 Bypass

Hydrograph type = SCS Runoff
 Storm frequency = 1 yrs
 Drainage area = 9.15 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 2.90 in
 Storm duration = 24 hrs

Peak discharge = 6.31 cfs
 Time interval = 2 min
 Curve number = 75
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.2 min
 Distribution = Type III
 Shape factor = 484

Hydrograph Volume = 29,760 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17	5.73
12.20	6.14
12.23	6.31 <<
12.27	6.29
12.30	6.16
12.33	5.95

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:26 PM

Hyd. No. 4

Area A - Discharge Point 1

Hydrograph type = Combine
 Storm frequency = 1 yrs
 Inflow hyds. = 2, 3

Peak discharge = 10.09 cfs
 Time interval = 2 min

Hydrograph Volume = 58,353 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 2 + (cfs)	Hyd. 3 = (cfs)	Outflow (cfs)
12.17	3.69	5.73	9.42
12.20	3.75	6.14	9.89
12.23	3.78	6.31 <<	10.09 <<
12.27	3.79 <<	6.29	10.08
12.30	3.79	6.16	9.95
12.33	3.78	5.95	9.73
12.37	3.75	5.67	9.43

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:26 PM

Hyd. No. 6

Area B - Discharge Point 2

Hydrograph type	= SCS Runoff	Peak discharge	= 1.72 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 1.81 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 17.4 min
Total precip.	= 2.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 7,723 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17	1.60
12.20	1.69
12.23	1.72 <<
12.27	1.69
12.30	1.64
12.33	1.57

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:26 PM

Hyd. No. 8

Area C1 - Pond 2 Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 11.50 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 5.85 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.8 min
Total precip.	= 2.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 34,433 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.03	10.65
12.07	11.50 <<
12.10	10.42

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:26 PM

Hyd. No. 9

Pond 2 Outflow

Hydrograph type = Reservoir
 Storm frequency = 1 yrs
 Inflow hyd. No. = 8
 Max. Elevation = 287.45 ft

Peak discharge = 2.62 cfs
 Time interval = 2 min
 Reservoir name = POND 2
 Max. Storage = 32,185 cuft

Storage Indication method used. Wet pond routing start elevation = 286.20 ft.

Outflow hydrograph volume = 34,182 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.23	5.06	287.35	2.39	2.38	----	----	----	----	----	----	----	2.38
12.27	4.73	287.38	2.44	2.44	----	----	----	----	----	----	----	2.44
12.30	4.39	287.40	2.48	2.48	----	----	----	----	----	----	----	2.48
12.33	4.05	287.42	2.53	2.52	----	----	----	0.02	----	----	----	2.53
12.37	3.70	287.43	2.57	2.54	----	----	----	0.03	----	----	----	2.57
12.40	3.34	287.44	2.60	2.56	----	----	----	0.04	----	----	----	2.60
12.43	2.97	287.45	2.61	2.57	----	----	----	0.04	----	----	----	2.61
12.47	2.61	287.45 <<	2.62	2.58	----	----	----	0.04	----	----	----	2.62 <<
12.50	2.23	287.45	2.61	2.57	----	----	----	0.04	----	----	----	2.61
12.53	1.89	287.44	2.60	2.56	----	----	----	0.04	----	----	----	2.60
12.57	1.65	287.43	2.57	2.55	----	----	----	0.03	----	----	----	2.57
12.60	1.52	287.42	2.55	2.53	----	----	----	0.02	----	----	----	2.55
12.63	1.46	287.41	2.52	2.51	----	----	----	0.01	----	----	----	2.52
12.67	1.43	287.40	2.49	2.49	----	----	----	0.00	----	----	----	2.49
12.70	1.39	287.39	2.46	2.46	----	----	----	----	----	----	----	2.46
12.73	1.35	287.38	2.44	2.44	----	----	----	----	----	----	----	2.44
12.77	1.31	287.37	2.42	2.41	----	----	----	----	----	----	----	2.41
12.80	1.27	287.36	2.40	2.39	----	----	----	----	----	----	----	2.39
12.83	1.23	287.34	2.37	2.37	----	----	----	----	----	----	----	2.37

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:26 PM

Hyd. No. 10

Area C2 - Pond 2 Bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 1.86 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 2.37 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 14.4 min
Total precip.	= 2.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 7,954 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.13	1.70
12.17	1.82
12.20	1.86 <<
12.23	1.82
12.27	1.74

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:26 PM

Hyd. No. 11

Area C - Discharge Point 3

Hydrograph type = Combine
 Storm frequency = 1 yrs
 Inflow hyds. = 9, 10

Peak discharge = 4.20 cfs
 Time interval = 2 min

Hydrograph Volume = 42,136 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 9 + (cfs)	Hyd. 10 = (cfs)	Outflow (cfs)
12.13	2.12	1.70	3.82
12.17	2.24	1.82	4.06
12.20	2.32	1.86 <<	4.17
12.23	2.38	1.82	4.20 <<
12.27	2.44	1.74	4.18
12.30	2.48	1.64	4.12
12.33	2.53	1.51	4.05
12.37	2.57	1.38	3.95
12.40	2.60	1.24	3.84

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:26 PM

Hyd. No. 13

Area D - Discharge Point 4

Hydrograph type	= SCS Runoff	Peak discharge	= 1.24 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 1.78 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 25.2 min
Total precip.	= 2.90 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 6,375 cuft

(Printed values \geq 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.23	1.14
12.27	1.20
12.30	1.23
12.33	1.24 <<
12.37	1.22
12.40	1.20
12.43	1.16
12.47	1.12

...End

APPENDIX 7 – 10-YEAR DESIGN

STORM HYDROGRAPHS

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	34.66	2	736	164,140	---	-----	-----	Existing Area A (Design PT 1)
2	SCS Runoff	6.75	2	730	27,487	---	-----	-----	Existing Area B (Design PT 2)
3	SCS Runoff	15.67	2	734	69,431	---	-----	-----	Existing Area C (Design PT 3)
4	SCS Runoff	5.16	2	730	21,007	---	-----	-----	Existing Area D (Design PT 4)
Covington Existing - rev 2-06.gpw					Return Period: 10 Year		Wednesday, Mar 8 2006, 2:29 PM		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:29 PM

Hyd. No. 1

Existing Area A (Design PT 1)

Hydrograph type	= SCS Runoff	Peak discharge	= 34.66 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 15.53 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.4 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 164,140 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.20	32.93
12.23	34.32
12.27	34.66 <<
12.30	34.23
12.33	33.33
12.37	32.12

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:29 PM

Hyd. No. 2

Existing Area B (Design PT 2)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.75 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 2.63 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.8 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 27,487 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.13	6.44
12.17	6.75 <<
12.20	6.71
12.23	6.45

...End

Hydrograph Report

Hydrallow Hydrographs by Intellisolve

Wednesday, Mar 8 2006, 2:29 PM

Hyd. No. 3

Existing Area C (Design PT 3)

Hydrograph type	= SCS Runoff	Peak discharge	= 15.67 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 7.14 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 18.0 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 69,431 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17	14.85
12.20	15.56
12.23	15.67 <<
12.27	15.35
12.30	14.79

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:29 PM

Hyd. No. 4

Existing Area D (Design PT 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.16 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 2.01 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 14.4 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 21,007 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.13	4.92
12.17	5.16 <<
12.20	5.13
12.23	4.93

...End

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	22.19	2	724	68,568	---	-----	-----	Area A1 - Pond 1 Inflow
2	Reservoir	12.75	2	730	68,555	1	274.28	20,346	Pond 1 Outflow
3	SCS Runoff	21.50	2	734	95,012	---	-----	-----	Area A2 - Pond 1 Bypass
4	Combine	33.89	2	732	163,566	2, 3	-----	-----	Area A - Discharge Point 1
6	SCS Runoff	4.95	2	732	21,901	---	-----	-----	Area B - Discharge Point 2
8	SCS Runoff	26.71	2	724	82,535	---	-----	-----	Area C1 - Pond 2 Inflow
9	Reservoir	9.73	2	738	82,273	8	288.49	46,371	Pond 2 Outflow
10	SCS Runoff	6.08	2	730	24,770	---	-----	-----	Area C2 - Pond 2 Bypass
11	Combine	15.50	2	732	107,042	9, 10	-----	-----	Area C - Discharge Point 3
13	SCS Runoff	3.94	2	738	19,377	---	-----	-----	Area D - Discharge Point 4
Covington Proposed-rev 2 2-06.GPW Return Period: 10 Year								Wednesday, Mar 8 2006, 2:30 PM	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:30 PM

Hyd. No. 1

Area A1 - Pond 1 Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 22.19 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 4.86 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.7 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 68,568 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.03	20.86
12.07	22.19 <<

...End

Hydrograph Report

Hydraflow Hydrographs by Intellisolve

Wednesday, Mar 8 2006, 2:30 PM

Hyd. No. 2

Pond 1 Outflow

Hydrograph type	= Reservoir	Peak discharge	= 12.75 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyd. No.	= 1	Reservoir name	= POND 1
Max. Elevation	= 274.28 ft	Max. Storage	= 20,346 cuft

Storage Indication method used. Wet pond routing start elevation = 271.40 ft.

Outflow hydrograph volume = 68,555 cuft

Hydrograph Discharge Table

(Printed values >= 90% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.10	19.86	274.17	11.50	5.57	-----	-----	-----	5.93	-----	-----	-----	11.50
12.13	15.72	274.26	12.51	5.69	-----	-----	-----	6.82	-----	-----	-----	12.50
12.17	12.23	274.28	12.75	5.71	-----	-----	-----	7.03	-----	-----	-----	12.75 <<
12.20	10.30	274.26	12.50	5.69	-----	-----	-----	6.82	-----	-----	-----	12.50
12.23	9.34	274.23	12.07	5.64	-----	-----	-----	6.43	-----	-----	-----	12.07
12.27	8.69	274.18	11.59	5.58	-----	-----	-----	6.00	-----	-----	-----	11.58

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:30 PM

Hyd. No. 3

Area A2 - Pond 1 Bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 21.50 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 9.15 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 19.2 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 95,012 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17	20.47
12.20	21.39
12.23	21.50 <<
12.27	21.02
12.30	20.20

...End

Hydrograph Report

Hydraflow Hydrographs by Intellsolve

Wednesday, Mar 8 2006, 2:30 PM

Hyd. No. 4

Area A - Discharge Point 1

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Inflow hyds. = 2, 3

Peak discharge = 33.89 cfs
 Time interval = 2 min

Hydrograph Volume = 163,566 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 2 + (cfs)	Hyd. 3 = (cfs)	Outflow (cfs)
12.13	12.50	18.81	31.31
12.17	12.75 <<	20.47	33.22
12.20	12.50	21.39	33.89 <<
12.23	12.07	21.50 <<	33.56
12.27	11.58	21.02	32.60
12.30	11.10	20.20	31.30

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:30 PM

Hyd. No. 6

Area B - Discharge Point 2

Hydrograph type	= SCS Runoff	Peak discharge	= 4.95 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 1.81 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 17.4 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 21,901 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17	4.76
12.20	4.95 <<
12.23	4.95
12.27	4.81
12.30	4.60

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:30 PM

Hyd. No. 8

Area C1 - Pond 2 Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 26.71 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 5.85 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.8 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 82,535 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.03	25.11
12.07	26.71 <<

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:30 PM

Hyd. No. 9

Pond 2 Outflow

Hydrograph type = Reservoir
 Storm frequency = 10 yrs
 Inflow hyd. No. = 8
 Max. Elevation = 288.49 ft

Peak discharge = 9.73 cfs
 Time interval = 2 min
 Reservoir name = POND 2
 Max. Storage = 46,371 cuft

Storage Indication method used. Wet pond routing start elevation = 286.20 ft.

Outflow hydrograph volume = 82,273 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.17	14.72	288.43	9.19	4.07	----	----	----	5.07	----	----	----	9.14
12.20	12.40	288.46	9.51	4.11	----	----	----	5.35	----	----	----	9.45
12.23	11.24	288.48	9.68	4.13	----	----	----	5.49	----	----	----	9.62
12.27	10.46	288.49	9.76	4.14	----	----	----	5.57	----	----	----	9.71
12.30	9.68	288.49	9.79	4.14	----	----	----	5.59	----	----	----	9.73 <<
12.33	8.89	288.49	9.76	4.14	----	----	----	5.56	----	----	----	9.70
12.37	8.09	288.48	9.67	4.13	----	----	----	5.49	----	----	----	9.62
12.40	7.28	288.46	9.53	4.11	----	----	----	5.37	----	----	----	9.48
12.43	6.48	288.44	9.35	4.09	----	----	----	5.21	----	----	----	9.30
12.47	5.66	288.42	9.12	4.06	----	----	----	5.01	----	----	----	9.07
12.50	4.85	288.39	8.85	4.02	----	----	----	4.78	----	----	----	8.80

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:30 PM

Hyd. No. 10

Area C2 - Pond 2 Bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 6.08 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 2.37 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 14.4 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 24,770 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.13	5.81
12.17	6.08 <<
12.20	6.05
12.23	5.81

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:30 PM

Hyd. No. 11

Area C - Discharge Point 3

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Inflow hyds. = 9, 10

Peak discharge = 15.50 cfs
 Time interval = 2 min

Hydrograph Volume = 107,042 cuft

(Printed values \geq 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 9 + (cfs)	Hyd. 10 = (cfs)	Outflow (cfs)
12.13	8.58	5.81	14.39
12.17	9.14	6.08 <<	15.22
12.20	9.45	6.05	15.50 <<
12.23	9.62	5.81	15.43
12.27	9.71	5.46	15.17
12.30	9.73 <<	5.05	14.78
12.33	9.70	4.58	14.29

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:30 PM

Hyd. No. 13

Area D - Discharge Point 4

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Drainage area = 1.78 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 5.50 in
 Storm duration = 24 hrs

Peak discharge = 3.94 cfs
 Time interval = 2 min
 Curve number = 77
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 25.2 min
 Distribution = Type III
 Shape factor = 484

Hydrograph Volume = 19,377 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.23	3.77
12.27	3.91
12.30	3.94 <<
12.33	3.89
12.37	3.80
12.40	3.67

...End

APPENDIX 8 – 100-YEAR DESIGN

STORM HYDROGRAPHS

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	58.82	2	736	278,960	---	-----	-----	Existing Area A (Design PT 1)
2	SCS Runoff	11.35	2	730	46,320	---	-----	-----	Existing Area B (Design PT 2)
3	SCS Runoff	27.14	2	734	120,083	---	-----	-----	Existing Area C (Design PT 3)
4	SCS Runoff	8.67	2	730	35,400	---	-----	-----	Existing Area D (Design PT 4)
Covington Existing - rev 2-06.gpw					Return Period: 100 Year		Wednesday, Mar 8 2006, 2:33 PM		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:33 PM

Hyd. No. 1

Existing Area A (Design PT 1)

Hydrograph type	= SCS Runoff	Peak discharge	= 58.82 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 15.53 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.4 min
Total precip.	= 7.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 278,960 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.20	56.58
12.23	58.58
12.27	58.82 <<
12.30	57.78
12.33	55.98
12.37	53.70

...End

Hydrograph Report

Hydrflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:33 PM

Hyd. No. 2

Existing Area B (Design PT 2)

Hydrograph type	= SCS Runoff	Peak discharge	= 11.35 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 2.63 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.8 min
Total precip.	= 7.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 46,320 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.13	10.92
12.17	11.35 <<
12.20	11.22
12.23	10.72

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:33 PM

Hyd. No. 3

Existing Area C (Design PT 3)

Hydrograph type	= SCS Runoff	Peak discharge	= 27.14 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 7.14 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 18.0 min
Total precip.	= 7.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 120,083 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17	26.11
12.20	27.13
12.23	27.14 <<
12.27	26.43
12.30	25.30

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:33 PM

Hyd. No. 4

Existing Area D (Design PT 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 8.67 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 2.01 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 14.4 min
Total precip.	= 7.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 35,400 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.13	8.34
12.17	8.67 <<
12.20	8.58
12.23	8.19

...End

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	33.30	2	724	105,401	---	-----	-----	Area A1 - Pond 1 Inflow
2	Reservoir	21.28	2	728	105,388	1	274.95	25,505	Pond 1 Outflow
3	SCS Runoff	36.45	2	732	161,475	---	-----	-----	Area A2 - Pond 1 Bypass
4	Combine	56.76	2	732	266,862	2, 3	-----	-----	Area A - Discharge Point 1
6	SCS Runoff	8.00	2	732	35,728	---	-----	-----	Area B - Discharge Point 2
8	SCS Runoff	40.08	2	724	126,871	---	-----	-----	Area C1 - Pond 2 Inflow
9	Reservoir	16.90	2	734	126,605	8	289.15	56,873	Pond 2 Outflow
10	SCS Runoff	10.23	2	730	41,741	---	-----	-----	Area C2 - Pond 2 Bypass
11	Combine	26.95	2	732	168,346	9, 10	-----	-----	Area C - Discharge Point 3
13	SCS Runoff	6.54	2	738	32,382	---	-----	-----	Area D - Discharge Point 4
Covington Proposed-rev 2 2-06.GPW Return Period: 100 Year							Wednesday, Mar 8 2006, 2:34 PM		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:34 PM

Hyd. No. 1

Area A1 - Pond 1 Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 33.30 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 4.86 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.7 min
Total precip.	= 7.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 105,401 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.03 31.45
12.07 33.30 <<

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:34 PM

Hyd. No. [REDACTED]

Pond 1 [REDACTED]

Hydrograph type = Reservoir
 Storm frequency = 100 yrs
 Inflow hydrograph = 1
 Max. Elevation = 274.95 ft

Peak discharge = 21.28 cfs
 Time interval = 2 min
 Reservoir name = POND 1
 Max. Storage = 25,505 cuft

Storage Indication method used. Wet pond routing start elevation = 271.40 ft.

Outflow hydrograph volume = 105,388 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.10	29.68	274.86	20.00	6.39	-----	-----	0.00	13.61	0.00	-----	-----	20.00
12.13	23.42	274.95	21.28	6.49	-----	-----	0.00	14.78	0.00	-----	-----	21.28 <<
12.17	18.16	274.94	21.18	6.49	-----	-----	0.00	14.70	0.00	-----	-----	21.18
12.20	15.27	274.88	20.31	6.42	-----	-----	0.00	13.89	0.00	-----	-----	20.31
12.23	13.82	274.80	19.19	6.33	-----	-----	0.00	12.86	0.00	-----	-----	19.19

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:34 PM

Hyd. No. 3

Area A2 - Pond 1 Bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 36.45 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 9.15 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 19.2 min
Total precip.	= 7.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 161,475 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17	35.14
12.20	36.45 <<
12.23	36.41
12.27	35.39
12.30	33.83

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:34 PM

Hyd. No. 4

Area A - Discharge Point 1

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Inflow hyds. = 2, 3

Peak discharge = 56.76 cfs
 Time interval = 2 min

Hydrograph Volume = 266,862 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 2 + (cfs)	Hyd. 3 = (cfs)	Outflow (cfs)
12.13	21.28 <<	32.53	53.80
12.17	21.18	35.14	56.32
12.20	20.31	36.45 <<	56.76 <<
12.23	19.19	36.41	55.59
12.27	18.10	35.39	53.49

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:34 PM

Hyd. No. 6

Area B - Discharge Point 2

Hydrograph type	= SCS Runoff	Peak discharge	= 8.00 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 1.81 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 17.4 min
Total precip.	= 7.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 35,728 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.13	7.20
12.17	7.74
12.20	8.00 <<
12.23	7.96
12.27	7.71
12.30	7.35

...End

Hydrograph Report

Hydraflow Hydrographs by Intellisolve

Wednesday, Mar 8 2006, 2:34 PM

Hyd. No. 8

Area C1 - Pond 2 Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 40.08 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 5.85 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.8 min
Total precip.	= 7.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 126,871 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.03	37.86
12.07	40.08 <<

...End

Hydrograph Report

Hydraflow Hydrographs by Intellsolve

Wednesday, Mar 8 2006, 2:34 PM

Hyd. No. 9

Pond 2 Outflow

Hydrograph type	= Reservoir	Peak discharge	= 16.90 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 8	Reservoir name	= POND 2
Max. Elevation	= 289.15 ft	Max. Storage	= 56,873 cuft

Storage Indication method used. Wet pond routing start elevation = 286.20 ft.

Outflow hydrograph volume = 126,605 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.13	28.19	289.05	15.74	4.78	-----	-----	-----	10.96	-----	-----	-----	15.74
12.17	21.86	289.12	16.53	4.85	-----	-----	-----	11.68	-----	-----	-----	16.53
12.20	18.38	289.15	16.84	4.88	-----	-----	-----	11.96	-----	-----	-----	16.84
12.23	16.63	289.15	16.90	4.88	-----	-----	-----	12.02	-----	-----	-----	16.90 <<
12.27	15.46	289.14	16.83	4.88	-----	-----	-----	11.95	-----	-----	-----	16.82
12.30	14.29	289.13	16.66	4.86	-----	-----	-----	11.80	-----	-----	-----	16.66
12.33	13.10	289.11	16.41	4.84	-----	-----	-----	11.57	-----	-----	-----	16.41
12.37	11.92	289.08	16.07	4.81	-----	-----	-----	11.26	-----	-----	-----	16.07
12.40	10.72	289.05	15.67	4.77	-----	-----	-----	10.90	-----	-----	-----	15.67

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:34 PM

Hyd. No. 10

Area C2 - Pond 2 Bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 10.23 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 2.37 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 14.4 min
Total precip.	= 7.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 41,741 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.13	9.84
12.17	10.23 <<
12.20	10.11
12.23	9.66

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:34 PM

Hyd. No. 11

Area C - Discharge Point 3

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Inflow hyds. = 9, 10

Peak discharge = 26.95 cfs
 Time interval = 2 min

Hydrograph Volume = 168,346 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 9 + (cfs)	Hyd. 10 = (cfs)	Outflow (cfs)
12.13	15.74	9.84	25.58
12.17	16.53	10.23 <<	26.76
12.20	16.84	10.11	26.95 <<
12.23	16.90 <<	9.66	26.55
12.27	16.82	9.02	25.84
12.30	16.66	8.29	24.95

...End

Hydrograph Report

Hydraflow Hydrographs by Intellisolve

Wednesday, Mar 8 2006, 2:34 PM

Hyd. No. 13

Area D - Discharge Point 4

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Drainage area = 1.78 ac
 Basin Slope = 0.0 %
 Tc method = USER
 Total precip. = 7.80 in
 Storm duration = 24 hrs

Peak discharge = 6.54 cfs
 Time interval = 2 min
 Curve number = 77
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 25.2 min
 Distribution = Type III
 Shape factor = 484

Hydrograph Volume = 32,382 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.20	5.98
12.23	6.33
12.27	6.52
12.30	6.54 <<
12.33	6.43
12.37	6.25
12.40	6.02

...End

APPENDIX 9 – RESERVOIR

REPORTS

Pond Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:48 PM

Pond No. 1 - POND 1

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	268.00	318	0	0
2.00	270.00	1,868	2,186	2,186
4.00	272.00	3,846	5,714	7,900
6.00	274.00	6,396	10,242	18,142
8.00	276.00	9,098	15,494	33,636

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	12.00	0.00	0.00
Span (in)	= 24.00	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 267.57	271.50	0.00	0.00
Length (ft)	= 53.00	0.00	0.00	0.00
Slope (%)	= 0.60	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	2.00	20.00	0.00
Crest El. (ft)	= 275.00	273.25	275.00	0.00
Weir Coeff.	= 3.33	3.33	2.60	0.00
Weir Type	= Riser	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	268.00	0.00	0.00	---	---	0.00	0.00	0.00	---	---	0.00
0.20	219	268.20	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
0.40	437	268.40	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
0.60	656	268.60	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
0.80	874	268.80	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
1.00	1,093	269.00	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
1.20	1,312	269.20	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
1.40	1,530	269.40	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
1.60	1,749	269.60	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
1.80	1,967	269.80	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
2.00	2,186	270.00	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
2.20	2,757	270.20	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
2.40	3,329	270.40	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
2.60	3,900	270.60	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
2.80	4,472	270.80	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
3.00	5,043	271.00	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
3.20	5,614	271.20	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
3.40	6,186	271.40	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
3.60	6,757	271.60	1.14	0.04	---	---	0.00	0.00	0.00	---	---	0.04
3.80	7,329	271.80	1.14	0.37	---	---	0.00	0.00	0.00	---	---	0.37
4.00	7,900	272.00	1.14	0.96	---	---	0.00	0.00	0.00	---	---	0.96
4.20	8,924	272.20	1.73	1.69	---	---	0.00	0.00	0.00	---	---	1.69
4.40	9,948	272.40	2.48	2.41	---	---	0.00	0.00	0.00	---	---	2.41
4.60	10,973	272.60	2.93	2.93	---	---	0.00	0.00	0.00	---	---	2.93
4.80	11,997	272.80	3.48	3.38	---	---	0.00	0.00	0.00	---	---	3.38
5.00	13,021	273.00	3.79	3.78	---	---	0.00	0.00	0.00	---	---	3.78
5.20	14,045	273.20	4.21	4.14	---	---	0.00	0.00	0.00	---	---	4.14
5.40	15,069	273.40	4.95	4.47	---	---	0.00	0.39	0.00	---	---	4.86
5.60	16,094	273.60	6.21	4.78	---	---	0.00	1.38	0.00	---	---	6.16
5.80	17,118	273.80	7.80	5.07	---	---	0.00	2.72	0.00	---	---	7.79
6.00	18,142	274.00	9.69	5.35	---	---	0.00	4.33	0.00	---	---	9.67
6.20	19,691	274.20	11.78	5.61	---	---	0.00	6.17	0.00	---	---	11.78
6.40	21,241	274.40	14.07	5.86	---	---	0.00	8.21	0.00	---	---	14.07

Continues on next page...

POND 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
6.60	22,790	274.60	16.54	6.10	---	---	0.00	10.45	0.00	---	---	16.54
6.80	24,340	274.80	19.18	6.33	---	---	0.00	12.85	0.00	---	---	19.18
7.00	25,889	275.00	21.97	6.55	---	---	0.00	15.42	0.00	---	---	21.97
7.20	27,438	275.20	28.38	6.67	---	---	3.58	18.14	4.65	---	---	33.03
7.40	28,988	275.40	34.68	4.74	---	---	10.11	19.82	13.16	---	---	47.84
7.60	30,537	275.60	38.21	3.04	---	---	18.58	16.59	24.17	---	---	62.38
7.80	32,087	275.80	39.69	2.22	---	---	23.02	14.46	37.22	---	---	76.90
8.00	33,636	276.00	40.61	1.77	---	---	25.50	13.33	52.00	---	---	92.61

...End

Pond Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Mar 8 2006, 2:47 PM

Pond No. 2 - POND 2

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	284.00	6,062	0	0
2.00	286.00	9,292	15,354	15,354
4.00	288.00	13,952	23,244	38,598
6.00	290.00	17,821	31,773	70,371

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	11.00	0.00	0.00
Span (in)	= 24.00	11.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 283.57	286.33	0.00	0.00
Length (ft)	= 70.00	0.00	0.00	0.00
Slope (%)	= 1.39	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	1.70	15.00	0.00
Crest El. (ft)	= 289.33	287.50	289.33	0.00
Weir Coeff.	= 3.33	3.33	2.60	0.00
Weir Type	= Riser	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	284.00	0.00	0.00	---	---	0.00	0.00	0.00	---	---	0.00
0.20	1,535	284.20	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
0.40	3,071	284.40	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
0.60	4,606	284.60	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
0.80	6,142	284.80	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
1.00	7,677	285.00	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
1.20	9,212	285.20	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
1.40	10,748	285.40	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
1.60	12,283	285.60	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
1.80	13,819	285.80	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
2.00	15,354	286.00	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
2.20	17,678	286.20	1.14	0.00	---	---	0.00	0.00	0.00	---	---	0.00
2.40	20,003	286.40	1.14	0.02	---	---	0.00	0.00	0.00	---	---	0.02
2.60	22,327	286.60	1.14	0.30	---	---	0.00	0.00	0.00	---	---	0.30
2.80	24,652	286.80	1.14	0.80	---	---	0.00	0.00	0.00	---	---	0.80
3.00	26,976	287.00	1.48	1.45	---	---	0.00	0.00	0.00	---	---	1.45
3.20	29,300	287.20	2.08	2.06	---	---	0.00	0.00	0.00	---	---	2.06
3.40	31,625	287.40	2.49	2.49	---	---	0.00	0.00	0.00	---	---	2.49
3.60	33,949	287.60	3.04	2.86	---	---	0.00	0.18	0.00	---	---	3.04
3.80	36,274	287.80	4.17	3.20	---	---	0.00	0.93	0.00	---	---	4.13
4.00	38,598	288.00	5.61	3.50	---	---	0.00	2.00	0.00	---	---	5.50
4.20	41,775	288.20	7.16	3.78	---	---	0.00	3.32	0.00	---	---	7.09
4.40	44,953	288.40	8.91	4.03	---	---	0.00	4.83	0.00	---	---	8.87
4.60	48,130	288.60	10.88	4.28	---	---	0.00	6.53	0.00	---	---	10.81
4.80	51,307	288.80	12.90	4.51	---	---	0.00	8.39	0.00	---	---	12.90
5.00	54,485	289.00	15.13	4.73	---	---	0.00	10.40	0.00	---	---	15.13
5.20	57,662	289.20	17.48	4.93	---	---	0.00	12.55	0.00	---	---	17.48
5.40	60,839	289.40	20.70	5.13	---	---	0.74	14.83	0.72	---	---	21.43
5.60	64,017	289.60	26.92	4.34	---	---	5.61	16.97	5.47	---	---	32.39
5.80	67,194	289.80	31.42	3.04	---	---	12.88	15.50	12.57	---	---	43.99
6.00	70,371	290.00	33.96	1.98	---	---	19.40	12.58	21.39	---	---	55.35

APPENDIX 10 – CONSTRUCTION

LOG BOOK

APPENDIX H

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Table of Contents

- I. Pre-Construction Meeting Documents
 - a. Preamble to Site Assessment and Inspections
 - b. Operator's Certification
 - c. Qualified Professional's Credentials & Certification
 - d. Pre-Construction Site Assessment Checklist

- II. Construction Duration Inspections
 - a. Directions
 - b. Modification to the SWPPP

- III. Monthly Summary Reports

- IV. Monitoring, Reporting, and Three-Month Status Reports
 - a. Operator's Compliance Response Form

Properly completing forms such as those contained in Appendix H meet the inspection requirement of NYS-DEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

b. Operators Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law.

Name (please print): _____

Title _____ Date: _____

Address: _____

Phone: _____ Email: _____

Signature: _____

c. Qualified Professional's Credentials & Certification

"I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

Name (please print): _____

Title _____ Date: _____

Address: _____

Phone: _____ Email: _____

Signature: _____

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

- (1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;
- (2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;
- (3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;
- (4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);
- (5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and
- (6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

Maintaining Water Quality**Yes No NA**

- Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
- Is there residue from oil and floating substances, visible oil film, or globules or grease?
- All disturbance is within the limits of the approved plans.
- Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping**1. General Site Conditions****Yes No NA**

- Is construction site litter and debris appropriately managed?
- Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
- Is construction impacting the adjacent property?
- Is dust adequately controlled?

2. Temporary Stream Crossing**Yes No NA**

- Maximum diameter pipes necessary to span creek without dredging are installed.
- Installed non-woven geotextile fabric beneath approaches.
- Is fill composed of aggregate (no earth or soil)?
- Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices**1. Excavation Dewatering****Yes No NA**

- Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
- Clean water from upstream pool is being pumped to the downstream pool.
- Sediment laden water from work area is being discharged to a silt-trapping device.
- Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader**Yes No NA**

- Installed per plan.
- Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
- Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales**Yes No NA**

- Installed per plan with minimum side slopes 2H:1V or flatter.
- Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
- Sediment-laden runoff directed to sediment trapping structure

Sediment Control Practices (continued)**3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)****Yes No NA**

- Installed concrete blocks lengthwise so open ends face outward, not upward.
- Placed wire screen between No. 3 crushed stone and concrete blocks.
- Drainage area is 1 acre or less.
- Excavated area is 900 cubic feet.
- Excavated side slopes should be 2:1.
- 2" x 4" frame is constructed and structurally sound.
- Posts 3-foot maximum spacing between posts.
- Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
- Posts are stable, fabric is tight and without rips or frayed areas.
- Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap**Yes No NA**

- Outlet structure is constructed per the approved plan or drawing.
- Geotextile fabric has been placed beneath rock fill.
- Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin**Yes No NA**

- Basin and outlet structure constructed per the approved plan.
- Basin side slopes are stabilized with seed/mulch.
- Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
- Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM
FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

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Properly completing forms such as those contained in this document meet the inspection requirement of NYSDEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

b. Operators Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law. "

Name (please print): _____

Title _____ Date: _____

Address: _____

Phone: _____ Email: _____

Signature: _____

c. Qualified Professional's Credentials & Certification

"I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

Name (please print): _____

Title _____ Date: _____

Address: _____

Phone: _____ Email: _____

Signature: _____

d. Pre-construction Site Assessment Checklist (NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

Has a Notice of Intent been filed with the NYS Department of Conservation?

Is the SWPPP on-site? Where? _____

Is the Plan current? What is the latest revision date? _____

Is a copy of the NOI (with brief description) onsite? Where? _____

Have all contractors involved with stormwater related activities signed a contractor's certification?

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

(6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

Maintaining Water Quality

Yes No NA

- Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
- Is there residue from oil and floating substances, visible oil film, or globules or grease?
- All disturbance is within the limits of the approved plans.
- Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes No NA

- Is construction site litter and debris appropriately managed?
- Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
- Is construction impacting the adjacent property?
- Is dust adequately controlled?

2. Temporary Stream Crossing

Yes No NA

- Maximum diameter pipes necessary to span creek without dredging are installed.
- Installed non-woven geotextile fabric beneath approaches.
- Is fill composed of aggregate (no earth or soil)?
- Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

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Yes No NA

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- Sediment laden water from work area is being discharged to a silt-trapping device.
- Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader

Yes No NA

- Installed per plan.
- Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
- Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

Yes No NA

- Installed per plan with minimum side slopes 2H:1V or flatter.
- Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
- Sediment-laden runoff directed to sediment trapping structure

Sediment Control (continued)

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes No NA

- Installed concrete blocks lengthwise so open ends face outward, not upward.
 - Placed wire screen between No. 3 crushed stone and concrete blocks.
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 - Excavated area is 900 cubic feet.
 - Excavated side slopes should be 2:1.
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 - Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
 - Posts are stable, fabric is tight and without rips or frayed areas.
- Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap

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- Outlet structure is constructed per the approved plan or drawing.
 - Geotextile fabric has been placed beneath rock fill.
- Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin

Yes No NA

- Basin and outlet structure constructed per the approved plan.
 - Basin side slopes are stabilized with seed/mulch.
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