STORMWATER POLLUTION PREVENTION PLAN & DRAINAGE ANALYSIS

SPCA of Westchester
590 North State Road
Town of Ossining - New York

October 9, 2018
Revised: January 7, 2019

Hudson Engineering & Consulting, P.C.
45 Knollwood Road - Suite 201
Elmsford, NY 10523

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1.) NYSDEC Notice of Intent

0644089821

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR _____
(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-15-002

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
SPCA of Westchester

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
Laukhuf

Owner/Operator Contact Person First Name
Shannon

Owner/Operator Mailing Address
590 North State Road

City
Briarcliff Manor

State: NY
Zip: 10510-

Phone (Owner/Operator): 9149412896
Fax (Owner/Operator): ___-___-____

Email (Owner/Operator)
shannon@spca914.org

FED TAX ID
__-_____ (not required for individuals)

Project Site Information

Project/Site Name
SPCA of Westchester

Street Address (NOT P.O. BOX)
590 North State Road

Side of Street
○ **North** ○ **South** ● **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Town of Ossining

State: NY
Zip: 10510-
County: Westchester
DEC Region: 3

Name of Nearest Cross Street
Stone Creek Lane

Distance to Nearest Cross Street (Feet)
0

Project In Relation to Cross Street
○ **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel
90.11-1-50

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting): 593933

Y Coordinates (Northing): 4558800

2. What is the nature of this construction project?

○ **New Construction**

● **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ● COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME — Number of Lots
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ● COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***Note**: for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	Total Area To Be Disturbed	Existing Impervious Area To Be Disturbed	Future Impervious Area Within Disturbed Area
3.83.8	2.22.2	1.01.0	1.31.3

5. Do you plan to disturb more than 5 acres of soil at any one time? ○ **Yes** ● **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
%	70 %	%	30 %

7. Is this a phased project? ○ **Yes** ● **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date 04/01/2019 - **End Date** 04/01/2021

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

Pocantico River

9a. Type of waterbody identified in Question 9?

- ○ Wetland / State Jurisdiction On Site (Answer 9b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ○ Stream / Creek Off Site
- ● River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ● Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002? ○ **Yes** ● **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ○ **Yes** ● **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ● **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ● **No**
If Yes, what is the acreage to be disturbed?

.

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ● **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ● Yes ○ No ○ Unknown

16. What is the name of the municipality/entity that owns the separate storm sewer system?

Town of Ossining

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ Yes ● No ○ Unknown

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ Yes ● No

19. Is this property owned by a state authority, state agency, federal government or local government? ○ Yes ● No

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ○ Yes ● No

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ● Yes ○ No

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ● Yes ○ No
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ● Yes ○ No

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- (●) **Professional Engineer (P.E.)**
- ( ) **Soil and Water Conservation District (SWCD)**
- ( ) **Registered Landscape Architect (R.L.A)**
- ( ) **Certified Professional in Erosion and Sediment Control (CPESC)**
- ( ) **Owner/Operator**
- ( ) **Other**

SWPPP Preparer
Hudson Engineering & Consulting, PC

Contact Name (Last, Space, First)
Stein Michael

Mailing Address
45 Knollwood Road, Suite 201

City
Elmsford

State NY Zip 10523-

Phone 914-909-0420

Fax 914-560-2086

Email
michael@hudsonec.com

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-15-002. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name Michael **MI** F

Last Name Stein

Signature

Date 12/28/2018

25. Has a construction sequence schedule for the planned management practices been prepared? ● Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ Check Dams
- ○ Construction Road Stabilization
- ● Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ○ Sediment Basin
- ○ Sediment Traps
- ● Silt Fence
- ● Stabilized Construction Entrance
- ● Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ○ Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ● Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ● Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ● Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ○ Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ● Retaining Wall
- ○ Riprap Slope Protection
- ○ Rock Outlet Protection
- ○ Streambank Protection

Other

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ○ **Preservation of Undisturbed Areas**
- ○ **Preservation of Buffers**
- ● **Reduction of Clearing and Grading**
- ○ **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ● **Sidewalk Reduction**
- ● **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ○ **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- ● All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

0.10015 **acre-feet**

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1)		and/or	
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)		and/or	
○ Tree Planting/Tree Pit (RR-3)		and/or	
○ Disconnection of Rooftop Runoff (RR-4)		and/or	
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			
○ Rain Garden (RR-6)			
○ Stormwater Planter (RR-7)			
○ Rain Barrel/Cistern (RR-8)			
○ Porous Pavement (RR-9)			
○ Green Roof (RR-10)			
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			
○ Infiltration Basin (I-2)			
○ Dry Well (I-3)			
○ Underground Infiltration System (I-4)			
○ Bioretention (F-5)			
○ Dry Swale (O-1)			
Standard SMPs			
○ Micropool Extended Detention (P-1)			
○ Wet Pond (P-2)			
○ Wet Extended Detention (P-3)			
○ Multiple Pond System (P-4)			
○ Pocket Pond (P-5)			
○ Surface Sand Filter (F-1)			
○ Underground Sand Filter (F-2)			
○ Perimeter Sand Filter (F-3)			
● Organic Filter (F-4)	0.09	and/or	0.09
○ Shallow Wetland (W-1)			
○ Extended Detention Wetland (W-2)			
○ Pond/Wetland System (W-3)			
○ Pocket Wetland (W-4)			
○ Wet Swale (O-2)			

Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	Total Contributing Impervious Area(acres)
● Hydrodynamic	0.407979
○ Wet Vault	
○ Media Filter	
○ Other	

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name: First Defense Unit (FD-3HC)

Manufacturer: HydroInternational

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

0.100505 **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

● **Yes** ○ **No**

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

. **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

○ **Yes** ○ **No**

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

[ ][ ][ ].[ ][ ][ ] **acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a). [ ][ ][ ].[ ][ ][ ]

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ○ **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required

[ ][ ][ ].[ ][ ][ ] **acre-feet**

CPv Provided

[ ][ ][ ].[ ][ ][ ] **acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

● Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development

9.89666 **CFS**

Post-development

7.771171 **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

22.2555 **CFS**

Post-development

19.1911 **CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ● **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

Property Owner

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP [N][Y][R][ ][ ][ ][ ][ ][ ]
- ○ Other [ ]
- ● None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ○ **Yes** ● **No**
If Yes, Indicate Size of Impact. [ ][ ][ ][ ][ ][ ].[ ]

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ● **Yes** ○ **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ● **Yes** ○ **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. [N][Y][R][ ][ ][ ][ ][ ][ ]

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name: Shannon

MI:

Print Last Name: Laukhuf

Owner/Operator Signature:

Date: / /

2.) NYSDEC Contractor Certification Statement

CONTRACTOR and SUBCONTRACTOR CERTIFICATION STATEMENT

for the New York State Department of Environmental Conservation (DEC) State Pollutant Discharge Elimination System Permit for Stormwater Discharges from Construction Activity (GP-0-15-002)

As per *Part III.A.5* on page 19 of *GP-0-15-002* (effective January 29, 2015):

'Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor*. The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.'

The *owner or operator* shall have each contractor and subcontractor involved in soil disturbance sign a copy of the following certification statement before they commence any *construction activity*:

SPCA of Westchester	**NYR** _____	Ossining (T)
Name of Construction Site	*DEC Permit ID*	*Municipality (MS4)*

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

Responsible Corporate Officer/Partner Signature	Date
Name of above Signatory	Name of Company
Title of above Signatory	Mailing Address
Telephone of Company	City, State and Zip

Identify the specific elements of the SWPPP the contractor or subcontractor is responsible for:
The contractor shall be responsible for the installation and maintenance of all temporary and permanent erosion
and sediment control practices for the duration of construction activities.

***'TRAINED CONTRACTOR'* FOR THE CERTIFIED CONTRACTOR OR SUBCONTRACTOR**

Name of Trained Employee	*Title of Trained Employee*	*NYSDEC SWT #*

A copy of this signed contractor certification statement must be maintained at the SWPPP on site

3.) Narrative

STORMWATER POLLUTION PREVENTION PLAN
SPCA of Westchester
590 North State Road
Town of Ossining - New York

A. INTRODUCTION

This Stormwater Pollution Prevention Plan & Stormwater Analysis presents the proposed Best Management Practices (BMPs) to control erosion, sedimentation, and manage stormwater during the construction of a proposed animal rescue facility, with associated driveway, parking, walkways and landscaping, located at 590 North State Road (SBL 90.11-1-50) in the Town of Ossining, Westchester County, New York.

This Plan consists of this narrative and a plan set entitled: "SPCA of Westchester, 590 North State Road, Town of Ossining, Westchester County, New York", all as prepared by Hudson Engineering and Consulting, P.C., Elmsford, New York, last revised January 7, 2019. The design is in accordance with the Town of Ossining requirements. The plans have been prepared to meet the requirements of the New York State Department of Environmental Conservation (NYSDEC). Since the project proposes to disturb approximately 2.21-acres, this Plan is required by the New York State Department of Environmental Conservation (NYSDEC) pursuant to the Phase II regulations under General Permit GP-0-15-002.

B. METHODOLOGY

The stormwater analysis was developed utilizing the Soil Conservation Service (SCS) TR-20 methodologies (HydroCad®) to assist with the drainage analysis and design of the mitigating practice. The "Complex Number" (CN) value determination is based on soil type, vegetation and land use. *See Soil Map & Report contained herein.* The "Time of Concentration" (T_c) is determined by the time wise longest flow path within each watershed. The CN and T_c data is input into the computer model. The project site was modeled for the peak rates of runoff from the 1-, 10- 25- and 100-year Type III – 24-hour extreme storm events in both the Pre- and Post- Developed Conditions.

This project involves modifications to an existing developed property; therefore, this will be classified as redevelopment per the NYSDEC Phase II regulations. According to Section 9.2.1 of the NYS Stormwater Design Manual for Redevelopment entitled 'Sizing Criteria', the project is required to treat the Water Quality Volume (WQv) from 25% of the existing impervious area, as well as 100% of all new proposed impervious areas.

Impervious area coverage for Water Quality was calculated as follows:

Impervious Coverage	
25% Existing Impervious Area	7,293 square feet
100% New Impervious Area	24,086 square feet
Total Impervious Area to be Treated	**31,379 square feet**

The stormwater management design is based on the NYSDEC "New York State Stormwater Management Design Manual", latest edition and "Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMP'S", by the Metropolitan Washington Council of Governments. Stormwater quality has been analyzed in accordance with the guidelines set forth in the New York State General Permit for Storm Water Discharge, GP-0-15-002.

C. LIST OF PERMITS

The following is a list of permits and approvals required for the project along with the status.

- Town of Ossining – Building Permit – Pending
- Town of Ossining – Planning Board Approval – Pending
- NYSDEC – SPDES General Permit # GP-0-15-002. – Pending

D. PRE-DESIGN INVESTIGATIVE ANALYSIS

As previously stated, due to the presence of high groundwater witnessed throughout the site, as well as the location of the project in relation to an existing Town regulated wetland onsite, it was determined that conventional infiltration practices could not be utilized in the stormwater design (i.e. infiltration chambers, infiltration basins, etc.). Therefore, no deep hole testing or percolation testing was performed.

E. PRE-DEVELOPED CONDITION

In the pre-developed condition, the site was modeled as two watersheds: Watershed 1 and Watershed 2.

Watershed 1 contains approximately 115,658-square feet of tributary area which includes 43,520-square feet of area in the form of woods, 34,751-square feet of area in the form of lawn and landscaping, 1,928-square feet of area in the form of an existing watercourse, with the remaining 35,459-square feet of area as

impervious in the form of buildings, driveways and parking areas. The weighted Complex Number (CN) value is calculated as 80 and the Time of Concentration (Tc) is calculated as 12.1 minutes. The runoff from this watershed flows overland in a westerly direction where it enters an existing watercourse along the western property boundary and is subsequently conveyed to an existing culvert located at the northwest corner of the property at Design Point 1 – DP-1.

Watershed 2 contains approximately 51,330-square feet of tributary area which includes 20,932-square feet of area in the form of woods, 13,276-square feet of area in the form of brush, 8,519-square feet of area in the form of lawn and landscaping, 368-square feet of area in the form of an existing watercourse, with the remaining 8,235-square feet of area as impervious in the form of buildings and walkways. The weighted Complex Number (CN) value is calculated as 68 and the Time of Concentration (Tc) is calculated as 16.0 minutes. The runoff from this watershed flows overland in a westerly direction where it enters an existing watercourse at the northeastern corner of the property at Design Point 2.

The peak rates of runoff were calculated to be as follows:

Pre-Developed Conditions				
	1 Year	10 Year	25 Year	100 Year
	cfs	cfs	cfs	cfs
DP-1	2.70	7.70	10.73	17.10
DP-2	0.40	1.96	3.03	5.45

F. POST-DEVELOPED CONDITION

In the post-developed condition, the site is modeled as four (4) watersheds: Watersheds 1, 1A, 1B and 2.

Watershed 1 consists of the majority of the front of the property, including the existing wetland area. This watershed contains 74,951 square feet of tributary area which includes 42,591-square feet of area in the form of woods, 26,283-square feet of area in the form of lawn and landscaping, 1,928-square feet of area in the form of an existing watercourse, with the remaining 4,149-square feet of area as impervious in the form of proposed walkways and driveways. The weighted Complex Number (CN) value is calculated as 74 and the Time of Concentration (Tc) is calculated as 18.50 minutes. The runoff from this watershed flows overland in a westerly direction where it enters an existing watercourse along the western property boundary and is subsequently conveyed to an existing culvert located at the northwest corner of the property.

Watershed 1A consists of the proposed parking lot and adjacent landscaped areas. This watershed contains 35,601-square feet of area which includes 8,335-square feet of area in the form of lawn and landscaping and 27,266-square feet of impervious area in the form of the proposed parking lot and front walkways. The

weighted Complex Number (CN) value is calculated as 90 and the Time of Concentration (Tc) is calculated as 5.6 minutes. The runoff from this watershed flows overland in a southwesterly direction, where it is captured via a proposed catch basin and conveyed to a proposed bypass manhole. The proposed bypass manhole structure has been designed to direct the Water Quality Volume from the watershed to a proposed hydrodynamic separator, which has been sized to pre-treat the runoff prior to discharging to a proposed NYSDEC Organic Filter Practice (Type F-4). To bypass flows for storms of higher intensity, a 12-inch outlet pipe has been set 0.89-feet above the outlet to the separator unit within the bypass structure. The proposed NYSDEC Organic Filter Practice (Type F-4) has been designed to treat the overall water quality volume for the entire property, as well as bypass the flows for all stronger storm events up to and including the 100-year storm. From here the treated runoff is conveyed to a proposed manhole adjacent to the practice, where it meets with the runoff from Watershed 1B, and is subsequently conveyed to Design Point 1, where it meets with the runoff from Watershed 1.

Watersheds 1A-1 & 1A-2 consist of the proposed outdoor kennel areas to the north and east of the building. These watersheds contain a total of 3,135-square feet of area, all of which is impervious. The weighted Complex Number (CN) value is calculated as 98 and the Time of Concentration (Tc) is calculated as 1.2 minutes and 1.7 minutes, respectively. The runoff from these watersheds flows overland to a proposed curtain drain which runs adjacent to each kennel area. From here, the runoff is conveyed to a proposed sewer bypass manhole located adjacent to the front the building. Since this area has the potential for carrying animal waste, including fecal coliform, the proposed bypass manhole has been designed with a 4-inch high concrete weir to direct the Water Quality Volume (first flush) from the watershed to the proposed sanitary sewer service connection. All storms of higher intensity will flow over the weir and subsequently be conveyed to the proposed hydrodynamic separator adjacent to the parking area, where it will meet with the runoff from Watershed 1A and pass through the Organic Filter Practice.

Watershed 1B consists of 20,885-square feet of roof area for the proposed building. The weighted Complex Number (CN) value is calculated as 98 with a direct entry Time of Concentration (Tc) of 1.0 minute. The runoff is captured via a series of roof drain leaders and is conveyed to a proposed hydrodynamic separator, which has been sized to treat the runoff from the roof area. From here the runoff is conveyed to a proposed manhole adjacent to the Organic Filter practice, where it meets with the runoff from Watershed 1A, and is subsequently conveyed to Design Point 1, where it meets with the runoff from Watershed 1.

Watershed 2 consists of the rear yard of the property and contains approximately 32,413-square feet of tributary area which includes 13,317-square feet of area in the form of woods, 6,548-square feet of area in the form of brush, 10,314-square feet of area in the form of lawn and landscaping, 368-square feet of area in the form of an existing watercourse, with the remaining 1,866-square feet of area as impervious in the form of proposed walkways. The weighted Complex Number

(CN) value is calculated as 64 and the Time of Concentration (Tc) is calculated as 14.1 minutes. The runoff from this watershed flows overland in a westerly direction where it enters an existing watercourse at the northeastern corner of the property at Design Point 2.

The peak rates of runoff were calculated to be as follows:

Post-Developed Conditions				
	1 Year	10 Year	25 Year	100 Year
	cfs	cfs	cfs	cfs
DP-1	1.85	6.65	9.68	15.85
DP-2	0.16	1.06	1.73	3.26

G. SUMMARY OF FLOWS AT DESIGN POINT

Design Point	STORM EVENT			
	1-year	10-year	25-year	100-year
DP-1				
• Pre-[cfs]	2.70	7.70	10.73	17.10
• **Post-[cfs]**	**1.85**	**6.65**	**9.68**	**15.85**
DP-2				
• Pre-[cfs]	0.40	1.96	3.03	5.45
• **Post-[cfs]**	**0.16**	**1.06**	**1.73**	**3.26**

The flow rates of runoff for all storm events in the proposed condition are less than those in the existing condition.

H. WATER QUALITY VOLUME

As previously mentioned, this project includes the redevelopment of the existing property, as well as the construction of 24,086 square feet of additional impervious area. According to Section 9.2.1 of the NYS Stormwater Design Manual for Redevelopment entitled 'Sizing Criteria', the project is required to treat the Water Quality Volume (WQv) from 25% of the existing impervious area, as well as 100% of all new proposed impervious areas.

Impervious area coverage for Water Quality was calculated as follows:

Impervious Coverage	
25% Existing Impervious Area	7,293 square feet
100% New Impervious Area	24,086 square feet
Total Impervious Area to be Treated	**31,379 square feet**

Overall Water Quality Volume:

The Water Quality Volume (WQv) calculations were performed for the overall property as follows:

P= 90% Rainfall 1.5 -inches

A_i = Impervious Area = 31,379 -square feet

A_i = 0.7204 -acres

A_t = Tributary Area = 166,988 -square feet

A_t = 3.8335 -acres

I = % Impervious = 18.79%

R_v= 0.05+0.009(I); where I = Percent Impervious written as a percent

R_v= 0.219 **(0.20 minimum)**

R_v= 0.219

$$WQ_v = \frac{(P \times R_v \times A_t)}{12} = 0.10500 \text{ acre-feet} = 4573.81 \text{ cubic feet}$$

Rainfall = 2.53 -inches → 0.10600 acre-feet OKAY

The proposed Organic Filter (Type F-4) has been sized to treat the entire required water quality volume from the property. The WQv is to be pre-treated via a 5-foot Diameter First Defense Unit hydrodynamic device located upstream of the filter practice. A proposed bypass manhole has also been provided to redirect the flows for storms of higher intensity away from the separator and directly to the proposed Organic Filter. *Water Quality routing calculations are contained within Section 9 of this report.*

Watersheds 1A-1 & 1A-2 – Kennel Areas

The Water Quality Volume (WQv) calculations were performed for the proposed outdoor kennel areas as follows:

P= 90% Rainfall 1.5 -inches

A_i = Impervious Area = 3,135 -square feet

A_i = 0.0720 -acres

A_t = Tributary Area = 3,135 -square feet

A_t = 0.0720 -acres

I = % Impervious = 100.00%

R_v= 0.05+0.009(I); where I = Percent Impervious written as a percent

R_v= 0.950 **(0.20 minimum)**

R_v= 0.950

$$WQ_v = \frac{(P \times R_v \times A_t)}{12} = 0.00855 \text{ acre-feet} = 372.28 \text{ cubic feet}$$

Rainfall = 1.64 -inches → 0.00900 acre-feet OKAY

Since the kennel areas have the potential for carrying animal waste, including fecal coliform, a proposed bypass manhole has been designed with a 4-inch high concrete weir to direct the Water Quality Volume (first flush) from the watershed to the proposed sanitary sewer service connection. All storms of higher intensity will flow over the weir and subsequently be conveyed to the proposed Organic Filter Practice. *Water Quality routing calculations are contained within Section 9 of this report.*

Watershed 1B – Roof Area

The Water Quality Volume (WQv) calculations were performed for the proposed roof area as follows:

P= 90% Rainfall 1.5 -inches

A_i = Impervious Area = 20,885 -square feet

A_i = 0.4795 -acres

A_t = Tributary Area = 20,885 -square feet

A_t = 0.4795 -acres

I = % Impervious = 100.00%

R_v= 0.05+0.009(I); where I = Percent Impervious written as a percent

R_v= 0.950 **(0.20 minimum)**

R_v= 0.950

$$WQ_v = \frac{(P \times R_v \times A_t)}{12} = 0.05694 \text{ acre-feet} = 2480.09 \text{ cubic feet}$$

Rainfall = 1.65 -inches → 0.05700 acre-feet OKAY

The entire required water quality volume is treated via a 3-foot Diameter First Defense Unit hydrodynamic device. The device has also been sized to bypass the 100-year storm event. *Water Quality routing calculations are contained within Section 9 of this report.*

I. NYSDEC TABLE 3.1 DESIGN REGULATIONS:

Each mitigation practice is contained in Table 3.1 of the NYSDEC design regulations and is discussed below.

- Preservation of Undisturbed Areas: Permanent conservation easements of undisturbed areas are not proposed for this site.
- Preservation of Buffers. See above.

- Reduction of Clearing and Grading: All construction is occurring in areas previously disturbed.
- Locating Development in Less Sensitive Areas: No development is planned within sensitive areas.
- Open Space Design: Not applicable to this application.
- Soil Restoration: As required, all disturbed soil areas will be "deep tilled" prior to the establishment of ground cover. Deep tilling restores the absorptive quality of the soil.
- Roadway Reduction: No roadways are being proposed as part of this application.
- Sidewalk Reduction: All sidewalks have been designed to the minimum extent possible in order meet the required pedestrian traffic on-site.
- Driveway Reduction: No excess pavement was incorporated into the layout.
- Cul-de-sac Reduction: No Cul-de-sacs are being proposed as part of this application.
- Building Footprint Reduction: The proposed building footprint is considered the minimum footprint desired for the required operations.
- Parking Reduction: Parking for the facility has been provided as required by the Town of Ossining.
- Conservation of Natural Areas: All existing wetland areas are to remain undisturbed and protected as required by the Town of Ossining.
- Sheet Flow to riparian buffers or filter strips: Sheet flow to for Watersheds 1 and 2 does exist through riparian buffers. However, no credit was taken for this treatment in the design calculations.
- Vegetated Open Swale: An "O-Type Swale" is not applicable to this site.
- Tree Planting/Tree Boxes: Tree Planting/Tree Boxes could be incorporated in the design, however, the entire water quality volume is already being treated via an organic filter practice.
- Disconnection of Rooftop Runoff: Not applicable to this application.
- Stream Daylighting for Redevelopment Projects: Not applicable to this application.
- Rain Gardens: Rain Gardens could be incorporated in the design, however, the entire water quality volume is already being treated via an organic filter practice.
- Green Roof: Green roof technology is not a viable alternative for this application.
- Stormwater Planters: Stormwater Planters could be incorporated in the design, however, the entire water quality volume is already being treated via an organic filter practice.
- Rain tank/Cistern: Rain tanks/Cisterns could be incorporated if desired.
- Porous Pavement: Porous Pavement could be incorporated into the design, however, due to the presence of high groundwater and ledge rock onsite, the use of porous pavement may not be effective.

J. CONSTRUCTION PHASE

During the construction phase of the project, a sediment and erosion control plan shall be implemented in accordance with the New York State Department of Environmental Conservation's Best Management Practices (BMP). The primary goals of the sediment and erosion control plan are to prevent the tracking of dirt and mud onto adjacent roads, to prevent mud and silt from entering into existing and proposed drainage facilities, and to protect the receiving waters from contamination during the construction.

During construction, the party responsible for implementing the temporary (during construction) Stormwater Management facilities Maintenance Program will be the site contractor. Contact information will be filed with the Town.

A New York State Professional Engineer or Certified Professional In Erosion and Sediment Control (P.E. or CPESC) shall conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls shown on the plan have been adequately installed and/or implemented to ensure overall preparedness of the site for construction. Following the commencement of construction, site inspections shall be conducted by the P.E. or CPESC at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

During each inspection, the representative shall record the following:

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 approximate degree of sediment accumulation as a percentage of the sediment storage volume;

5. Inspect all erosion and sediment control practices and record all maintenance requirements. 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 the barrier. Record the depth of sediment within containment structures and any erosion near outlet and overflow structures.

6. All identified deficiencies.

The construction manager shall maintain a record of all inspection reports in a site logbook. The site logbook shall be maintained on-site and be made available to the Town of Ossining and/or the NYSDEC. A summary of the site inspection activities shall be posted on a monthly basis in a public accessible location at the site.

The projects anticipated start date is April 2019 and the anticipated completed date is April 2021.

K. CONSTRUCTION SEQUENCING

The following erosion control schedule shall be utilized:

1. Install construction entrance to the development area.
2. Establish construction staging area.
3. Install tree protection on trees as noted on plans.
4. Selective vegetation removal for silt fence installation.
5. Install silt fence down slope of all areas to be disturbed as shown on the plan.
6. Remove trees where necessary (clear & grub) for the proposed construction.
7. Strip topsoil and stockpile at the locations specified on the plans (up gradient of erosion control measures). Temporarily stabilize topsoil stockpiles (hydroseed during May 1st through October 31st planting season or by covering with a tarpaulin(s) November 1st through april 30th. Install silt fence around toe of slope.
8. Demolish any existing site features and/or structures noted as being removed on the construction documents and dispose of off-site.
9. Rough grade site.
10. Install additional erosion and sediment controls as necessary
11. Excavate and construct foundation for new building.
12. Rough grade parking lot and install drain inlets, hydrodynamic separator and manholes, as well as all associated onsite piping from existing brook up to location of proposed organic filter and roof drain leader connection at building.
13. Construct building. Install and connect all roof drain leaders to previously installed stormwater piping.

14. Construct organic surface filter practice (do not allow site runoff to enter filter until the entire tributary area is completely stabilized and 80% vegetative cover has been established in all landscaped areas, as well as within the organic filter).

15. Install curbing and sub-base courses.

16. Install 4”-6” topsoil, fine grade, seed the entire project site and install landscape plantings. Spread salt hay over seeded areas.

17. Install bituminous concrete top course.

18. Clean pavement, drain lines, catch basins and water quality devices. Clean organic filter practice.

19. Remove all temporary soil erosion and sediment control measures after the site is stabilized with vegetation.

* Soil erosion and sediment control maintenance must occur weekly and prior to and after every ½” or greater rainfall event.

L. EROSION AND SEDIMENT CONTROL COMPONENTS

The primary aim of the soil and sediment control measures is to reduce soil erosion from areas stripped of vegetation during and after construction and to prevent silt from reaching the off-site drainage structures and downstream properties. As outlined in the Construction Sequencing schedule, the Sediment and Erosion Control Components are an integral component of the construction sequencing and will be implemented to control sedimentation and re-establish vegetation as soon as practicable.

Planned erosion and sedimentation control practices during construction include the installation, inspection and maintenance of the inlet protection, soil stockpile areas, diversion swales, sediment traps and silt fencing. General land grading practices, including land stabilization and construction sequencing are also integrated into the Sediment and Erosion Control Plan. Dust control is not expected to be a problem due to the relatively limited area of exposure, the undisturbed perimeter of trees around the project area and the relatively short time of exposure. Should excessive dust be generated, it will be controlled by sprinkling.

All proposed soil erosion and sediment control practices have been designed in accordance with the following publications:

- New York State standards and Specifications for Urban Erosion and Sediment Control, latest edition.

- New York State General Permit for Stormwater Discharges, GP-0-15-002 (General permit).

- "Reducing the Impacts of Stormwater Runoff from New Development", as published by the New York State Department of Environmental Conservation (NYSDEC), second edition, April, 1993.

The proposed soil erosion and sediment control devices include the planned erosion control practices outlined below. Maintenance procedures for each erosion control practice have also been outlined below.

- **SILT FENCE**

  Silt fence (geo-textile filter cloth) shall be placed in locations depicted on the approved plans. The purpose of the silt fence is to reduce the velocity of sediment laden stormwater from small drainage areas and to intercept the transported sediment load. In general, silt fence shall be used at the toe of slopes or intermediately within slopes where obvious channel concentration of stormwater is not present.

  Maintenance

  Silt fencing shall be inspected at a minimum of once per week and prior to and within 48 hours following a rain event ½" or greater. Inspections shall include ensuring that the fence material is tightly secured to the woven wire and the wire is secured to the wood posts. In addition, overlapping filter fabric shall be secure and the fabric shall be maintained a minimum of six (6) inches below grade. In the event that any "bulges" develop in the fence, that section of fence shall be replaced within 48 hours with new fence section. Any sediment build-up against the fence shall be removed within 48 hours and deposited on-site a minimum of 100 feet outside of any wetland or watercourse.

- **INLET PROTECTION**

  After driveway catch basins and surface inlets have been installed, these drain inlets will receive stormwater from the driveway, Temporary Diversion Swales and surrounding overland watersheds. In order to protect the receiving waters from sedimentation, the contractor shall install ¾ inch stone aggregate around the perimeter of all catch basins and surface inlets as illustrated on the approved plans. This barrier will allow stormwater to be filtered prior to reaching the basin inlet grate.

  Maintenance

  The stone aggregate shall be inspected weekly prior to and within 48 hours following a rain event ½" or greater. Care shall be taken to ensure that all stone aggregate are properly located and secure and do not become displaced. The stone aggregate shall be inspected for accumulated sediments and any

accumulated sediment shall be removed from the device and deposited not less than 100 feet from wetland or watercourse.

- **TREE PROTECTION**

  All significant trees to be preserved located within the limits of disturbance and on the perimeter of the disturbance limits shall be protected from harm by erecting a 3' high (minimum) snow fence completely surrounding the tree. Snow fence should extend to the drip-line of the tree to be preserved. Trees designated to be protected shall be identified during the staking of the limits of disturbance for each construction phase.

  Maintenance

  The snow fence shall be inspected daily to ensure that the perimeter of the fence remains at the drip-line of the tree to be preserved. Any damaged portions of the fence shall be repaired or replaced within 48 hours. Care shall also be taken to ensure that no construction equipment is driven or parked within the drip-line of the tree to be preserved.

- **SOIL/SHOT ROCK STOCKPILING**

  All soil and shot rock stripped from the construction area during grubbing and mass grading shall be stockpiled in locations approved by the Town's representative, but in no case shall they be placed within 100' of a wetland or watercourse. The stockpiled soils shall be re-used during finish-grading to provide a suitable growing medium for plant establishment. Soil stockpiles shall be protected from erosion by vegetating the stockpile with rapidly – germinating grass seed or covering the stockpile with tarpaulin and surrounding it with either silt fence.

  Maintenance

  Sediment controls (silt fence) surrounding the stockpiles shall be inspected according to the recommended maintenance outline above. All stockpiles shall be inspected for signs of erosion or problems with seed establishment weekly and prior to and within 48 hours following a rain event ½" or greater.

- **GENERAL LAND GRADING**

  The intent of the Erosion & Sediment Control Plan is to control disturbed areas such that soils are protected from erosion by temporary methods and, ultimately, by permanent vegetation. Where practicable, all cut and fill slopes shall be kept to a maximum slope of 2:1. In the event that a slope must exceed a 2:1 slope, it will be stabilized with stone riprap. On fill slopes, all material will be placed in layers not to exceed 12 inches in depth and adequately compacted. Where practicable, diversion swales shall be constructed on the top of all fill embankments to divert any overland flows away from the fill slopes.

- **SURFACE STABILIZATION**

  All disturbed will be protected from erosion with the use of vegetative measures (i.e., grass seed mix, sod) hydromulch netting or hay. When activities temporarily cease during construction, soil stockpiles and exposed soil should be stabilized by seed, mulch or other appropriate measures as soon as possible, but in no case more than 14 days after construction activity has ceased. All seeded areas will be re-seeded areas as necessary and mulch according to the site plan to maintain a vigorous, dense vegetative cover,

  Erosion control barriers consisting of silt fencing shall be placed around exposed areas during construction. Where exposed areas are immediately uphill from a wetland or watercourse, the erosion control barrier will consist of double rows of silt fencing. Any areas stripped of vegetation during construction will be vegetated and/or mulch as soon as possible, but in no case more than 14 days to prevent erosion of the exposed soils. And topsoil removed during construction will be temporarily stockpiled for future use in grading and landscaping.

  As mentioned above, temporary vegetation will be established to protect exposed soil areas during construction. If growing conditions are not suitable for the temporary vegetation, mulch will be used to the satisfaction of the Commissioner of Public Works. Materials that may be used for mulching include straw, hay, salt hay, wood fiber, synthetic soil stabilizers, mulch netting, sod or hydromulch. In site areas where significant erosion potential exists (steep slopes) and where specifically directed by the Town's representative, Curlex Excelsior erosion control blankets (manufactured by American Excelsior, or approved equal) shall be installed. A permanent vegetative cover will be established upon completion of construction of those areas that have been brought to finish-grade and to remain undisturbed.

- **DEWATERING**

  Prevent surface water and subsurface or ground water from flowing into excavations and trenches. Pump out any accumulated water.

  Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.

  Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

M. CONSTRUCTION PRACTICES TO MINIMIZE STORMWATER CONTAMINATION

General:

Adequate measures shall be taken to minimize contaminant particles arising from the discharge of solid materials, including building materials, grading operations, and the reclamation and placement of pavement, during project construction, including but not limited to:

- Building materials, garbage, and debris shall be cleaned up daily and deposited into dumpsters, which will be periodically removed from the site and appropriately disposed of. All dumpsters and containers left on-site shall be covered and surrounded with silt fence in order to prevent contaminants from leaving the site. Silt fencing shall be inspected on a weekly basis.

- Dump trucks hauling material from the construction site will be covered with a tarpaulin.

- The paved street adjacent to the site entrance will be swept daily to remove excess mud, dirt, or rock tracked from the site.

- Petroleum products will be stored in tightly sealed containers that are clearly labeled.

- All vehicles on site will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage.

- All spills will be cleaned up immediately upon discovery. Spills large enough to reach the storm system will be reported to the National Response Center at 1-800-424-8802.

- Materials and equipment necessary for spill cleanup will be kept in the temporary material storage trailer onsite. Equipment will include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, saw dust, and plastic and metal trash containers.

- All paint containers and curing compounds will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm system, but will be properly disposed according to the manufacturer's instructions.

- Sanitary waste will be collected from portable units a minimum of two times a week to avoid overfilling. All sanitary waste units shall be surrounded by silt fence to prevent contaminants from leaving the site. Silt fencing shall be inspected on a weekly basis.

- Any asphalt substances used on-site will be applied according to the manufacturer's recommendation.

- Fertilizers will be stored in a covered shed and partially used bags will be transferred to a sealable bin to avoid spills and will be applied only in the minimum amounts recommended by the manufacturer and worked into the soil to limit exposure to stormwater.

- No disturbed area shall be left un-stabilized for longer than 14 days during the growing season.

- When erosion is likely to be a problem, grubbing operations shall be scheduled and performed such that grading operations and permanent erosion control features can follow within 24 hours thereafter.

- As work progresses, patch seeding shall be done as required on areas previously treated to maintain or establish protective cover.

- Drainage pipes and swales/ditches shall generally be constructed in a sequence from outlet to inlet in order to stabilize outlet areas and ditches before water is directed to the new installation or any portion thereof, unless conditions unique to the location warrant an alternative method.

Spill Control & Spill Response:

- For all hazardous materials stored on site, the manufacturer's recommended methods for spill clean up will be clearly posted. Site personnel will be made aware of the procedures, and the locations of the information and cleanup supplies.
- Appropriate cleanup materials and equipment will be maintained by the Contractor in the materials storage area on-site. As appropriate, equipment and materials may include items such as booms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for clean up purposes.
- All spills will be cleaned immediately after discovery and the materials disposed of properly.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

- After a spill, a report will be prepared describing the spill, what caused it, and the cleanup measures taken. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring, as well as clean up instructions in the event of reoccurrences.
- The Contractor's site superintendent, responsible for day-to-day operations, will be the spill prevention and cleanup coordinator. The Contractor is responsible for ensuring that the site superintendent has had appropriate training for hazardous materials handling, spill management, and cleanup.
- The Contractor's site superintendent will be notified immediately when a spill or the threat of a spill is observed. The superintendent will assess the situation and determine the appropriate response.
- If spills represent an imminent threat of escaping erosion and sediment controls and entering receiving waters, personnel will be directed to respond immediately to contain the release and notify the superintendent after the situation has been stabilized.
- Spill kits containing appropriate materials and equipment for spill response and cleanup will be maintained by the Contractor at the site.
- If oil sheen is observed on surface water, action will be taken immediately to remove the material causing the sheen. The Contractor will use appropriate materials to contain and absorb the spill. The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases.
- If a spill occurs the superintendent or the superintendent's designee will be responsible for completing the spill reporting form and for reporting the spill to the contacts listed below.
- Personnel with primary responsibility for spill response and clean up will receive training by the Contractor's site superintendent or designee. The training must include identifying the location of the spill kits and other spill response equipment and the use of spill response materials.
- Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities.

<u>Spill Control Notification:</u>

- A reportable spill is a quantity of five (5) gallons or more or any spill of oil which: (1) violates water quality standards, (2) produces a "sheen" on a surface water, or (3) causes a sludge or emulsion. This spill must be reported immediately to the agencies listed below.
- Any spill of oil or hazardous substance to waters of the state must be reported immediately by telephone to the following agencies:

- 911 – Police, Fire and EMS
- Town of Ossining Building Department
  101 Route 9A
  Ossining, NY 10562
  Phone: (914) 941-3199
- Briarcliff Manor Fire Department
  1111 Pleasantville Road
  Briarcliff Manor, NY 10510
  Phone: (914) 834-0016
- NYS Department of Environmental Conservation (NYSDEC)
  Spill Reporting Hotline
  (1800) 457–7362
- National Response Center: (1800) 424-8802
- Local Emergency Planning Committee (LEPC)
  Westchester County Office of Emergency Management
  200 Bradhurst Avenue
  Hawthorne, NY 10532
  (914) 864–5450
- Westchester County Department of Health (WCDOH)
  Spill Reporting Hotline
  (914) 813-5000
- U.S. Environmental Protection Agency (USEPA)
  EPCRA Information Hotline
  1(800) 535–0202
- U.S. Department of Labor and Occupational Safety and Health Administration (OSHA)
  Tarrytown, NY
  (914) 524–7510

N. STORMWATER MANAGEMENT FACILITIES MAINTENANCE PROGRAM

The following maintenance plan has been developed to maintain the proper function of all drainage and erosion and sediment control facilities:

- Erosion & Sediment Control Maintenance:

  During the construction of the project, the site erosion and sediment control measures as well as basin embankments and outlet structures will be inspected by the project superintendent once a week and/or within 24 hours following a rainstorm ½" or greater. Any repairs required shall be performed in a timely manner. All sediment removal and/or repairs will be followed within 24 hours by re-vegetation. Remove sediment and correct erosion by re-seed eroded

areas and gullies within 7 days.

- General Stormwater Facilities Maintenance (Storm Sewer, Catch Basins/Drain Inlets, Manholes, Pre-treatment Device and Organic Filter)

  All stormwater facilities shall be inspected immediately after completion of construction, and then monthly for the first three (3) months following the completion of the Project. Within the first three (3) months, inspections shall immediately be performed following a large storm event (i.e. producing 1/2" (one-half inch) of rain or greater. Thereafter, these facilities shall be inspected as described as follows. Upon inspection, facilities shall be immediately maintained and/or cleaned as may be required. Any site areas exhibiting soil erosion of any kind shall be immediately restored and stabilized with vegetation, mulch or stone, depending on the area to be stabilized.

  Upon each inspection, all visible debris including, but not limited to, twigs, leaf and forest litter shall be removed from the swales, overflow discharge points and frames and grates of drainage structures.

- Sumps − Catch Basin/Drain Inlets and Drain Manholes

  All catch basin/drain inlets and drain manholes with sumps have been designed to trap sediment prior to its transport to the infiltration practice and, ultimately, downstream. These sumps will require periodic inspection and maintenance to ensure that adequate depth is maintained within the sumps.

  All sumps shall be inspected once per month for the first three (3) months (after drainage system has been put into service). Thereafter, all sumps shall be inspected every four (4) months. The Owner, or their duly authorized representative, shall take measurements of the sump depth.

  If sediment has accumulated to 1/2 (one-half) the depth of the sump, all sediment shall be removed from the sump. Sediments can be removed with hand-labor or with a vacuum truck.

  The use of road salt shall be minimized for maintenance of roadway and driveway areas.

- Hydrodynamic Separator:

  The hydrodynamic separator (First Defense Unit) shall be inspected every six (6) months (Spring and Fall) for excess sediment accumulation. During dry weather conditions, accumulated sediments shall be vacuumed out when sediment has reached 1/2 (one-half) the capacity of the isolated sump, or when

an appreciable level of hydrocarbons and trash has accumulated, whichever occurs first.

Upon completion of construction, the First Defense Unit should be inspected quarterly during the first year in order to develop an appropriate schedule of maintenance. When the sediment pile is within 30 to 36 inches of the water surface, the system should be maintained. A vacuum truck shall be used to remove the accumulated sediment and debris. Refer to manufacturer's literature for detailed maintenance instructions.

- Organic Surface Filter:

  The organic filter shall be maintained during dry weather conditions. Silt/sediment shall be removed from the filter bed when the accumulation exceeds on inch. When the filtering capacity of the filter diminished substantially (i.e., when water ponds on the surface of the filter bed for more than 48-hours), the top few inches of discolored material shall be removed and shall be replaced with fresh material. The removed sediments shall be disposed in an acceptable manner (i.e., landfill).

O. CONCLUSION:

The stormwater management plan proposed meets and exceeds all the requirements set forth by the Town of Ossining and the New York State Department of Environmental Conservation (NYSDEC) for redevelopment projects. Design modification requirements that may occur during the approval process, will be performed and submitted for review to the Town of Ossining.

4.) Extreme Precipitation Table

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New York
Location	
Longitude	73.815 degrees West
Latitude	41.172 degrees North
Elevation	0 feet
Date/Time	Mon, 29 Jan 2018 15:05:03 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.34	0.52	0.64	0.84	1.05	1.30	**1yr**	0.90	1.24	1.50	1.84	2.26	2.78	3.16	**1yr**	2.46	3.04	3.54	4.24	4.88	**1yr**
2yr	0.41	0.63	0.78	1.02	1.28	1.59	**2yr**	1.11	1.49	1.83	2.25	2.78	3.41	3.84	**2yr**	3.02	3.69	4.26	5.02	5.70	**2yr**
5yr	0.47	0.73	0.92	1.23	1.57	1.98	**5yr**	1.35	1.83	2.29	2.84	3.51	4.31	4.88	**5yr**	3.81	4.69	5.45	6.29	7.06	**5yr**
10yr	0.52	0.82	1.04	1.41	1.83	2.34	**10yr**	1.58	2.15	2.71	3.38	4.18	5.14	5.86	**10yr**	4.55	5.63	6.56	7.46	8.31	**10yr**
25yr	0.60	0.96	1.22	1.69	2.25	2.91	**25yr**	1.94	2.65	3.39	4.26	5.28	6.49	7.46	**25yr**	5.75	7.17	8.41	9.35	10.32	**25yr**
50yr	0.68	1.09	1.40	1.96	2.63	3.44	**50yr**	2.27	3.11	4.03	5.07	6.30	7.76	8.97	**50yr**	6.87	8.62	10.15	11.09	12.16	**50yr**
100yr	0.77	1.24	1.60	2.27	3.09	4.07	**100yr**	2.67	3.65	4.78	6.04	7.53	9.29	10.79	**100yr**	8.22	10.37	12.26	13.16	14.32	**100yr**
200yr	0.86	1.41	1.83	2.63	3.63	4.82	**200yr**	3.13	4.28	5.68	7.21	9.01	11.12	12.98	**200yr**	9.84	12.48	14.81	15.63	16.89	**200yr**
500yr	1.03	1.69	2.21	3.21	4.51	6.03	**500yr**	3.89	5.30	7.14	9.11	11.41	14.13	16.59	**500yr**	12.51	15.95	19.03	19.61	21.00	**500yr**

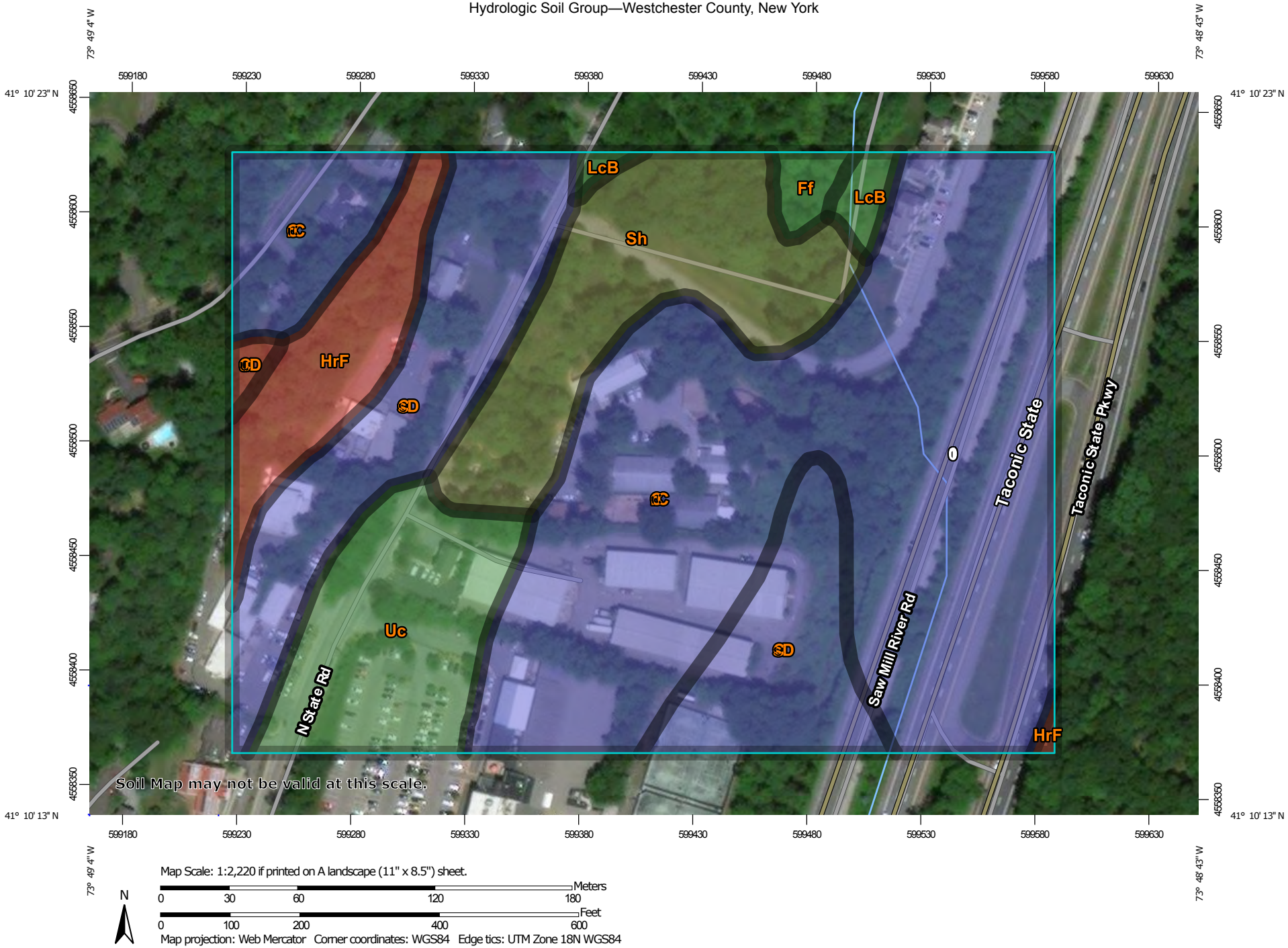
Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.52	0.70	0.86	1.15	**1yr**	0.75	1.12	1.37	1.70	2.14	2.42	2.91	**1yr**	2.14	2.80	3.28	3.77	4.34	**1yr**
2yr	0.39	0.60	0.74	1.00	1.23	1.48	**2yr**	1.06	1.44	1.70	2.16	2.70	3.29	3.71	**2yr**	2.92	3.56	4.10	4.82	5.50	**2yr**
5yr	0.43	0.67	0.83	1.14	1.45	1.73	**5yr**	1.25	1.69	1.98	2.51	3.15	4.05	4.48	**5yr**	3.58	4.31	4.97	5.80	6.49	**5yr**
10yr	0.47	0.73	0.90	1.26	1.63	1.93	**10yr**	1.41	1.89	2.23	2.79	3.54	4.54	5.18	**10yr**	4.02	4.98	5.74	6.45	7.02	**10yr**
25yr	0.53	0.81	1.00	1.43	1.89	2.23	**25yr**	1.63	2.18	2.59	3.18	4.15	5.47	6.29	**25yr**	4.84	6.05	7.23	7.60	7.91	**25yr**
50yr	0.58	0.88	1.10	1.58	2.12	2.49	**50yr**	1.83	2.44	2.93	3.52	4.68	6.32	7.29	**50yr**	5.60	7.01	8.44	8.60	8.60	**50yr**
100yr	0.64	0.96	1.21	1.74	2.39	2.79	**100yr**	2.07	2.73	3.31	3.88	5.28	7.33	8.47	**100yr**	6.49	8.15	9.86	9.73	9.31	**100yr**
200yr	0.70	1.05	1.33	1.93	2.69	3.12	**200yr**	2.32	3.05	3.75	4.29	5.97	8.53	9.87	**200yr**	7.55	9.49	11.54	10.98	10.05	**200yr**
500yr	0.80	1.19	1.53	2.22	3.15	3.62	**500yr**	2.72	3.54	4.43	4.88	7.05	10.44	12.09	**500yr**	9.24	11.63	14.22	12.91	11.01	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.38	0.58	0.71	0.96	1.18	1.42	**1yr**	1.02	1.39	1.62	2.12	2.54	3.00	3.40	**1yr**	2.65	3.27	3.85	4.67	5.33	**1yr**
2yr	0.42	0.65	0.80	1.08	1.33	1.60	**2yr**	1.15	1.56	1.82	2.36	2.91	3.55	4.00	**2yr**	3.15	3.84	4.42	5.26	6.04	**2yr**
5yr	0.51	0.78	0.97	1.33	1.70	2.01	**5yr**	1.47	1.97	2.33	3.03	3.80	4.60	5.30	**5yr**	4.07	5.10	5.94	6.76	7.57	**5yr**
10yr	0.60	0.92	1.14	1.60	2.06	2.41	**10yr**	1.78	2.36	2.81	3.70	4.65	5.79	6.59	**10yr**	5.12	6.34	7.44	8.52	9.42	**10yr**
25yr	0.75	1.14	1.42	2.03	2.67	3.08	**25yr**	2.30	3.01	3.62	4.85	6.07	7.63	8.78	**25yr**	6.75	8.45	9.64	11.27	12.25	**25yr**
50yr	0.89	1.35	1.68	2.42	3.26	3.72	**50yr**	2.81	3.64	4.36	5.96	7.43	9.41	10.90	**50yr**	8.32	10.48	11.99	13.93	14.96	**50yr**
100yr	1.07	1.61	2.02	2.92	4.00	4.50	**100yr**	3.45	4.40	5.28	7.35	9.08	11.59	13.54	**100yr**	10.26	13.02	14.92	17.22	18.27	**100yr**
200yr	1.27	1.92	2.43	3.52	4.91	5.43	**200yr**	4.23	5.31	6.38	9.05	11.10	14.28	16.79	**200yr**	12.64	16.14	18.55	21.27	22.35	**200yr**
500yr	1.64	2.44	3.13	4.55	6.47	6.98	**500yr**	5.59	6.82	8.19	11.98	14.49	18.80	22.32	**500yr**	16.64	21.46	24.75	28.20	29.23	**500yr**

5.) Soils Maps & Soils Data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41° 10' 13" N
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HrF
SD
Uc
SD
Uc
SD
HrF
Taconic State
Taconic State Pkwy
Saw Mill River Rd
N State Rd
Soil Map may not be valid at this scale.
Map Scale: 1:2,220 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 30 60 120 180
Feet
0 100 200 400 600
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 13, Oct 8, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Oct 5, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CrC	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	11.6	49.3%
CsD	Chatfield-Charlton complex, 15 to 35 percent slopes, very rocky	B	4.5	19.0%
CuD	Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes	D	0.1	0.5%
Ff	Fluvaquents-Udifluvents complex, frequently flooded	A/D	0.2	1.0%
HrF	Hollis-Rock outcrop complex, 35 to 60 percent slopes	D	1.5	6.2%
LcB	Leicester loam, 3 to 8 percent slopes, stony	A/D	0.3	1.2%
Sh	Sun loam	C/D	3.0	12.9%
Uc	Udorthents, wet substratum	A/D	2.3	9.9%
Totals for Area of Interest			**23.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

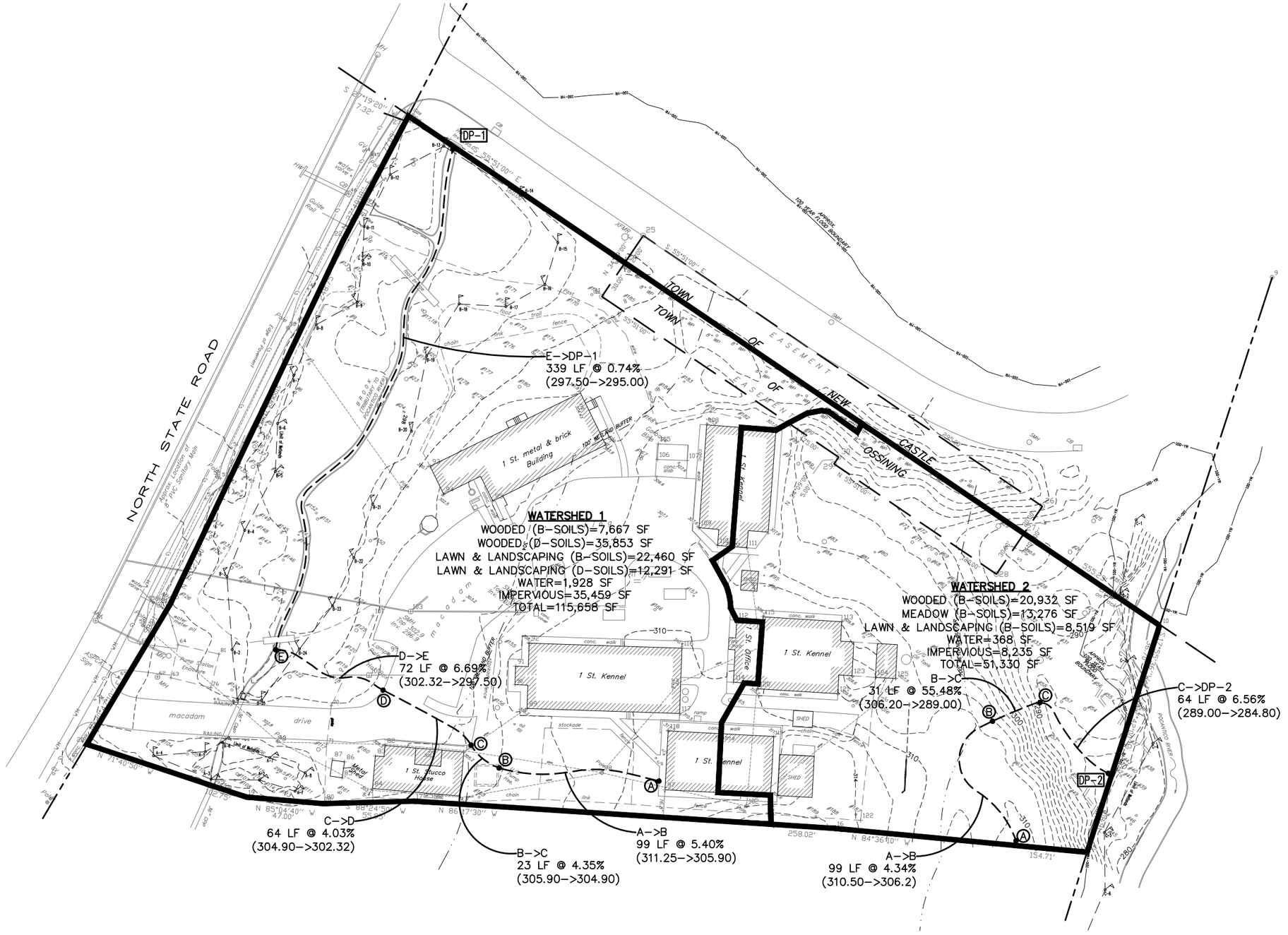
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

6.) Watershed Maps



ANY ALTERATIONS OR REVISIONS OF THESE PLANS, UNLESS DONE BY OR UNDER THE DIRECTION OF THE NYS LICENSED AND REGISTERED ENGINEER THAT PREPARED THEM, IS A VIOLATION OF THE NYS EDUCATION LAW.

No.	Description	Date
	Revisions	

THIS PLAN NOT VALID FOR CONSTRUCTION WITHOUT ENGINEERS SEAL & SIGNATURE

PROJECT:

SPCA OF WESTCHESTER
590 NORTH STATE ROAD
TOWN OF OSSINING
WESTCHESTER COUNTY – NEW YORK

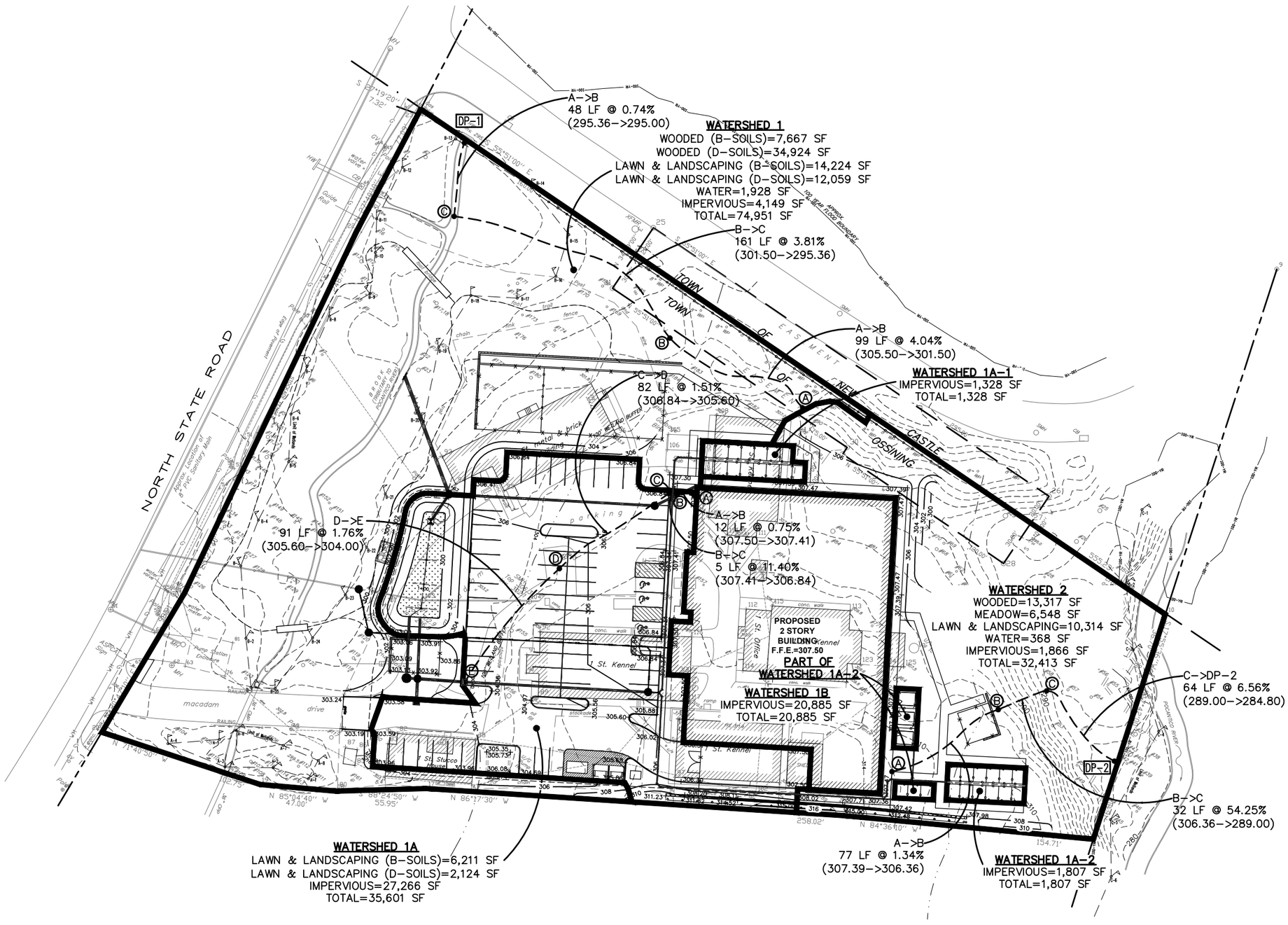
WATERSHED MAP – EXISTING

STATE OF NEW YORK · PIONEER · LICENSED PROFESSIONAL ENGINEER · No. 80837

HEC

HUDSON ENGINEERING & CONSULTING, P.C.
45 Knollwood Road • Suite 201
Elmsford, New York 10523
T: 914-909-0420
F: 914-560-2086

Date: 2/27/18
Scale: 1" = 30'
Designed By: D.C.
Checked By: M.S.
Sheet: 1 / 1
Sheet No. WS-E



EXISTING INFORMATION SHOWN HEREON HAS BEEN PROVIDED BY SUMMIT LAND SURVEYORS, DATED JANUARY 31, 2016

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

No.	Description	Date
5.	REVISED PER TOWN COMMENTS	1/7/19
4.	REVISED PER TOWN COMMENTS	11/28/18
3.	PLANNING BOARD SUBMISSION	10/9/18
2.	REVISED PER CLIENT MEETING	3/14/18
1.	REVISED PER CLIENT MEETING	2/27/18

THIS PLAN NOT VALID FOR CONSTRUCTION WITHOUT ENGINEERS SEAL & SIGNATURE

PROJECT:

SPCA OF WESTCHESTER
590 NORTH STATE ROAD
TOWN OF OSSINING
WESTCHESTER COUNTY – NEW YORK

WATERSHED MAP – PROPOSED

STATE OF NEW YORK · HIGHWAY OFFICE · No. 60657 · LICENSED PROFESSIONAL ENGINEER

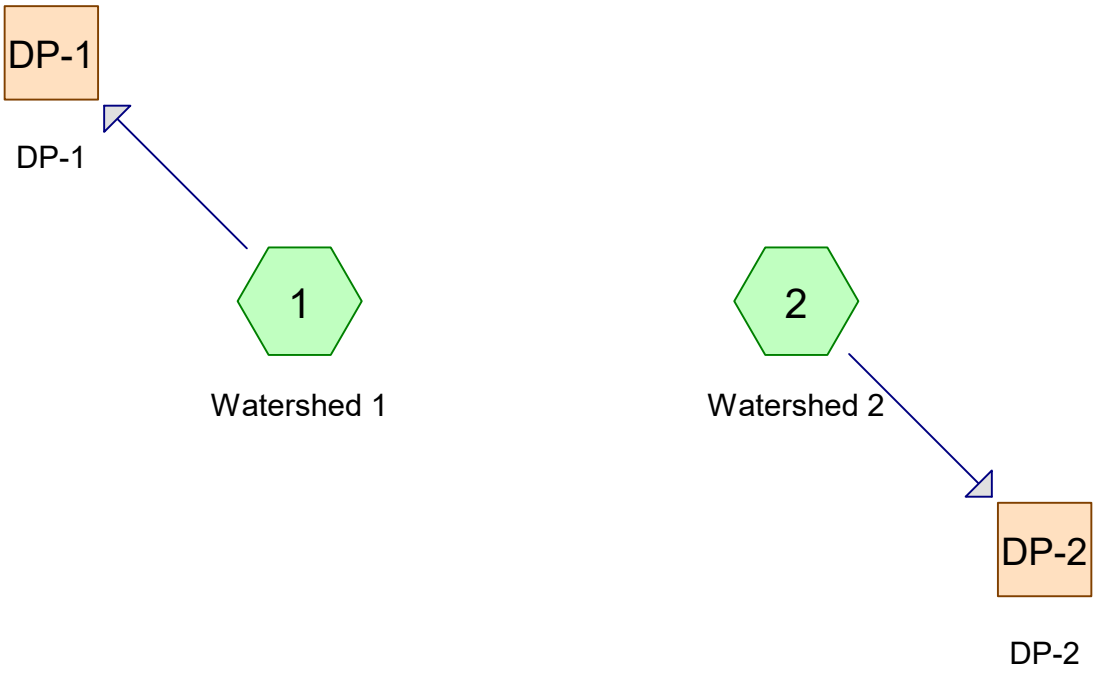
HEC

HUDSON ENGINEERING & CONSULTING, P.C.
45 Knollwood Road - Suite 201
Elmsford, New York 10523
T: 914-909-0420
F: 914-560-2086

Date: 2/27/18 | Sheet: 1
Scale: 1" = 30' | 1
Designed By: D.C.
Checked By: M.S.

Sheet No.
WS-P

7.) Pre-Development Analysis of the 1-, 10-, 25- & 100-Year Storm Frequencies



Subcat Reach Pond Link

Routing Diagram for Existing
Prepared by Hudson Engineering & Consulting, P.C., Printed 12/28/2018
HydroCAD® 10.00-22 s/n 02549 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.711	61	>75% Grass cover, Good, HSG B (1, 2)
0.282	80	>75% Grass cover, Good, HSG D (1)
0.305	67	Brush, Poor, HSG B (2)
0.814	98	Parking Lot, Walkways, Buildings etc. (1)
0.189	98	Parking Lot, Walkways, Buildings, etc. (2)
0.008	98	Water Surface, HSG B (2)
0.044	98	Water Surface, HSG D (1)
0.176	55	Woods, Good, HSG B (1)
0.823	77	Woods, Good, HSG D (1)
0.481	58	Woods/grass comb., Good, HSG B (2)
3.834	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.681	HSG B	1, 2
0.000	HSG C	
1.149	HSG D	1
1.003	Other	1, 2
3.834		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
0.000	0.711	0.000	0.282	0.000	0.993	>75% Grass cover, Good	
0.000	0.305	0.000	0.000	0.000	0.305	Brush, Poor	
0.000	0.000	0.000	0.000	0.814	0.814	Parking Lot, Walkways, Buildings etc.	
0.000	0.000	0.000	0.000	0.189	0.189	Parking Lot, Walkways, Buildings, etc.	
0.000	0.008	0.000	0.044	0.000	0.053	Water Surface	
0.000	0.176	0.000	0.823	0.000	0.999	Woods, Good	
0.000	0.481	0.000	0.000	0.000	0.481	Woods/grass comb., Good	
0.000	**1.681**	**0.000**	**1.149**	**1.003**	**3.834**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Watershed 1 Runoff Area=115,658 sf 32.33% Impervious Runoff Depth=1.09"
Flow Length=598' Tc=12.1 min CN=80 Runoff=2.70 cfs 0.241 af

Subcatchment 2: Watershed 2 Runoff Area=51,330 sf 16.76% Impervious Runoff Depth=0.52"
Flow Length=194' Tc=16.0 min CN=68 Runoff=0.40 cfs 0.051 af

Reach DP-1: DP-1 Inflow=2.70 cfs 0.241 af
Outflow=2.70 cfs 0.241 af

Reach DP-2: DP-2 Inflow=0.40 cfs 0.051 af
Outflow=0.40 cfs 0.051 af

Total Runoff Area = 3.834 ac Runoff Volume = 0.291 af Average Runoff Depth = 0.91"
72.46% Pervious = 2.778 ac 27.54% Impervious = 1.056 ac

Summary for Subcatchment 1: Watershed 1

Runoff = 2.70 cfs @ 12.17 hrs, Volume= 0.241 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.78"

	Area (sf)	CN	Description
	7,667	55	Woods, Good, HSG B
	35,853	77	Woods, Good, HSG D
	22,460	61	>75% Grass cover, Good, HSG B
	12,291	80	>75% Grass cover, Good, HSG D
	1,928	98	Water Surface, HSG D
*	35,459	98	Parking Lot, Walkways, Buildings etc.
	115,658	80	Weighted Average
	78,271		67.67% Pervious Area
	37,387		32.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	99	0.0540	0.18		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.3	23	0.0435	1.46		**Shallow Concentrated Flow, B->C** Short Grass Pasture Kv= 7.0 fps
0.3	64	0.0403	4.08		**Shallow Concentrated Flow, C->D** Paved Kv= 20.3 fps
0.9	73	0.0669	1.29		**Shallow Concentrated Flow, D->E** Woodland Kv= 5.0 fps
1.4	339	0.0074	4.09	20.43	**Channel Flow, E->DP-1** Area= 5.0 sf Perim= 7.0' r= 0.71' n= 0.025 Earth, clean & winding
12.1	598	Total			

Summary for Subcatchment 2: Watershed 2

Runoff = 0.40 cfs @ 12.27 hrs, Volume= 0.051 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.78"

	Area (sf)	CN	Description
	20,932	58	Woods/grass comb., Good, HSG B
	13,276	67	Brush, Poor, HSG B
	8,519	61	>75% Grass cover, Good, HSG B
	368	98	Water Surface, HSG B
*	8,235	98	Parking Lot, Walkways, Buildings, etc.
	51,330	68	Weighted Average
	42,727		83.24% Pervious Area
	8,603		16.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	99	0.0434	0.11		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.41"
0.1	31	0.5548	3.72		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.8	64	0.0656	1.28		**Shallow Concentrated Flow, C->DP-2** Woodland Kv= 5.0 fps
16.0	194	Total			

Summary for Reach DP-1: DP-1

Inflow Area = 2.655 ac, 32.33% Impervious, Inflow Depth = 1.09" for 1-Year event
Inflow = 2.70 cfs @ 12.17 hrs, Volume= 0.241 af
Outflow = 2.70 cfs @ 12.17 hrs, Volume= 0.241 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach DP-2: DP-2

Inflow Area = 1.178 ac, 16.76% Impervious, Inflow Depth = 0.52" for 1-Year event
Inflow = 0.40 cfs @ 12.27 hrs, Volume= 0.051 af
Outflow = 0.40 cfs @ 12.27 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Watershed 1 Runoff Area=115,658 sf 32.33% Impervious Runoff Depth=3.02"
Flow Length=598' Tc=12.1 min CN=80 Runoff=7.70 cfs 0.667 af

Subcatchment 2: Watershed 2 Runoff Area=51,330 sf 16.76% Impervious Runoff Depth=1.98"
Flow Length=194' Tc=16.0 min CN=68 Runoff=1.96 cfs 0.194 af

Reach DP-1: DP-1 Inflow=7.70 cfs 0.667 af
Outflow=7.70 cfs 0.667 af

Reach DP-2: DP-2 Inflow=1.96 cfs 0.194 af
Outflow=1.96 cfs 0.194 af

Total Runoff Area = 3.834 ac Runoff Volume = 0.862 af Average Runoff Depth = 2.70"
72.46% Pervious = 2.778 ac 27.54% Impervious = 1.056 ac

Summary for Subcatchment 1: Watershed 1

Runoff = 7.70 cfs @ 12.17 hrs, Volume= 0.667 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.14"

	Area (sf)	CN	Description
	7,667	55	Woods, Good, HSG B
	35,853	77	Woods, Good, HSG D
	22,460	61	>75% Grass cover, Good, HSG B
	12,291	80	>75% Grass cover, Good, HSG D
	1,928	98	Water Surface, HSG D
*	35,459	98	Parking Lot, Walkways, Buildings etc.
	115,658	80	Weighted Average
	78,271		67.67% Pervious Area
	37,387		32.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	99	0.0540	0.18		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.3	23	0.0435	1.46		**Shallow Concentrated Flow, B->C** Short Grass Pasture Kv= 7.0 fps
0.3	64	0.0403	4.08		**Shallow Concentrated Flow, C->D** Paved Kv= 20.3 fps
0.9	73	0.0669	1.29		**Shallow Concentrated Flow, D->E** Woodland Kv= 5.0 fps
1.4	339	0.0074	4.09	20.43	**Channel Flow, E->DP-1** Area= 5.0 sf Perim= 7.0' r= 0.71' n= 0.025 Earth, clean & winding
12.1	598	Total			

Summary for Subcatchment 2: Watershed 2

Runoff = 1.96 cfs @ 12.23 hrs, Volume= 0.194 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.14"

	Area (sf)	CN	Description
	20,932	58	Woods/grass comb., Good, HSG B
	13,276	67	Brush, Poor, HSG B
	8,519	61	>75% Grass cover, Good, HSG B
	368	98	Water Surface, HSG B
*	8,235	98	Parking Lot, Walkways, Buildings, etc.
	51,330	68	Weighted Average
	42,727		83.24% Pervious Area
	8,603		16.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	99	0.0434	0.11		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.41"
0.1	31	0.5548	3.72		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.8	64	0.0656	1.28		**Shallow Concentrated Flow, C->DP-2** Woodland Kv= 5.0 fps
16.0	194	Total			

Summary for Reach DP-1: DP-1

Inflow Area = 2.655 ac, 32.33% Impervious, Inflow Depth = 3.02" for 10-Year event
Inflow = 7.70 cfs @ 12.17 hrs, Volume= 0.667 af
Outflow = 7.70 cfs @ 12.17 hrs, Volume= 0.667 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach DP-2: DP-2

Inflow Area = 1.178 ac, 16.76% Impervious, Inflow Depth = 1.98" for 10-Year event
Inflow = 1.96 cfs @ 12.23 hrs, Volume= 0.194 af
Outflow = 1.96 cfs @ 12.23 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Watershed 1 Runoff Area=115,658 sf 32.33% Impervious Runoff Depth=4.23"
Flow Length=598' Tc=12.1 min CN=80 Runoff=10.73 cfs 0.935 af

Subcatchment 2: Watershed 2 Runoff Area=51,330 sf 16.76% Impervious Runoff Depth=3.00"
Flow Length=194' Tc=16.0 min CN=68 Runoff=3.03 cfs 0.295 af

Reach DP-1: DP-1 Inflow=10.73 cfs 0.935 af
Outflow=10.73 cfs 0.935 af

Reach DP-2: DP-2 Inflow=3.03 cfs 0.295 af
Outflow=3.03 cfs 0.295 af

Total Runoff Area = 3.834 ac Runoff Volume = 1.230 af Average Runoff Depth = 3.85"
72.46% Pervious = 2.778 ac 27.54% Impervious = 1.056 ac

Summary for Subcatchment 1: Watershed 1

Runoff = 10.73 cfs @ 12.17 hrs, Volume= 0.935 af, Depth= 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.49"

	Area (sf)	CN	Description
	7,667	55	Woods, Good, HSG B
	35,853	77	Woods, Good, HSG D
	22,460	61	>75% Grass cover, Good, HSG B
	12,291	80	>75% Grass cover, Good, HSG D
	1,928	98	Water Surface, HSG D
*	35,459	98	Parking Lot, Walkways, Buildings etc.
	115,658	80	Weighted Average
	78,271		67.67% Pervious Area
	37,387		32.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	99	0.0540	0.18		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.3	23	0.0435	1.46		**Shallow Concentrated Flow, B->C** Short Grass Pasture Kv= 7.0 fps
0.3	64	0.0403	4.08		**Shallow Concentrated Flow, C->D** Paved Kv= 20.3 fps
0.9	73	0.0669	1.29		**Shallow Concentrated Flow, D->E** Woodland Kv= 5.0 fps
1.4	339	0.0074	4.09	20.43	**Channel Flow, E->DP-1** Area= 5.0 sf Perim= 7.0' r= 0.71' n= 0.025 Earth, clean & winding
12.1	598	Total			

Summary for Subcatchment 2: Watershed 2

Runoff = 3.03 cfs @ 12.22 hrs, Volume= 0.295 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.49"

	Area (sf)	CN	Description
	20,932	58	Woods/grass comb., Good, HSG B
	13,276	67	Brush, Poor, HSG B
	8,519	61	>75% Grass cover, Good, HSG B
	368	98	Water Surface, HSG B
*	8,235	98	Parking Lot, Walkways, Buildings, etc.
	51,330	68	Weighted Average
	42,727		83.24% Pervious Area
	8,603		16.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	99	0.0434	0.11		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.41"
0.1	31	0.5548	3.72		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.8	64	0.0656	1.28		**Shallow Concentrated Flow, C->DP-2** Woodland Kv= 5.0 fps
16.0	194	Total			

Summary for Reach DP-1: DP-1

Inflow Area = 2.655 ac, 32.33% Impervious, Inflow Depth = 4.23" for 25-Year event
Inflow = 10.73 cfs @ 12.17 hrs, Volume= 0.935 af
Outflow = 10.73 cfs @ 12.17 hrs, Volume= 0.935 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach DP-2: DP-2

Inflow Area = 1.178 ac, 16.76% Impervious, Inflow Depth = 3.00" for 25-Year event
Inflow = 3.03 cfs @ 12.22 hrs, Volume= 0.295 af
Outflow = 3.03 cfs @ 12.22 hrs, Volume= 0.295 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Watershed 1 Runoff Area=115,658 sf 32.33% Impervious Runoff Depth=6.84"
Flow Length=598' Tc=12.1 min CN=80 Runoff=17.10 cfs 1.514 af

Subcatchment 2: Watershed 2 Runoff Area=51,330 sf 16.76% Impervious Runoff Depth=5.34"
Flow Length=194' Tc=16.0 min CN=68 Runoff=5.45 cfs 0.524 af

Reach DP-1: DP-1 Inflow=17.10 cfs 1.514 af
Outflow=17.10 cfs 1.514 af

Reach DP-2: DP-2 Inflow=5.45 cfs 0.524 af
Outflow=5.45 cfs 0.524 af

Total Runoff Area = 3.834 ac Runoff Volume = 2.039 af Average Runoff Depth = 6.38"
72.46% Pervious = 2.778 ac 27.54% Impervious = 1.056 ac

Summary for Subcatchment 1: Watershed 1

Runoff = 17.10 cfs @ 12.16 hrs, Volume= 1.514 af, Depth= 6.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
	7,667	55	Woods, Good, HSG B
	35,853	77	Woods, Good, HSG D
	22,460	61	>75% Grass cover, Good, HSG B
	12,291	80	>75% Grass cover, Good, HSG D
	1,928	98	Water Surface, HSG D
*	35,459	98	Parking Lot, Walkways, Buildings etc.
	115,658	80	Weighted Average
	78,271		67.67% Pervious Area
	37,387		32.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	99	0.0540	0.18		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.3	23	0.0435	1.46		**Shallow Concentrated Flow, B->C** Short Grass Pasture Kv= 7.0 fps
0.3	64	0.0403	4.08		**Shallow Concentrated Flow, C->D** Paved Kv= 20.3 fps
0.9	73	0.0669	1.29		**Shallow Concentrated Flow, D->E** Woodland Kv= 5.0 fps
1.4	339	0.0074	4.09	20.43	**Channel Flow, E->DP-1** Area= 5.0 sf Perim= 7.0' r= 0.71' n= 0.025 Earth, clean & winding
12.1	598	Total			

Summary for Subcatchment 2: Watershed 2

Runoff = 5.45 cfs @ 12.22 hrs, Volume= 0.524 af, Depth= 5.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
	20,932	58	Woods/grass comb., Good, HSG B
	13,276	67	Brush, Poor, HSG B
	8,519	61	>75% Grass cover, Good, HSG B
	368	98	Water Surface, HSG B
*	8,235	98	Parking Lot, Walkways, Buildings, etc.
	51,330	68	Weighted Average
	42,727		83.24% Pervious Area
	8,603		16.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	99	0.0434	0.11		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.41"
0.1	31	0.5548	3.72		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.8	64	0.0656	1.28		**Shallow Concentrated Flow, C->DP-2** Woodland Kv= 5.0 fps
16.0	194	Total			

Summary for Reach DP-1: DP-1

Inflow Area = 2.655 ac, 32.33% Impervious, Inflow Depth = 6.84" for 100-Year event
Inflow = 17.10 cfs @ 12.16 hrs, Volume= 1.514 af
Outflow = 17.10 cfs @ 12.16 hrs, Volume= 1.514 af, Atten= 0%, Lag= 0.0 min

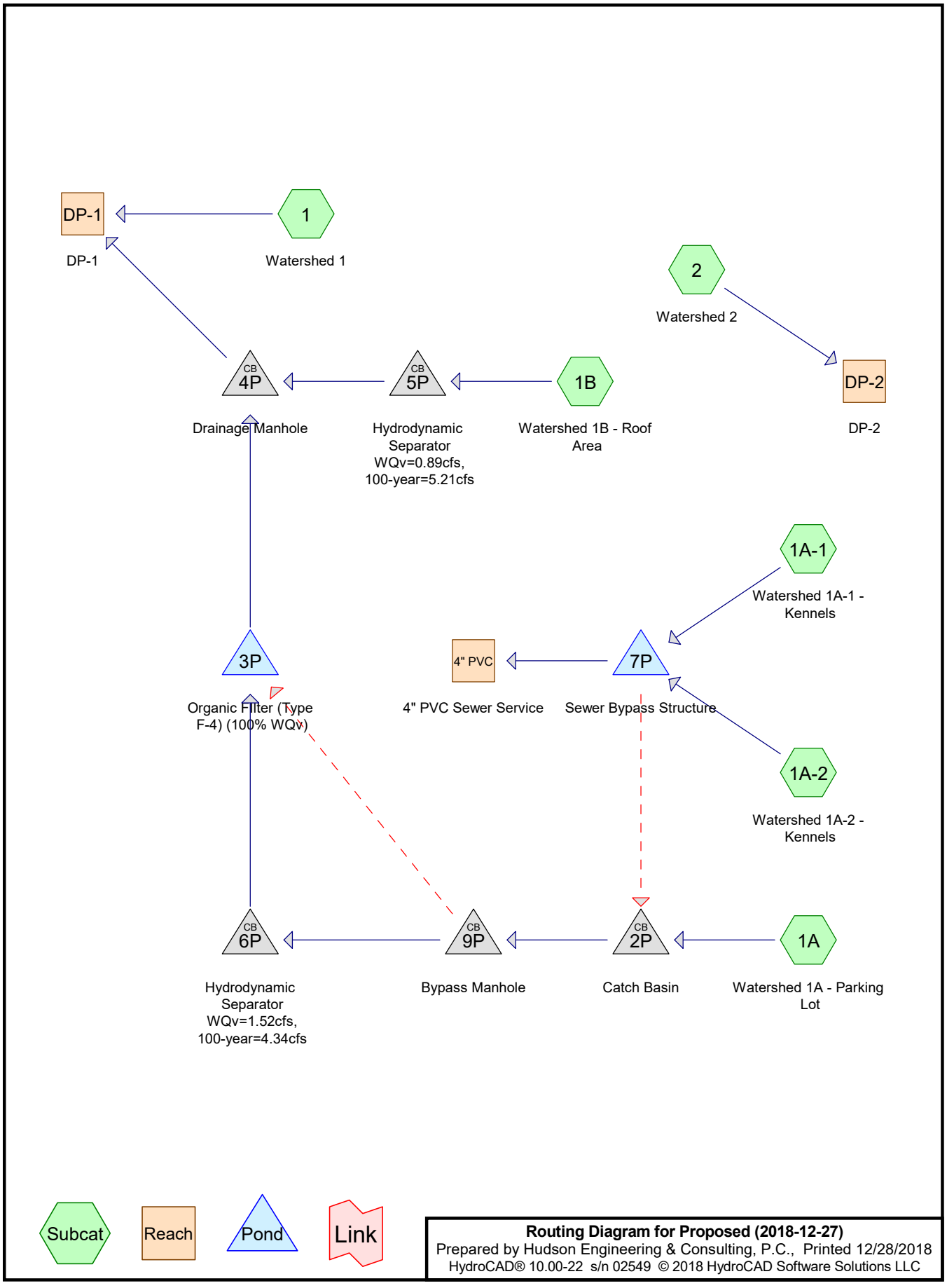
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach DP-2: DP-2

Inflow Area = 1.178 ac, 16.76% Impervious, Inflow Depth = 5.34" for 100-Year event
Inflow = 5.45 cfs @ 12.22 hrs, Volume= 0.524 af
Outflow = 5.45 cfs @ 12.22 hrs, Volume= 0.524 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

8.) Post-Development Analysis of the 1-, 10-, 25- & 100-Year Storm Frequencies



Routing Diagram for Proposed (2018-12-27)
Prepared by Hudson Engineering & Consulting, P.C., Printed 12/28/2018
HydroCAD® 10.00-22 s/n 02549 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.706	61	>75% Grass cover, Good, HSG B (1, 1A, 2)
0.326	80	>75% Grass cover, Good, HSG D (1, 1A)
0.150	67	Brush, Poor, HSG B (2)
0.793	98	Parking Lot, Walkways, Buildings etc. (1, 1A, 1A-1, 1A-2)
0.043	98	Parking Lot, Walkways, Buildings, etc. (2)
0.479	98	Proposed Building (1B)
0.008	98	Water Surface, HSG B (2)
0.044	98	Water Surface, HSG D (1)
0.176	55	Woods, Good, HSG B (1)
0.802	77	Woods, Good, HSG D (1)
0.306	58	Woods/grass comb., Good, HSG B (2)
3.833	**79**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.346	HSG B	1, 1A, 2
0.000	HSG C	
1.172	HSG D	1, 1A
1.315	Other	1, 1A, 1A-1, 1A-2, 1B, 2
3.833		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
0.000	0.706	0.000	0.326	0.000	1.031	>75% Grass cover, Good	
0.000	0.150	0.000	0.000	0.000	0.150	Brush, Poor	
0.000	0.000	0.000	0.000	0.793	0.793	Parking Lot, Walkways, Buildings etc.	
0.000	0.000	0.000	0.000	0.043	0.043	Parking Lot, Walkways, Buildings, etc.	
0.000	0.000	0.000	0.000	0.479	0.479	Proposed Building	
0.000	0.008	0.000	0.044	0.000	0.053	Water Surface	
0.000	0.176	0.000	0.802	0.000	0.978	Woods, Good	
0.000	0.306	0.000	0.000	0.000	0.306	Woods/grass comb., Good	
0.000	**1.346**	**0.000**	**1.172**	**1.315**	**3.833**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Watershed 1 Runoff Area=74,951 sf 8.11% Impervious Runoff Depth=0.77"
Flow Length=308' Tc=18.5 min CN=74 Runoff=0.98 cfs 0.111 af

Subcatchment 1A: Watershed 1A - Parking Runoff Area=35,601 sf 76.59% Impervious Runoff Depth=1.78"
Flow Length=190' Tc=5.6 min CN=90 Runoff=1.72 cfs 0.121 af

Subcatchment 1A-1: Watershed 1A-1 - Runoff Area=1,328 sf 100.00% Impervious Runoff Depth=2.55"
Flow Length=171' Slope=0.0100 '/' Tc=1.2 min CN=98 Runoff=0.10 cfs 0.006 af

Subcatchment 1A-2: Watershed 1A-2 - Runoff Area=1,807 sf 100.00% Impervious Runoff Depth=2.55"
Flow Length=257' Slope=0.0100 '/' Tc=1.7 min CN=98 Runoff=0.13 cfs 0.009 af

Subcatchment 1B: Watershed 1B - Roof Runoff Area=20,865 sf 100.00% Impervious Runoff Depth=2.55"
Tc=1.0 min CN=98 Runoff=1.53 cfs 0.102 af

Subcatchment 2: Watershed 2 Runoff Area=32,413 sf 6.89% Impervious Runoff Depth=0.38"
Flow Length=173' Tc=14.1 min CN=64 Runoff=0.16 cfs 0.023 af

Reach 4" PVC: 4" PVC Sewer Service Avg. Flow Depth=0.14' Max Vel=4.16 fps Inflow=0.15 cfs 0.015 af
4.0" Round Pipe n=0.010 L=184.0' S=0.0249 '/' Capacity=0.39 cfs Outflow=0.15 cfs 0.015 af

Reach DP-1: DP-1 Inflow=1.85 cfs 0.334 af
Outflow=1.85 cfs 0.334 af

Reach DP-2: DP-2 Inflow=0.16 cfs 0.023 af
Outflow=0.16 cfs 0.023 af

Pond 2P: Catch Basin Peak Elev=301.81' Inflow=1.74 cfs 0.122 af
15.0" Round Culvert n=0.013 L=25.5' S=0.0200 '/' Outflow=1.74 cfs 0.122 af

Pond 3P: Organic FIlter (Type F-4) (100% Peak Elev=301.61' Storage=2,716 cf Inflow=1.74 cfs 0.122 af
Outflow=0.14 cfs 0.122 af

Pond 4P: Drainage Manhole Peak Elev=296.90' Inflow=1.59 cfs 0.224 af
18.0" Round Culvert n=0.013 L=76.0' S=0.0099 '/' Outflow=1.59 cfs 0.224 af

Pond 5P: Hydrodynamic Separator WQv=0.89cfs, Peak Elev=302.11' Inflow=1.53 cfs 0.102 af
12.0" Round Culvert n=0.013 L=123.1' S=0.0413 '/' Outflow=1.53 cfs 0.102 af

Pond 6P: Hydrodynamic Separator WQv=1.52cfs, Peak Elev=301.36' Inflow=1.74 cfs 0.122 af
12.0" Round Culvert n=0.013 L=34.7' S=0.0150 '/' Outflow=1.74 cfs 0.122 af

Pond 7P: Sewer Bypass Structure Peak Elev=302.90' Storage=0.000 af Inflow=0.23 cfs 0.015 af
Primary=0.15 cfs 0.015 af Secondary=0.08 cfs 0.001 af Outflow=0.23 cfs 0.015 af

Pond 9P: Bypass Manhole Peak Elev=301.49' Inflow=1.74 cfs 0.122 af
Primary=1.74 cfs 0.122 af Secondary=0.01 cfs 0.000 af Outflow=1.74 cfs 0.122 af

Total Runoff Area = 3.833 ac Runoff Volume = 0.372 af Average Runoff Depth = 1.17"
64.32% Pervious = 2.465 ac 35.68% Impervious = 1.368 ac

Summary for Subcatchment 1: Watershed 1

Runoff = 0.98 cfs @ 12.28 hrs, Volume= 0.111 af, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.78"

	Area (sf)	CN	Description
	7,667	55	Woods, Good, HSG B
	34,924	77	Woods, Good, HSG D
	14,224	61	>75% Grass cover, Good, HSG B
	12,059	80	>75% Grass cover, Good, HSG D
	1,928	98	Water Surface, HSG D
*	4,149	98	Parking Lot, Walkways, Buildings etc.
	74,951	74	Weighted Average
	68,874		91.89% Pervious Area
	6,077		8.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	99	0.0404	0.11		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.41"
2.7	161	0.0381	0.98		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.2	48	0.0074	4.09	20.43	**Channel Flow, C->DP-1** Area= 5.0 sf Perim= 7.0' r= 0.71' n= 0.025 Earth, clean & winding
18.5	308	Total			

Summary for Subcatchment 1A: Watershed 1A - Parking Lot

Runoff = 1.72 cfs @ 12.08 hrs, Volume= 0.121 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.78"

	Area (sf)	CN	Description
	6,211	61	>75% Grass cover, Good, HSG B
	2,124	80	>75% Grass cover, Good, HSG D
*	27,266	98	Parking Lot, Walkways, Buildings etc.
	35,601	90	Weighted Average
	8,335		23.41% Pervious Area
	27,266		76.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	12	0.0075	0.05		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.1	5	0.1140	1.56		**Sheet Flow, B->C** Smooth surfaces n= 0.011 P2= 3.41"
1.1	82	0.0151	1.22		**Sheet Flow, C->D** Smooth surfaces n= 0.011 P2= 3.41"
0.6	91	0.0176	2.69		**Shallow Concentrated Flow, D->E** Paved Kv= 20.3 fps
5.6	190	Total			

Summary for Subcatchment 1A-1: Watershed 1A-1 - Kennels

Runoff = 0.10 cfs @ 12.02 hrs, Volume= 0.006 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.78"

	Area (sf)	CN	Description
*	1,328	98	Parking Lot, Walkways, Buildings etc.
	1,328		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
0.9	160	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013
1.2	171	Total			

Summary for Subcatchment 1A-2: Watershed 1A-2 - Kennels

Runoff = 0.13 cfs @ 12.02 hrs, Volume= 0.009 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.78"

	Area (sf)	CN	Description
*	1,807	98	Parking Lot, Walkways, Buildings etc.
	1,807		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
1.4	246	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013 Corrugated PE, smooth interior

1.7	257	Total

Summary for Subcatchment 1B: Watershed 1B - Roof Area

Runoff = 1.53 cfs @ 12.01 hrs, Volume= 0.102 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.78"

	Area (sf)	CN	Description
*	20,865	98	Proposed Building
	20,865		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment 2: Watershed 2

Runoff = 0.16 cfs @ 12.28 hrs, Volume= 0.023 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.78"

	Area (sf)	CN	Description
	13,317	58	Woods/grass comb., Good, HSG B
	6,548	67	Brush, Poor, HSG B
	10,314	61	>75% Grass cover, Good, HSG B
	368	98	Water Surface, HSG B
*	1,866	98	Parking Lot, Walkways, Buildings, etc.
	32,413	64	Weighted Average
	30,179		93.11% Pervious Area
	2,234		6.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	77	0.0134	0.10		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.1	32	0.5425	3.68		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.8	64	0.0656	1.28		**Shallow Concentrated Flow, C->DP-2** Woodland Kv= 5.0 fps
14.1	173	Total			

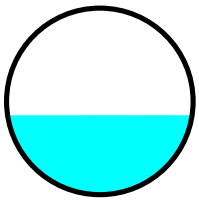
Summary for Reach 4" PVC: 4" PVC Sewer Service

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 2.47" for 1-Year event
Inflow = 0.15 cfs @ 12.02 hrs, Volume= 0.015 af
Outflow = 0.15 cfs @ 12.04 hrs, Volume= 0.015 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.16 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.50 fps, Avg. Travel Time= 2.1 min

Peak Storage= 7 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.39 cfs

4.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 184.0' Slope= 0.0249 '/'
Inlet Invert= 301.31', Outlet Invert= 296.73'



Summary for Reach DP-1: DP-1

Inflow Area = 3.017 ac, 41.25% Impervious, Inflow Depth = 1.33" for 1-Year event
Inflow = 1.85 cfs @ 12.02 hrs, Volume= 0.334 af
Outflow = 1.85 cfs @ 12.02 hrs, Volume= 0.334 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach DP-2: DP-2

Inflow Area = 0.744 ac, 6.89% Impervious, Inflow Depth = 0.38" for 1-Year event
Inflow = 0.16 cfs @ 12.28 hrs, Volume= 0.023 af
Outflow = 0.16 cfs @ 12.28 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Pond 2P: Catch Basin

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 1.79" for 1-Year event
Inflow = 1.74 cfs @ 12.08 hrs, Volume= 0.122 af
Outflow = 1.74 cfs @ 12.08 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min
Primary = 1.74 cfs @ 12.08 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 301.81' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	301.07'	**15.0" Round Culvert** L= 25.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.07' / 300.56' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.74 cfs @ 12.08 hrs HW=301.81' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.74 cfs @ 2.31 fps)

Summary for Pond 3P: Organic FIlter (Type F-4) (100% WQv)

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 1.79" for 1-Year event
Inflow = 1.74 cfs @ 12.08 hrs, Volume= 0.122 af
Outflow = 0.14 cfs @ 13.21 hrs, Volume= 0.122 af, Atten= 92%, Lag= 67.8 min
Primary = 0.14 cfs @ 13.21 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 301.61' @ 13.21 hrs Surf.Area= 2,141 sf Storage= 2,716 cf

Plug-Flow detention time= 397.7 min calculated for 0.122 af (100% of inflow)
Center-of-Mass det. time= 397.7 min (1,209.4 - 811.7)

Volume	Invert	Avail.Storage	Storage Description
#1	300.00'	6,298 cf	**Organic Filter (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
300.00	1,262	0	0	1,262
301.00	1,794	1,520	1,520	1,812
302.00	2,381	2,081	3,601	2,420
303.00	3,026	2,697	6,298	3,091

Device	Routing	Invert	Outlet Devices
#1	Primary	296.98'	**12.0" Round 12" HDPE (OUT)** L= 17.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 296.98' / 296.25' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	302.15'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	301.55'	**0.5' long x 3.0' breadth Broad-Crested Rectangular Weir X 4.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Device 1	300.00'	**1.375 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.14 cfs @ 13.21 hrs HW=301.61' (Free Discharge)
└**1=12" HDPE (OUT)** (Passes 0.14 cfs of 6.07 cfs potential flow)
  ├**2=Grate** (Controls 0.00 cfs)
  ├**3=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.59 fps)
  └**4=Exfiltration** (Exfiltration Controls 0.07 cfs)

Summary for Pond 4P: Drainage Manhole

Inflow Area = 1.296 ac, 85.24% Impervious, Inflow Depth = 2.07" for 1-Year event
Inflow = 1.59 cfs @ 12.01 hrs, Volume= 0.224 af
Outflow = 1.59 cfs @ 12.01 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 12.01 hrs, Volume= 0.224 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 296.90' @ 12.01 hrs
Flood Elev= 303.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.25'	**18.0" Round Culvert** L= 76.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 296.25' / 295.50' S= 0.0099 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.57 cfs @ 12.01 hrs HW=296.90' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.57 cfs @ 2.16 fps)

Summary for Pond 5P: Hydrodynamic Separator WQv=0.89cfs, 100-year=5.21cfs

Inflow Area = 0.479 ac,100.00% Impervious, Inflow Depth = 2.55" for 1-Year event
Inflow = 1.53 cfs @ 12.01 hrs, Volume= 0.102 af
Outflow = 1.53 cfs @ 12.01 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.0 min
Primary = 1.53 cfs @ 12.01 hrs, Volume= 0.102 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 302.11' @ 12.01 hrs
Flood Elev= 307.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	301.34'	**12.0" Round 12" HDPE (OUT)** L= 123.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.34' / 296.25' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.52 cfs @ 12.01 hrs HW=302.11' (Free Discharge)
└**1=12" HDPE (OUT)** (Inlet Controls 1.52 cfs @ 2.36 fps)

Summary for Pond 6P: Hydrodynamic Separator WQv=1.52cfs, 100-year=4.34cfs

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 1.79" for 1-Year event
Inflow = 1.74 cfs @ 12.08 hrs, Volume= 0.122 af
Outflow = 1.74 cfs @ 12.08 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min
Primary = 1.74 cfs @ 12.08 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 301.36' @ 12.08 hrs
Flood Elev= 303.78'

Device	Routing	Invert	Outlet Devices
#1	Primary	300.52'	**12.0" Round Culvert** L= 34.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.52' / 300.00' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.74 cfs @ 12.08 hrs HW=301.36' (Free Discharge)
1=Culvert (Inlet Controls 1.74 cfs @ 2.46 fps)

Summary for Pond 7P: Sewer Bypass Structure

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 2.55" for 1-Year event
Inflow = 0.23 cfs @ 12.02 hrs, Volume= 0.015 af
Outflow = 0.23 cfs @ 12.02 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.1 min
Primary = 0.15 cfs @ 12.02 hrs, Volume= 0.015 af
Secondary = 0.08 cfs @ 12.02 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 302.90' @ 12.02 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 1.3 min calculated for 0.015 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (756.6 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1	302.53'	0.001 af	**4.00'D x 2.47'H 4' Bypass Manhole**

Device	Routing	Invert	Outlet Devices
#1	Primary	302.53'	**4.0" Round 4" PVC (to sewer)** L= 26.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 300.96' S= 0.0586 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	302.53'	**12.0" Round 12" HDPE (to storm)** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 301.07' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	302.86'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.15 cfs @ 12.02 hrs HW=302.90' (Free Discharge)
└**1=4" PVC (to sewer)** (Inlet Controls 0.15 cfs @ 1.70 fps)

Secondary OutFlow Max=0.08 cfs @ 12.02 hrs HW=302.90' (Free Discharge)
└**2=12" HDPE (to storm)** (Passes 0.08 cfs of 0.42 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.08 cfs @ 0.53 fps)

Summary for Pond 9P: Bypass Manhole

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 1.79" for 1-Year event
Inflow = 1.74 cfs @ 12.08 hrs, Volume= 0.122 af
Outflow = 1.74 cfs @ 12.08 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min
Primary = 1.74 cfs @ 12.08 hrs, Volume= 0.122 af
Secondary = 0.01 cfs @ 12.08 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 301.49' @ 12.08 hrs
Flood Elev= 303.84'

Device	Routing	Invert	Outlet Devices
#1	Secondary	301.45'	**12.0" Round 12" HDPE** L= 35.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.45' / 300.00' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	300.56'	**12.0" Round 12" HDPE** L= 2.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.56' / 300.52' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.74 cfs @ 12.08 hrs HW=301.49' (Free Discharge)
└**2=12" HDPE** (Barrel Controls 1.74 cfs @ 2.98 fps)

Secondary OutFlow Max=0.00 cfs @ 12.08 hrs HW=301.49' (Free Discharge)
└**1=12" HDPE** (Inlet Controls 0.00 cfs @ 0.51 fps)

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Watershed 1 Runoff Area=74,951 sf 8.11% Impervious Runoff Depth=2.48"
Flow Length=308' Tc=18.5 min CN=74 Runoff=3.46 cfs 0.355 af

Subcatchment 1A: Watershed 1A - Parking Runoff Area=35,601 sf 76.59% Impervious Runoff Depth=4.01"
Flow Length=190' Tc=5.6 min CN=90 Runoff=3.75 cfs 0.273 af

Subcatchment 1A-1: Watershed 1A-1 - Runoff Area=1,328 sf 100.00% Impervious Runoff Depth=4.90"
Flow Length=171' Slope=0.0100 '/' Tc=1.2 min CN=98 Runoff=0.18 cfs 0.012 af

Subcatchment 1A-2: Watershed 1A-2 - Runoff Area=1,807 sf 100.00% Impervious Runoff Depth=4.90"
Flow Length=257' Slope=0.0100 '/' Tc=1.7 min CN=98 Runoff=0.24 cfs 0.017 af

Subcatchment 1B: Watershed 1B - Roof Runoff Area=20,865 sf 100.00% Impervious Runoff Depth=4.90"
Tc=1.0 min CN=98 Runoff=2.87 cfs 0.196 af

Subcatchment 2: Watershed 2 Runoff Area=32,413 sf 6.89% Impervious Runoff Depth=1.67"
Flow Length=173' Tc=14.1 min CN=64 Runoff=1.06 cfs 0.104 af

Reach 4" PVC: 4" PVC Sewer Service Avg. Flow Depth=0.15' Max Vel=4.27 fps Inflow=0.16 cfs 0.027 af
4.0" Round Pipe n=0.010 L=184.0' S=0.0249 '/' Capacity=0.39 cfs Outflow=0.16 cfs 0.027 af

Reach DP-1: DP-1 Inflow=6.65 cfs 0.827 af
Outflow=6.65 cfs 0.827 af

Reach DP-2: DP-2 Inflow=1.06 cfs 0.104 af
Outflow=1.06 cfs 0.104 af

Pond 2P: Catch Basin Peak Elev=302.39' Inflow=3.90 cfs 0.276 af
15.0" Round Culvert n=0.013 L=25.5' S=0.0200 '/' Outflow=3.90 cfs 0.276 af

Pond 3P: Organic FIlter (Type F-4) (100% Peak Elev=302.14' Storage=3,936 cf Inflow=3.90 cfs 0.276 af
Outflow=2.49 cfs 0.276 af

Pond 4P: Drainage Manhole Peak Elev=297.29' Inflow=3.56 cfs 0.472 af
18.0" Round Culvert n=0.013 L=76.0' S=0.0099 '/' Outflow=3.56 cfs 0.472 af

Pond 5P: Hydrodynamic Separator WQv=0.89cfs, Peak Elev=302.76' Inflow=2.87 cfs 0.196 af
12.0" Round Culvert n=0.013 L=123.1' S=0.0413 '/' Outflow=2.87 cfs 0.196 af

Pond 6P: Hydrodynamic Separator WQv=1.52cfs, Peak Elev=301.99' Inflow=2.94 cfs 0.267 af
12.0" Round Culvert n=0.013 L=34.7' S=0.0150 '/' Outflow=2.94 cfs 0.267 af

Pond 7P: Sewer Bypass Structure Peak Elev=302.94' Storage=0.000 af Inflow=0.42 cfs 0.029 af
Primary=0.16 cfs 0.027 af Secondary=0.26 cfs 0.003 af Outflow=0.42 cfs 0.029 af

Pond 9P: Bypass Manhole Peak Elev=302.03' Inflow=3.90 cfs 0.276 af
Primary=2.94 cfs 0.267 af Secondary=0.96 cfs 0.009 af Outflow=3.90 cfs 0.276 af

Total Runoff Area = 3.833 ac Runoff Volume = 0.957 af Average Runoff Depth = 3.00"
64.32% Pervious = 2.465 ac 35.68% Impervious = 1.368 ac

Summary for Subcatchment 1: Watershed 1

Runoff = 3.46 cfs @ 12.27 hrs, Volume= 0.355 af, Depth= 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.14"

	Area (sf)	CN	Description
	7,667	55	Woods, Good, HSG B
	34,924	77	Woods, Good, HSG D
	14,224	61	>75% Grass cover, Good, HSG B
	12,059	80	>75% Grass cover, Good, HSG D
	1,928	98	Water Surface, HSG D
*	4,149	98	Parking Lot, Walkways, Buildings etc.
	74,951	74	Weighted Average
	68,874		91.89% Pervious Area
	6,077		8.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	99	0.0404	0.11		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.41"
2.7	161	0.0381	0.98		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.2	48	0.0074	4.09	20.43	**Channel Flow, C->DP-1** Area= 5.0 sf Perim= 7.0' r= 0.71' n= 0.025 Earth, clean & winding
18.5	308	Total			

Summary for Subcatchment 1A: Watershed 1A - Parking Lot

Runoff = 3.75 cfs @ 12.08 hrs, Volume= 0.273 af, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.14"

	Area (sf)	CN	Description
	6,211	61	>75% Grass cover, Good, HSG B
	2,124	80	>75% Grass cover, Good, HSG D
*	27,266	98	Parking Lot, Walkways, Buildings etc.
	35,601	90	Weighted Average
	8,335		23.41% Pervious Area
	27,266		76.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	12	0.0075	0.05		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.1	5	0.1140	1.56		**Sheet Flow, B->C** Smooth surfaces n= 0.011 P2= 3.41"
1.1	82	0.0151	1.22		**Sheet Flow, C->D** Smooth surfaces n= 0.011 P2= 3.41"
0.6	91	0.0176	2.69		**Shallow Concentrated Flow, D->E** Paved Kv= 20.3 fps
5.6	190	Total			

Summary for Subcatchment 1A-1: Watershed 1A-1 - Kennels

Runoff = 0.18 cfs @ 12.02 hrs, Volume= 0.012 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.14"

	Area (sf)	CN	Description
*	1,328	98	Parking Lot, Walkways, Buildings etc.
	1,328		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
0.9	160	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013
1.2	171	Total			

Summary for Subcatchment 1A-2: Watershed 1A-2 - Kennels

Runoff = 0.24 cfs @ 12.02 hrs, Volume= 0.017 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.14"

	Area (sf)	CN	Description
*	1,807	98	Parking Lot, Walkways, Buildings etc.
	1,807		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
1.4	246	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013 Corrugated PE, smooth interior

1.7	257	Total

Summary for Subcatchment 1B: Watershed 1B - Roof Area

Runoff = 2.87 cfs @ 12.01 hrs, Volume= 0.196 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.14"

	Area (sf)	CN	Description
*	20,865	98	Proposed Building
	20,865		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment 2: Watershed 2

Runoff = 1.06 cfs @ 12.21 hrs, Volume= 0.104 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.14"

	Area (sf)	CN	Description
	13,317	58	Woods/grass comb., Good, HSG B
	6,548	67	Brush, Poor, HSG B
	10,314	61	>75% Grass cover, Good, HSG B
	368	98	Water Surface, HSG B
*	1,866	98	Parking Lot, Walkways, Buildings, etc.
	32,413	64	Weighted Average
	30,179		93.11% Pervious Area
	2,234		6.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	77	0.0134	0.10		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.1	32	0.5425	3.68		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.8	64	0.0656	1.28		**Shallow Concentrated Flow, C->DP-2** Woodland Kv= 5.0 fps
14.1	173	Total			

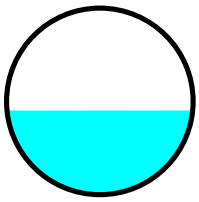
Summary for Reach 4" PVC: 4" PVC Sewer Service

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 4.42" for 10-Year event
Inflow = 0.16 cfs @ 12.02 hrs, Volume= 0.027 af
Outflow = 0.16 cfs @ 12.04 hrs, Volume= 0.027 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.27 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.81 fps, Avg. Travel Time= 1.7 min

Peak Storage= 7 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.39 cfs

4.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 184.0' Slope= 0.0249 '/'
Inlet Invert= 301.31', Outlet Invert= 296.73'



Summary for Reach DP-1: DP-1

Inflow Area = 3.017 ac, 41.25% Impervious, Inflow Depth = 3.29" for 10-Year event
Inflow = 6.65 cfs @ 12.21 hrs, Volume= 0.827 af
Outflow = 6.65 cfs @ 12.21 hrs, Volume= 0.827 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach DP-2: DP-2

Inflow Area = 0.744 ac, 6.89% Impervious, Inflow Depth = 1.67" for 10-Year event
Inflow = 1.06 cfs @ 12.21 hrs, Volume= 0.104 af
Outflow = 1.06 cfs @ 12.21 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Pond 2P: Catch Basin

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 4.05" for 10-Year event
Inflow = 3.90 cfs @ 12.08 hrs, Volume= 0.276 af
Outflow = 3.90 cfs @ 12.08 hrs, Volume= 0.276 af, Atten= 0%, Lag= 0.0 min
Primary = 3.90 cfs @ 12.08 hrs, Volume= 0.276 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 302.39' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	301.07'	**15.0" Round Culvert** L= 25.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.07' / 300.56' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.89 cfs @ 12.08 hrs HW=302.39' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 3.89 cfs @ 3.17 fps)

Summary for Pond 3P: Organic FIlter (Type F-4) (100% WQv)

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 4.05" for 10-Year event
Inflow = 3.90 cfs @ 12.08 hrs, Volume= 0.276 af
Outflow = 2.49 cfs @ 12.17 hrs, Volume= 0.276 af, Atten= 36%, Lag= 5.4 min
Primary = 2.49 cfs @ 12.17 hrs, Volume= 0.276 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 302.14' @ 12.17 hrs Surf.Area= 2,466 sf Storage= 3,936 cf

Plug-Flow detention time= 233.6 min calculated for 0.276 af (100% of inflow)
Center-of-Mass det. time= 233.7 min (1,022.4 - 788.7)

Volume	Invert	Avail.Storage	Storage Description
#1	300.00'	6,298 cf	**Organic Filter (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
300.00	1,262	0	0	1,262
301.00	1,794	1,520	1,520	1,812
302.00	2,381	2,081	3,601	2,420
303.00	3,026	2,697	6,298	3,091

Device	Routing	Invert	Outlet Devices
#1	Primary	296.98'	**12.0" Round 12" HDPE (OUT)** L= 17.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 296.98' / 296.25' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	302.15'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	301.55'	**0.5' long x 3.0' breadth Broad-Crested Rectangular Weir X 4.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Device 1	300.00'	**1.375 in/hr Exfiltration over Surface area**

Primary OutFlow Max=2.49 cfs @ 12.17 hrs HW=302.14' (Free Discharge)
└**1=12" HDPE (OUT)** (Passes 2.49 cfs of 6.44 cfs potential flow)
  ├**2=Grate** (Controls 0.00 cfs)
  ├**3=Broad-Crested Rectangular Weir** (Weir Controls 2.41 cfs @ 2.05 fps)
  └**4=Exfiltration** (Exfiltration Controls 0.08 cfs)

Summary for Pond 4P: Drainage Manhole

Inflow Area = 1.296 ac, 85.24% Impervious, Inflow Depth = 4.37" for 10-Year event
Inflow = 3.56 cfs @ 12.15 hrs, Volume= 0.472 af
Outflow = 3.56 cfs @ 12.15 hrs, Volume= 0.472 af, Atten= 0%, Lag= 0.0 min
Primary = 3.56 cfs @ 12.15 hrs, Volume= 0.472 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 297.29' @ 12.15 hrs
Flood Elev= 303.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.25'	**18.0" Round Culvert** L= 76.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 296.25' / 295.50' S= 0.0099 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.56 cfs @ 12.15 hrs HW=297.29' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.56 cfs @ 2.73 fps)

Summary for Pond 5P: Hydrodynamic Separator WQv=0.89cfs, 100-year=5.21cfs

Inflow Area = 0.479 ac,100.00% Impervious, Inflow Depth = 4.90" for 10-Year event
Inflow = 2.87 cfs @ 12.01 hrs, Volume= 0.196 af
Outflow = 2.87 cfs @ 12.01 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min
Primary = 2.87 cfs @ 12.01 hrs, Volume= 0.196 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 302.76' @ 12.01 hrs
Flood Elev= 307.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	301.34'	**12.0" Round 12" HDPE (OUT)** L= 123.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.34' / 296.25' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.85 cfs @ 12.01 hrs HW=302.75' (Free Discharge)
└**1=12" HDPE (OUT)** (Inlet Controls 2.85 cfs @ 3.63 fps)

Summary for Pond 6P: Hydrodynamic Separator WQv=1.52cfs, 100-year=4.34cfs

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 3.92" for 10-Year event
Inflow = 2.94 cfs @ 12.08 hrs, Volume= 0.267 af
Outflow = 2.94 cfs @ 12.08 hrs, Volume= 0.267 af, Atten= 0%, Lag= 0.0 min
Primary = 2.94 cfs @ 12.08 hrs, Volume= 0.267 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 301.99' @ 12.08 hrs
Flood Elev= 303.78'

Device	Routing	Invert	Outlet Devices
#1	Primary	300.52'	**12.0" Round Culvert** L= 34.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.52' / 300.00' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.94 cfs @ 12.08 hrs HW=301.99' (Free Discharge)
1=Culvert (Inlet Controls 2.94 cfs @ 3.74 fps)

Summary for Pond 7P: Sewer Bypass Structure

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 4.90" for 10-Year event
Inflow = 0.42 cfs @ 12.02 hrs, Volume= 0.029 af
Outflow = 0.42 cfs @ 12.02 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.02 hrs, Volume= 0.027 af
Secondary = 0.26 cfs @ 12.02 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 302.94' @ 12.02 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 1.0 min calculated for 0.029 af (100% of inflow)
Center-of-Mass det. time= 1.0 min (744.4 - 743.4)

Volume	Invert	Avail.Storage	Storage Description
#1	302.53'	0.001 af	**4.00'D x 2.47'H 4' Bypass Manhole**

Device	Routing	Invert	Outlet Devices
#1	Primary	302.53'	**4.0" Round 4" PVC (to sewer)** L= 26.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 300.96' S= 0.0586 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	302.53'	**12.0" Round 12" HDPE (to storm)** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 301.07' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	302.86'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.16 cfs @ 12.02 hrs HW=302.94' (Free Discharge)
└**1=4" PVC (to sewer)** (Inlet Controls 0.16 cfs @ 1.88 fps)

Secondary OutFlow Max=0.26 cfs @ 12.02 hrs HW=302.94' (Free Discharge)
└**2=12" HDPE (to storm)** (Passes 0.26 cfs of 0.52 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.26 cfs @ 0.79 fps)

Summary for Pond 9P: Bypass Manhole

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 4.05" for 10-Year event
Inflow = 3.90 cfs @ 12.08 hrs, Volume= 0.276 af
Outflow = 3.90 cfs @ 12.08 hrs, Volume= 0.276 af, Atten= 0%, Lag= 0.0 min
Primary = 2.94 cfs @ 12.08 hrs, Volume= 0.267 af
Secondary = 0.96 cfs @ 12.08 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 302.03' @ 12.08 hrs
Flood Elev= 303.84'

Device	Routing	Invert	Outlet Devices
#1	Secondary	301.45'	**12.0" Round 12" HDPE** L= 35.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.45' / 300.00' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	300.56'	**12.0" Round 12" HDPE** L= 2.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.56' / 300.52' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.94 cfs @ 12.08 hrs HW=302.03' (Free Discharge)
└**2=12" HDPE** (Inlet Controls 2.94 cfs @ 3.74 fps)

Secondary OutFlow Max=0.96 cfs @ 12.08 hrs HW=302.03' (Free Discharge)
└**1=12" HDPE** (Inlet Controls 0.96 cfs @ 2.04 fps)

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Watershed 1 Runoff Area=74,951 sf 8.11% Impervious Runoff Depth=3.60"
Flow Length=308' Tc=18.5 min CN=74 Runoff=5.05 cfs 0.516 af

Subcatchment 1A: Watershed 1A - Parking Runoff Area=35,601 sf 76.59% Impervious Runoff Depth=5.32"
Flow Length=190' Tc=5.6 min CN=90 Runoff=4.91 cfs 0.363 af

Subcatchment 1A-1: Watershed 1A-1 - Runoff Area=1,328 sf 100.00% Impervious Runoff Depth=6.25"
Flow Length=171' Slope=0.0100 '/' Tc=1.2 min CN=98 Runoff=0.23 cfs 0.016 af

Subcatchment 1A-2: Watershed 1A-2 - Runoff Area=1,807 sf 100.00% Impervious Runoff Depth=6.25"
Flow Length=257' Slope=0.0100 '/' Tc=1.7 min CN=98 Runoff=0.31 cfs 0.022 af

Subcatchment 1B: Watershed 1B - Roof Runoff Area=20,865 sf 100.00% Impervious Runoff Depth=6.25"
Tc=1.0 min CN=98 Runoff=3.63 cfs 0.250 af

Subcatchment 2: Watershed 2 Runoff Area=32,413 sf 6.89% Impervious Runoff Depth=2.62"
Flow Length=173' Tc=14.1 min CN=64 Runoff=1.73 cfs 0.162 af

Reach 4" PVC: 4" PVC Sewer Service Avg. Flow Depth=0.15' Max Vel=4.32 fps Inflow=0.17 cfs 0.032 af
4.0" Round Pipe n=0.010 L=184.0' S=0.0249 '/' Capacity=0.39 cfs Outflow=0.17 cfs 0.032 af

Reach DP-1: DP-1 Inflow=9.68 cfs 1.134 af
Outflow=9.68 cfs 1.134 af

Reach DP-2: DP-2 Inflow=1.73 cfs 0.162 af
Outflow=1.73 cfs 0.162 af

Pond 2P: Catch Basin Peak Elev=302.90' Inflow=5.13 cfs 0.368 af
15.0" Round Culvert n=0.013 L=25.5' S=0.0200 '/' Outflow=5.13 cfs 0.368 af

Pond 3P: Organic FIlter (Type F-4) (100% Peak Elev=302.26' Storage=4,233 cf Inflow=5.13 cfs 0.368 af
Outflow=4.64 cfs 0.368 af

Pond 4P: Drainage Manhole Peak Elev=297.93' Inflow=6.46 cfs 0.617 af
18.0" Round Culvert n=0.013 L=76.0' S=0.0099 '/' Outflow=6.46 cfs 0.617 af

Pond 5P: Hydrodynamic Separator WQv=0.89cfs, Peak Elev=303.32' Inflow=3.63 cfs 0.250 af
12.0" Round Culvert n=0.013 L=123.1' S=0.0413 '/' Outflow=3.63 cfs 0.250 af

Pond 6P: Hydrodynamic Separator WQv=1.52cfs, Peak Elev=302.27' Inflow=3.34 cfs 0.346 af
12.0" Round Culvert n=0.013 L=34.7' S=0.0150 '/' Outflow=3.34 cfs 0.346 af

Pond 7P: Sewer Bypass Structure Peak Elev=302.96' Storage=0.000 af Inflow=0.54 cfs 0.037 af
Primary=0.17 cfs 0.032 af Secondary=0.37 cfs 0.005 af Outflow=0.54 cfs 0.037 af

Pond 9P: Bypass Manhole Peak Elev=302.31' Inflow=5.13 cfs 0.368 af
Primary=3.34 cfs 0.346 af Secondary=1.79 cfs 0.022 af Outflow=5.13 cfs 0.368 af

Total Runoff Area = 3.833 ac Runoff Volume = 1.328 af Average Runoff Depth = 4.16"
64.32% Pervious = 2.465 ac 35.68% Impervious = 1.368 ac

Summary for Subcatchment 1: Watershed 1

Runoff = 5.05 cfs @ 12.25 hrs, Volume= 0.516 af, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.49"

	Area (sf)	CN	Description
	7,667	55	Woods, Good, HSG B
	34,924	77	Woods, Good, HSG D
	14,224	61	>75% Grass cover, Good, HSG B
	12,059	80	>75% Grass cover, Good, HSG D
	1,928	98	Water Surface, HSG D
*	4,149	98	Parking Lot, Walkways, Buildings etc.
	74,951	74	Weighted Average
	68,874		91.89% Pervious Area
	6,077		8.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	99	0.0404	0.11		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.41"
2.7	161	0.0381	0.98		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.2	48	0.0074	4.09	20.43	**Channel Flow, C->DP-1** Area= 5.0 sf Perim= 7.0' r= 0.71' n= 0.025 Earth, clean & winding
18.5	308	Total			

Summary for Subcatchment 1A: Watershed 1A - Parking Lot

Runoff = 4.91 cfs @ 12.08 hrs, Volume= 0.363 af, Depth= 5.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.49"

	Area (sf)	CN	Description
	6,211	61	>75% Grass cover, Good, HSG B
	2,124	80	>75% Grass cover, Good, HSG D
*	27,266	98	Parking Lot, Walkways, Buildings etc.
	35,601	90	Weighted Average
	8,335		23.41% Pervious Area
	27,266		76.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	12	0.0075	0.05		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.1	5	0.1140	1.56		**Sheet Flow, B->C** Smooth surfaces n= 0.011 P2= 3.41"
1.1	82	0.0151	1.22		**Sheet Flow, C->D** Smooth surfaces n= 0.011 P2= 3.41"
0.6	91	0.0176	2.69		**Shallow Concentrated Flow, D->E** Paved Kv= 20.3 fps
5.6	190	Total			

Summary for Subcatchment 1A-1: Watershed 1A-1 - Kennels

Runoff = 0.23 cfs @ 12.02 hrs, Volume= 0.016 af, Depth= 6.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.49"

	Area (sf)	CN	Description
*	1,328	98	Parking Lot, Walkways, Buildings etc.
	1,328		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
0.9	160	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013
1.2	171	Total			

Summary for Subcatchment 1A-2: Watershed 1A-2 - Kennels

Runoff = 0.31 cfs @ 12.02 hrs, Volume= 0.022 af, Depth= 6.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.49"

	Area (sf)	CN	Description
*	1,807	98	Parking Lot, Walkways, Buildings etc.
	1,807		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
1.4	246	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013 Corrugated PE, smooth interior

1.7	257	Total

Summary for Subcatchment 1B: Watershed 1B - Roof Area

Runoff = 3.63 cfs @ 12.01 hrs, Volume= 0.250 af, Depth= 6.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.49"

	Area (sf)	CN	Description
*	20,865	98	Proposed Building
	20,865		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment 2: Watershed 2

Runoff = 1.73 cfs @ 12.20 hrs, Volume= 0.162 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.49"

	Area (sf)	CN	Description
	13,317	58	Woods/grass comb., Good, HSG B
	6,548	67	Brush, Poor, HSG B
	10,314	61	>75% Grass cover, Good, HSG B
	368	98	Water Surface, HSG B
*	1,866	98	Parking Lot, Walkways, Buildings, etc.
	32,413	64	Weighted Average
	30,179		93.11% Pervious Area
	2,234		6.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	77	0.0134	0.10		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.1	32	0.5425	3.68		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.8	64	0.0656	1.28		**Shallow Concentrated Flow, C->DP-2** Woodland Kv= 5.0 fps
14.1	173	Total			

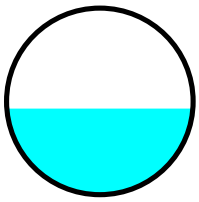
Summary for Reach 4" PVC: 4" PVC Sewer Service

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 5.40" for 25-Year event
Inflow = 0.17 cfs @ 12.02 hrs, Volume= 0.032 af
Outflow = 0.17 cfs @ 12.04 hrs, Volume= 0.032 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.32 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.94 fps, Avg. Travel Time= 1.6 min

Peak Storage= 7 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.39 cfs

4.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 184.0' Slope= 0.0249 '/'
Inlet Invert= 301.31', Outlet Invert= 296.73'



Summary for Reach DP-1: DP-1

Inflow Area = 3.017 ac, 41.25% Impervious, Inflow Depth = 4.51" for 25-Year event
Inflow = 9.68 cfs @ 12.14 hrs, Volume= 1.134 af
Outflow = 9.68 cfs @ 12.14 hrs, Volume= 1.134 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach DP-2: DP-2

Inflow Area = 0.744 ac, 6.89% Impervious, Inflow Depth = 2.62" for 25-Year event
Inflow = 1.73 cfs @ 12.20 hrs, Volume= 0.162 af
Outflow = 1.73 cfs @ 12.20 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Pond 2P: Catch Basin

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 5.40" for 25-Year event
Inflow = 5.13 cfs @ 12.08 hrs, Volume= 0.368 af
Outflow = 5.13 cfs @ 12.08 hrs, Volume= 0.368 af, Atten= 0%, Lag= 0.0 min
Primary = 5.13 cfs @ 12.08 hrs, Volume= 0.368 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 302.90' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	301.07'	**15.0" Round Culvert** L= 25.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.07' / 300.56' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=5.12 cfs @ 12.08 hrs HW=302.90' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 5.12 cfs @ 4.17 fps)

Summary for Pond 3P: Organic FIlter (Type F-4) (100% WQv)

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 5.40" for 25-Year event
Inflow = 5.13 cfs @ 12.08 hrs, Volume= 0.368 af
Outflow = 4.64 cfs @ 12.11 hrs, Volume= 0.368 af, Atten= 9%, Lag= 2.2 min
Primary = 4.64 cfs @ 12.11 hrs, Volume= 0.368 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 302.26' @ 12.11 hrs Surf.Area= 2,539 sf Storage= 4,233 cf

Plug-Flow detention time= 193.3 min calculated for 0.368 af (100% of inflow)
Center-of-Mass det. time= 193.5 min (974.5 - 781.0)

Volume	Invert	Avail.Storage	Storage Description
#1	300.00'	6,298 cf	**Organic Filter (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
300.00	1,262	0	0	1,262
301.00	1,794	1,520	1,520	1,812
302.00	2,381	2,081	3,601	2,420
303.00	3,026	2,697	6,298	3,091

Device	Routing	Invert	Outlet Devices
#1	Primary	296.98'	**12.0" Round 12" HDPE (OUT)** L= 17.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 296.98' / 296.25' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	302.15'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	301.55'	**0.5' long x 3.0' breadth Broad-Crested Rectangular Weir X 4.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Device 1	300.00'	**1.375 in/hr Exfiltration over Surface area**

Primary OutFlow Max=4.63 cfs @ 12.11 hrs HW=302.26' (Free Discharge)
└**1=12" HDPE (OUT)** (Passes 4.63 cfs of 6.53 cfs potential flow)
  ├**2=Grate** (Weir Controls 1.37 cfs @ 1.07 fps)
  ├**3=Broad-Crested Rectangular Weir** (Weir Controls 3.18 cfs @ 2.25 fps)
  └**4=Exfiltration** (Exfiltration Controls 0.08 cfs)

Summary for Pond 4P: Drainage Manhole

Inflow Area = 1.296 ac, 85.24% Impervious, Inflow Depth = 5.71" for 25-Year event
Inflow = 6.46 cfs @ 12.09 hrs, Volume= 0.617 af
Outflow = 6.46 cfs @ 12.09 hrs, Volume= 0.617 af, Atten= 0%, Lag= 0.0 min
Primary = 6.46 cfs @ 12.09 hrs, Volume= 0.617 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 297.93' @ 12.09 hrs
Flood Elev= 303.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.25'	**18.0" Round Culvert** L= 76.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 296.25' / 295.50' S= 0.0099 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.46 cfs @ 12.09 hrs HW=297.92' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.46 cfs @ 3.66 fps)

Summary for Pond 5P: Hydrodynamic Separator WQv=0.89cfs, 100-year=5.21cfs

Inflow Area = 0.479 ac,100.00% Impervious, Inflow Depth = 6.25" for 25-Year event
Inflow = 3.63 cfs @ 12.01 hrs, Volume= 0.250 af
Outflow = 3.63 cfs @ 12.01 hrs, Volume= 0.250 af, Atten= 0%, Lag= 0.0 min
Primary = 3.63 cfs @ 12.01 hrs, Volume= 0.250 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 303.32' @ 12.01 hrs
Flood Elev= 307.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	301.34'	**12.0" Round 12" HDPE (OUT)** L= 123.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.34' / 296.25' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.61 cfs @ 12.01 hrs HW=303.30' (Free Discharge)
└**1=12" HDPE (OUT)** (Inlet Controls 3.61 cfs @ 4.59 fps)

Summary for Pond 6P: Hydrodynamic Separator WQv=1.52cfs, 100-year=4.34cfs

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 5.08" for 25-Year event
Inflow = 3.34 cfs @ 12.08 hrs, Volume= 0.346 af
Outflow = 3.34 cfs @ 12.08 hrs, Volume= 0.346 af, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.08 hrs, Volume= 0.346 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 302.27' @ 12.08 hrs
Flood Elev= 303.78'

Device	Routing	Invert	Outlet Devices
#1	Primary	300.52'	**12.0" Round Culvert** L= 34.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.52' / 300.00' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.33 cfs @ 12.08 hrs HW=302.27' (Free Discharge)
1=Culvert (Inlet Controls 3.33 cfs @ 4.25 fps)

Summary for Pond 7P: Sewer Bypass Structure

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 6.25" for 25-Year event
Inflow = 0.54 cfs @ 12.02 hrs, Volume= 0.037 af
Outflow = 0.54 cfs @ 12.02 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.17 cfs @ 12.02 hrs, Volume= 0.032 af
Secondary = 0.37 cfs @ 12.02 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 302.96' @ 12.02 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.9 min calculated for 0.037 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (740.7 - 739.8)

Volume	Invert	Avail.Storage	Storage Description
#1	302.53'	0.001 af	**4.00'D x 2.47'H 4' Bypass Manhole**

Device	Routing	Invert	Outlet Devices
#1	Primary	302.53'	**4.0" Round 4" PVC (to sewer)** L= 26.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 300.96' S= 0.0586 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	302.53'	**12.0" Round 12" HDPE (to storm)** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 301.07' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	302.86'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.17 cfs @ 12.02 hrs HW=302.96' (Free Discharge)
└**1=4" PVC (to sewer)** (Inlet Controls 0.17 cfs @ 1.96 fps)

Secondary OutFlow Max=0.36 cfs @ 12.02 hrs HW=302.96' (Free Discharge)
└**2=12" HDPE (to storm)** (Passes 0.36 cfs of 0.57 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.36 cfs @ 0.89 fps)

Summary for Pond 9P: Bypass Manhole

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 5.40" for 25-Year event
Inflow = 5.13 cfs @ 12.08 hrs, Volume= 0.368 af
Outflow = 5.13 cfs @ 12.08 hrs, Volume= 0.368 af, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.08 hrs, Volume= 0.346 af
Secondary = 1.79 cfs @ 12.08 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 302.31' @ 12.08 hrs
Flood Elev= 303.84'

Device	Routing	Invert	Outlet Devices
#1	Secondary	301.45'	**12.0" Round 12" HDPE** L= 35.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.45' / 300.00' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	300.56'	**12.0" Round 12" HDPE** L= 2.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.56' / 300.52' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.33 cfs @ 12.08 hrs HW=302.31' (Free Discharge)
└**2=12" HDPE** (Inlet Controls 3.33 cfs @ 4.25 fps)

Secondary OutFlow Max=1.78 cfs @ 12.08 hrs HW=302.31' (Free Discharge)
└**1=12" HDPE** (Inlet Controls 1.78 cfs @ 2.49 fps)

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Watershed 1 Runoff Area=74,951 sf 8.11% Impervious Runoff Depth=6.09"
Flow Length=308' Tc=18.5 min CN=74 Runoff=8.52 cfs 0.874 af

Subcatchment 1A: Watershed 1A - Parking Runoff Area=35,601 sf 76.59% Impervious Runoff Depth=8.08"
Flow Length=190' Tc=5.6 min CN=90 Runoff=7.27 cfs 0.550 af

Subcatchment 1A-1: Watershed 1A-1 - Runoff Area=1,328 sf 100.00% Impervious Runoff Depth=9.05"
Flow Length=171' Slope=0.0100 '/' Tc=1.2 min CN=98 Runoff=0.33 cfs 0.023 af

Subcatchment 1A-2: Watershed 1A-2 - Runoff Area=1,807 sf 100.00% Impervious Runoff Depth=9.05"
Flow Length=257' Slope=0.0100 '/' Tc=1.7 min CN=98 Runoff=0.44 cfs 0.031 af

Subcatchment 1B: Watershed 1B - Roof Runoff Area=20,865 sf 100.00% Impervious Runoff Depth=9.05"
Tc=1.0 min CN=98 Runoff=5.21 cfs 0.361 af

Subcatchment 2: Watershed 2 Runoff Area=32,413 sf 6.89% Impervious Runoff Depth=4.83"
Flow Length=173' Tc=14.1 min CN=64 Runoff=3.26 cfs 0.300 af

Reach 4" PVC: 4" PVC Sewer Service Avg. Flow Depth=0.16' Max Vel=4.40 fps Inflow=0.18 cfs 0.044 af
4.0" Round Pipe n=0.010 L=184.0' S=0.0249 '/' Capacity=0.39 cfs Outflow=0.18 cfs 0.044 af

Reach DP-1: DP-1 Inflow=15.85 cfs 1.796 af
Outflow=15.85 cfs 1.796 af

Reach DP-2: DP-2 Inflow=3.26 cfs 0.300 af
Outflow=3.26 cfs 0.300 af

Pond 2P: Catch Basin Peak Elev=304.38' Inflow=7.65 cfs 0.561 af
15.0" Round Culvert n=0.013 L=25.5' S=0.0200 '/' Outflow=7.65 cfs 0.561 af

Pond 3P: Organic FIlter (Type F-4) (100% Peak Elev=302.39' Storage=4,582 cf Inflow=7.65 cfs 0.561 af
Outflow=6.62 cfs 0.561 af

Pond 4P: Drainage Manhole Peak Elev=299.43' Inflow=10.47 cfs 0.922 af
18.0" Round Culvert n=0.013 L=76.0' S=0.0099 '/' Outflow=10.47 cfs 0.922 af

Pond 5P: Hydrodynamic Separator WQv=0.89cfs, Peak Elev=304.88' Inflow=5.21 cfs 0.361 af
12.0" Round Culvert n=0.013 L=123.1' S=0.0413 '/' Outflow=5.21 cfs 0.361 af

Pond 6P: Hydrodynamic Separator WQv=1.52cfs, Peak Elev=303.14' Inflow=4.34 cfs 0.504 af
12.0" Round Culvert n=0.013 L=34.7' S=0.0150 '/' Outflow=4.34 cfs 0.504 af

Pond 7P: Sewer Bypass Structure Peak Elev=303.00' Storage=0.000 af Inflow=0.77 cfs 0.054 af
Primary=0.18 cfs 0.044 af Secondary=0.59 cfs 0.010 af Outflow=0.77 cfs 0.054 af

Pond 9P: Bypass Manhole Peak Elev=303.18' Inflow=7.65 cfs 0.561 af
Primary=4.34 cfs 0.504 af Secondary=3.30 cfs 0.057 af Outflow=7.65 cfs 0.561 af

Total Runoff Area = 3.833 ac Runoff Volume = 2.139 af Average Runoff Depth = 6.70"
64.32% Pervious = 2.465 ac 35.68% Impervious = 1.368 ac

Summary for Subcatchment 1: Watershed 1

Runoff = 8.52 cfs @ 12.25 hrs, Volume= 0.874 af, Depth= 6.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
	7,667	55	Woods, Good, HSG B
	34,924	77	Woods, Good, HSG D
	14,224	61	>75% Grass cover, Good, HSG B
	12,059	80	>75% Grass cover, Good, HSG D
	1,928	98	Water Surface, HSG D
*	4,149	98	Parking Lot, Walkways, Buildings etc.
	74,951	74	Weighted Average
	68,874		91.89% Pervious Area
	6,077		8.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	99	0.0404	0.11		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.41"
2.7	161	0.0381	0.98		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.2	48	0.0074	4.09	20.43	**Channel Flow, C->DP-1** Area= 5.0 sf Perim= 7.0' r= 0.71' n= 0.025 Earth, clean & winding
18.5	308	Total			

Summary for Subcatchment 1A: Watershed 1A - Parking Lot

Runoff = 7.27 cfs @ 12.08 hrs, Volume= 0.550 af, Depth= 8.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
	6,211	61	>75% Grass cover, Good, HSG B
	2,124	80	>75% Grass cover, Good, HSG D
*	27,266	98	Parking Lot, Walkways, Buildings etc.
	35,601	90	Weighted Average
	8,335		23.41% Pervious Area
	27,266		76.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	12	0.0075	0.05		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.1	5	0.1140	1.56		**Sheet Flow, B->C** Smooth surfaces n= 0.011 P2= 3.41"
1.1	82	0.0151	1.22		**Sheet Flow, C->D** Smooth surfaces n= 0.011 P2= 3.41"
0.6	91	0.0176	2.69		**Shallow Concentrated Flow, D->E** Paved Kv= 20.3 fps
5.6	190	Total			

Summary for Subcatchment 1A-1: Watershed 1A-1 - Kennels

Runoff = 0.33 cfs @ 12.02 hrs, Volume= 0.023 af, Depth= 9.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
*	1,328	98	Parking Lot, Walkways, Buildings etc.
	1,328		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
0.9	160	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013
1.2	171	Total			

Summary for Subcatchment 1A-2: Watershed 1A-2 - Kennels

Runoff = 0.44 cfs @ 12.02 hrs, Volume= 0.031 af, Depth= 9.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
*	1,807	98	Parking Lot, Walkways, Buildings etc.
	1,807		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
1.4	246	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013 Corrugated PE, smooth interior

1.7	257	Total

Summary for Subcatchment 1B: Watershed 1B - Roof Area

Runoff = 5.21 cfs @ 12.01 hrs, Volume= 0.361 af, Depth= 9.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
*	20,865	98	Proposed Building
	20,865		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment 2: Watershed 2

Runoff = 3.26 cfs @ 12.20 hrs, Volume= 0.300 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
	13,317	58	Woods/grass comb., Good, HSG B
	6,548	67	Brush, Poor, HSG B
	10,314	61	>75% Grass cover, Good, HSG B
	368	98	Water Surface, HSG B
*	1,866	98	Parking Lot, Walkways, Buildings, etc.
	32,413	64	Weighted Average
	30,179		93.11% Pervious Area
	2,234		6.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	77	0.0134	0.10		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.1	32	0.5425	3.68		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.8	64	0.0656	1.28		**Shallow Concentrated Flow, C->DP-2** Woodland Kv= 5.0 fps
14.1	173	Total			

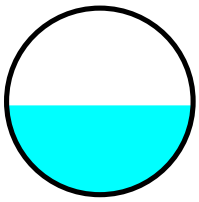
Summary for Reach 4" PVC: 4" PVC Sewer Service

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 7.30" for 100-Year event
Inflow = 0.18 cfs @ 12.02 hrs, Volume= 0.044 af
Outflow = 0.18 cfs @ 12.04 hrs, Volume= 0.044 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.40 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.15 fps, Avg. Travel Time= 1.4 min

Peak Storage= 8 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.39 cfs

4.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 184.0' Slope= 0.0249 '/'
Inlet Invert= 301.31', Outlet Invert= 296.73'



Summary for Reach DP-1: DP-1

Inflow Area = 3.017 ac, 41.25% Impervious, Inflow Depth = 7.14" for 100-Year event
Inflow = 15.85 cfs @ 12.17 hrs, Volume= 1.796 af
Outflow = 15.85 cfs @ 12.17 hrs, Volume= 1.796 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach DP-2: DP-2

Inflow Area = 0.744 ac, 6.89% Impervious, Inflow Depth = 4.83" for 100-Year event
Inflow = 3.26 cfs @ 12.20 hrs, Volume= 0.300 af
Outflow = 3.26 cfs @ 12.20 hrs, Volume= 0.300 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Pond 2P: Catch Basin

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 8.23" for 100-Year event
Inflow = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af
Outflow = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af, Atten= 0%, Lag= 0.0 min
Primary = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 304.38' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	301.07'	**15.0" Round Culvert** L= 25.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.07' / 300.56' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=7.63 cfs @ 12.07 hrs HW=304.37' (Free Discharge)
1=Culvert (Inlet Controls 7.63 cfs @ 6.22 fps)

Summary for Pond 3P: Organic FIlter (Type F-4) (100% WQv)

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 8.23" for 100-Year event
Inflow = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af
Outflow = 6.62 cfs @ 12.12 hrs, Volume= 0.561 af, Atten= 13%, Lag= 2.7 min
Primary = 6.62 cfs @ 12.12 hrs, Volume= 0.561 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 302.39' @ 12.12 hrs Surf.Area= 2,625 sf Storage= 4,582 cf

Plug-Flow detention time= 142.7 min calculated for 0.561 af (100% of inflow)
Center-of-Mass det. time= 142.7 min (913.0 - 770.4)

Volume	Invert	Avail.Storage	Storage Description
#1	300.00'	6,298 cf	**Organic Filter (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
300.00	1,262	0	0	1,262
301.00	1,794	1,520	1,520	1,812
302.00	2,381	2,081	3,601	2,420
303.00	3,026	2,697	6,298	3,091

Device	Routing	Invert	Outlet Devices
#1	Primary	296.98'	**12.0" Round 12" HDPE (OUT)** L= 17.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 296.98' / 296.25' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	302.15'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	301.55'	**0.5' long x 3.0' breadth Broad-Crested Rectangular Weir X 4.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Device 1	300.00'	**1.375 in/hr Exfiltration over Surface area**

Primary OutFlow Max=6.62 cfs @ 12.12 hrs HW=302.39' (Free Discharge)
└**1=12" HDPE (OUT)** (Inlet Controls 6.62 cfs @ 8.42 fps)
  ├**2=Grate** (Passes < 4.67 cfs potential flow)
  ├**3=Broad-Crested Rectangular Weir** (Passes < 4.12 cfs potential flow)
  └**4=Exfiltration** (Passes < 0.08 cfs potential flow)

Summary for Pond 4P: Drainage Manhole

Inflow Area = 1.296 ac, 85.24% Impervious, Inflow Depth = 8.53" for 100-Year event
Inflow = 10.47 cfs @ 12.05 hrs, Volume= 0.922 af
Outflow = 10.47 cfs @ 12.05 hrs, Volume= 0.922 af, Atten= 0%, Lag= 0.0 min
Primary = 10.47 cfs @ 12.05 hrs, Volume= 0.922 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 299.43' @ 12.05 hrs
Flood Elev= 303.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.25'	**18.0" Round Culvert** L= 76.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 296.25' / 295.50' S= 0.0099 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=10.46 cfs @ 12.05 hrs HW=299.43' (Free Discharge)
└**1=Culvert** (Inlet Controls 10.46 cfs @ 5.92 fps)

Summary for Pond 5P: Hydrodynamic Separator WQv=0.89cfs, 100-year=5.21cfs

Inflow Area = 0.479 ac,100.00% Impervious, Inflow Depth = 9.05" for 100-Year event
Inflow = 5.21 cfs @ 12.01 hrs, Volume= 0.361 af
Outflow = 5.21 cfs @ 12.01 hrs, Volume= 0.361 af, Atten= 0%, Lag= 0.0 min
Primary = 5.21 cfs @ 12.01 hrs, Volume= 0.361 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 304.88' @ 12.01 hrs
Flood Elev= 307.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	301.34'	**12.0" Round 12" HDPE (OUT)** L= 123.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.34' / 296.25' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.17 cfs @ 12.01 hrs HW=304.84' (Free Discharge)
└**1=12" HDPE (OUT)** (Inlet Controls 5.17 cfs @ 6.59 fps)

Summary for Pond 6P: Hydrodynamic Separator WQv=1.52cfs, 100-year=4.34cfs

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 7.40" for 100-Year event
Inflow = 4.34 cfs @ 12.07 hrs, Volume= 0.504 af
Outflow = 4.34 cfs @ 12.07 hrs, Volume= 0.504 af, Atten= 0%, Lag= 0.0 min
Primary = 4.34 cfs @ 12.07 hrs, Volume= 0.504 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 303.14' @ 12.07 hrs
Flood Elev= 303.78'

Device	Routing	Invert	Outlet Devices
#1	Primary	300.52'	**12.0" Round Culvert** L= 34.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.52' / 300.00' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.34 cfs @ 12.07 hrs HW=303.13' (Free Discharge)
1=Culvert (Inlet Controls 4.34 cfs @ 5.52 fps)

Summary for Pond 7P: Sewer Bypass Structure

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 9.05" for 100-Year event
Inflow = 0.77 cfs @ 12.02 hrs, Volume= 0.054 af
Outflow = 0.77 cfs @ 12.02 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 0.18 cfs @ 12.02 hrs, Volume= 0.044 af
Secondary = 0.59 cfs @ 12.02 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 303.00' @ 12.02 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.7 min calculated for 0.054 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (736.0 - 735.3)

Volume	Invert	Avail.Storage	Storage Description
#1	302.53'	0.001 af	**4.00'D x 2.47'H 4' Bypass Manhole**

Device	Routing	Invert	Outlet Devices
#1	Primary	302.53'	**4.0" Round 4" PVC (to sewer)** L= 26.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 300.96' S= 0.0586 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	302.53'	**12.0" Round 12" HDPE (to storm)** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 301.07' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	302.86'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.18 cfs @ 12.02 hrs HW=303.00' (Free Discharge)
└**1=4" PVC (to sewer)** (Inlet Controls 0.18 cfs @ 2.09 fps)

Secondary OutFlow Max=0.58 cfs @ 12.02 hrs HW=303.00' (Free Discharge)
└**2=12" HDPE (to storm)** (Passes 0.58 cfs of 0.67 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.58 cfs @ 1.05 fps)

Summary for Pond 9P: Bypass Manhole

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 8.23" for 100-Year event
Inflow = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af
Outflow = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af, Atten= 0%, Lag= 0.0 min
Primary = 4.34 cfs @ 12.07 hrs, Volume= 0.504 af
Secondary = 3.30 cfs @ 12.07 hrs, Volume= 0.057 af

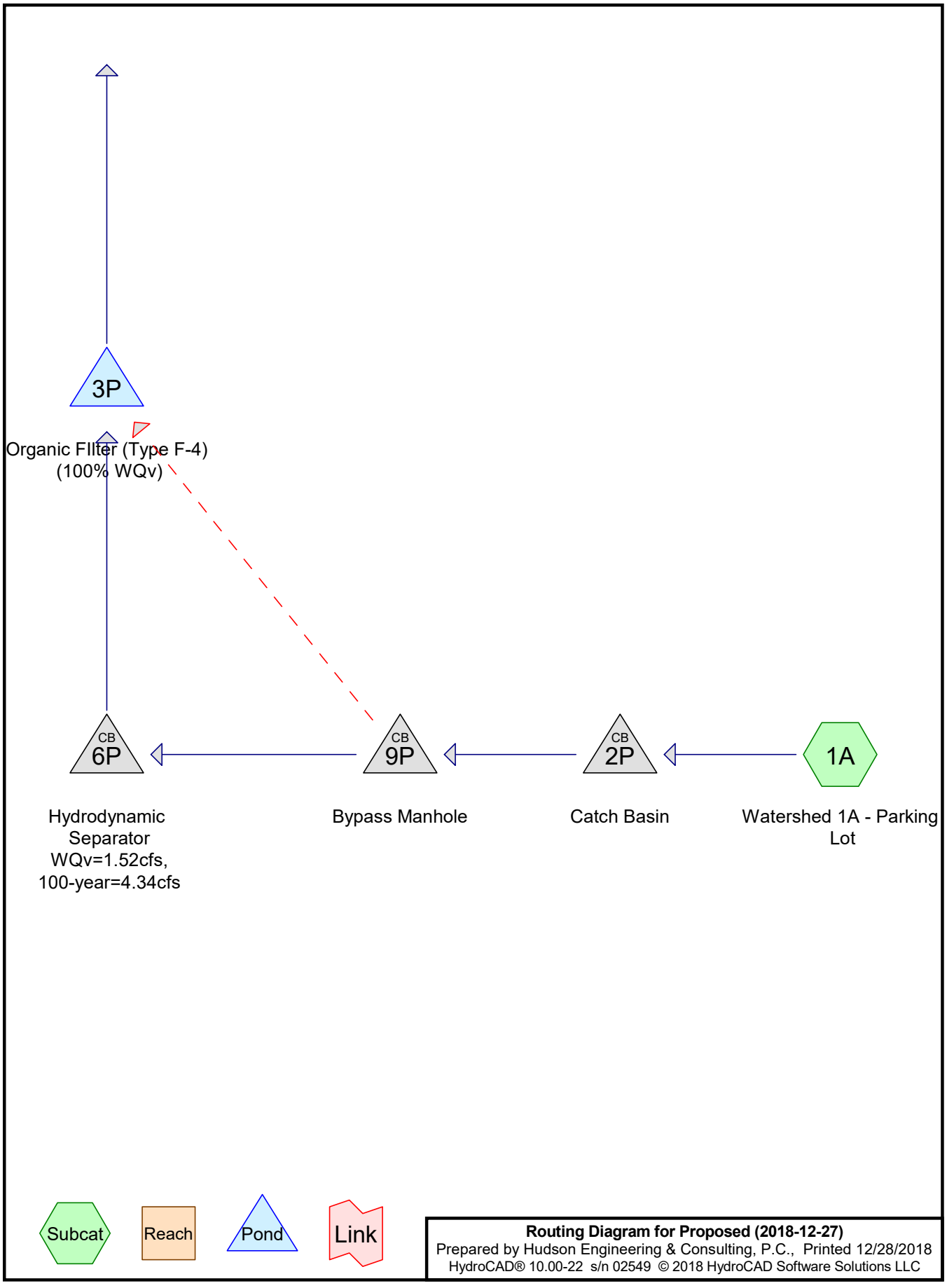
Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 303.18' @ 12.07 hrs
Flood Elev= 303.84'

Device	Routing	Invert	Outlet Devices
#1	Secondary	301.45'	**12.0" Round 12" HDPE** L= 35.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.45' / 300.00' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	300.56'	**12.0" Round 12" HDPE** L= 2.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.56' / 300.52' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.34 cfs @ 12.07 hrs HW=303.17' (Free Discharge)
└**2=12" HDPE** (Inlet Controls 4.34 cfs @ 5.52 fps)

Secondary OutFlow Max=3.30 cfs @ 12.07 hrs HW=303.17' (Free Discharge)
└**1=12" HDPE** (Inlet Controls 3.30 cfs @ 4.20 fps)

9.) Water Quality Calculations



Routing Diagram for Proposed (2018-12-27)
Prepared by Hudson Engineering & Consulting, P.C., Printed 12/28/2018
HydroCAD® 10.00-22 s/n 02549 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.143	61	>75% Grass cover, Good, HSG B (1A)
0.049	80	>75% Grass cover, Good, HSG D (1A)
0.626	98	Parking Lot, Walkways, Buildings etc. (1A)
0.817	**90**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.143	HSG B	1A
0.000	HSG C	
0.049	HSG D	1A
0.626	Other	1A
0.817		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
0.000	0.143	0.000	0.049	0.000	0.191	>75% Grass cover, Good	
0.000	0.000	0.000	0.000	0.626	0.626	Parking Lot, Walkways, Buildings etc.	
0.000	**0.143**	**0.000**	**0.049**	**0.626**	**0.817**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: Watershed 1A - Parking Runoff Area=35,601 sf 76.59% Impervious Runoff Depth=8.08"
Flow Length=190' Tc=5.6 min CN=90 Runoff=7.27 cfs 0.550 af

Pond 2P: Catch Basin Peak Elev=304.38' Inflow=7.65 cfs 0.561 af
15.0" Round Culvert n=0.013 L=25.5' S=0.0200 '/' Outflow=7.65 cfs 0.561 af

Pond 3P: Organic FIlter (Type F-4) (100% Peak Elev=302.39' Storage=4,582 cf Inflow=7.65 cfs 0.561 af
Outflow=6.62 cfs 0.561 af

Pond 6P: Hydrodynamic Separator WQv=1.52cfs, Peak Elev=303.14' Inflow=4.34 cfs 0.504 af
12.0" Round Culvert n=0.013 L=34.7' S=0.0150 '/' Outflow=4.34 cfs 0.504 af

Pond 9P: Bypass Manhole Peak Elev=303.18' Inflow=7.65 cfs 0.561 af
Primary=4.34 cfs 0.504 af Secondary=3.30 cfs 0.057 af Outflow=7.65 cfs 0.561 af

Total Runoff Area = 0.817 ac Runoff Volume = 0.550 af Average Runoff Depth = 8.08"
23.41% Pervious = 0.191 ac 76.59% Impervious = 0.626 ac

Summary for Subcatchment 1A: Watershed 1A - Parking Lot

Runoff = 7.27 cfs @ 12.08 hrs, Volume= 0.550 af, Depth= 8.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
	6,211	61	>75% Grass cover, Good, HSG B
	2,124	80	>75% Grass cover, Good, HSG D
*	27,266	98	Parking Lot, Walkways, Buildings etc.
	35,601	90	Weighted Average
	8,335		23.41% Pervious Area
	27,266		76.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	12	0.0075	0.05		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.1	5	0.1140	1.56		**Sheet Flow, B->C** Smooth surfaces n= 0.011 P2= 3.41"
1.1	82	0.0151	1.22		**Sheet Flow, C->D** Smooth surfaces n= 0.011 P2= 3.41"
0.6	91	0.0176	2.69		**Shallow Concentrated Flow, D->E** Paved Kv= 20.3 fps
5.6	190	Total			

Summary for Pond 2P: Catch Basin

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 8.23" for 100-Year event
Inflow = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af
Outflow = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af, Atten= 0%, Lag= 0.0 min
Primary = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 304.38' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	301.07'	**15.0" Round Culvert** L= 25.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.07' / 300.56' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=7.63 cfs @ 12.07 hrs HW=304.37' (Free Discharge)
1=Culvert (Inlet Controls 7.63 cfs @ 6.22 fps)

Summary for Pond 3P: Organic FIlter (Type F-4) (100% WQv)

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 8.23" for 100-Year event
Inflow = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af
Outflow = 6.62 cfs @ 12.12 hrs, Volume= 0.561 af, Atten= 13%, Lag= 2.7 min
Primary = 6.62 cfs @ 12.12 hrs, Volume= 0.561 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 302.39' @ 12.12 hrs Surf.Area= 2,625 sf Storage= 4,582 cf

Plug-Flow detention time= 142.7 min calculated for 0.561 af (100% of inflow)
Center-of-Mass det. time= 142.7 min (913.0 - 770.4)

Volume	Invert	Avail.Storage	Storage Description
#1	300.00'	6,298 cf	**Organic Filter (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
300.00	1,262	0	0	1,262
301.00	1,794	1,520	1,520	1,812
302.00	2,381	2,081	3,601	2,420
303.00	3,026	2,697	6,298	3,091

Device	Routing	Invert	Outlet Devices
#1	Primary	296.98'	**12.0" Round 12" HDPE (OUT)** L= 17.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 296.98' / 296.25' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	302.15'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	301.55'	**0.5' long x 3.0' breadth Broad-Crested Rectangular Weir X 4.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Device 1	300.00'	**1.375 in/hr Exfiltration over Surface area**

Primary OutFlow Max=6.62 cfs @ 12.12 hrs HW=302.39' (Free Discharge)
↑└**1=12" HDPE (OUT)** (Inlet Controls 6.62 cfs @ 8.42 fps)
↑ ├**2=Grate** (Passes < 4.67 cfs potential flow)
 ├**3=Broad-Crested Rectangular Weir** (Passes < 4.12 cfs potential flow)
 └**4=Exfiltration** (Passes < 0.08 cfs potential flow)

Summary for Pond 6P: Hydrodynamic Separator WQv=1.52cfs, 100-year=4.34cfs

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 7.40" for 100-Year event
Inflow = 4.34 cfs @ 12.07 hrs, Volume= 0.504 af
Outflow = 4.34 cfs @ 12.07 hrs, Volume= 0.504 af, Atten= 0%, Lag= 0.0 min
Primary = 4.34 cfs @ 12.07 hrs, Volume= 0.504 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 303.14' @ 12.07 hrs
Flood Elev= 303.78'

Device	Routing	Invert	Outlet Devices
#1	Primary	300.52'	**12.0" Round Culvert** L= 34.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.52' / 300.00' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.34 cfs @ 12.07 hrs HW=303.13' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.34 cfs @ 5.52 fps)

Summary for Pond 9P: Bypass Manhole

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 8.23" for 100-Year event
Inflow = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af
Outflow = 7.65 cfs @ 12.07 hrs, Volume= 0.561 af, Atten= 0%, Lag= 0.0 min
Primary = 4.34 cfs @ 12.07 hrs, Volume= 0.504 af
Secondary = 3.30 cfs @ 12.07 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 303.18' @ 12.07 hrs
Flood Elev= 303.84'

Device	Routing	Invert	Outlet Devices
#1	Secondary	301.45'	**12.0" Round 12" HDPE** L= 35.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.45' / 300.00' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	300.56'	**12.0" Round 12" HDPE** L= 2.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.56' / 300.52' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.34 cfs @ 12.07 hrs HW=303.17' (Free Discharge)
↑—**2=12" HDPE** (Inlet Controls 4.34 cfs @ 5.52 fps)

Secondary OutFlow Max=3.30 cfs @ 12.07 hrs HW=303.17' (Free Discharge)
↑—**1=12" HDPE** (Inlet Controls 3.30 cfs @ 4.20 fps)

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: Watershed 1A - Parking Runoff Area=35,601 sf 76.59% Impervious Runoff Depth=1.56"
Flow Length=190' Tc=5.6 min CN=90 Runoff=1.51 cfs 0.106 af

Pond 2P: Catch Basin Peak Elev=301.75' Inflow=1.52 cfs 0.106 af
15.0" Round Culvert n=0.013 L=25.5' S=0.0200 '/' Outflow=1.52 cfs 0.106 af

Pond 3P: Organic FIlter (Type F-4) (100% Peak Elev=301.54' Storage=2,562 cf Inflow=1.52 cfs 0.106 af
Outflow=0.07 cfs 0.106 af

Pond 6P: Hydrodynamic Separator WQv=1.52cfs, Peak Elev=301.29' Inflow=1.52 cfs 0.106 af
12.0" Round Culvert n=0.013 L=34.7' S=0.0150 '/' Outflow=1.52 cfs 0.106 af

Pond 9P: Bypass Manhole Peak Elev=301.41' Inflow=1.52 cfs 0.106 af
Primary=1.52 cfs 0.106 af Secondary=0.00 cfs 0.000 af Outflow=1.52 cfs 0.106 af

Total Runoff Area = 0.817 ac Runoff Volume = 0.106 af Average Runoff Depth = 1.56"
23.41% Pervious = 0.191 ac 76.59% Impervious = 0.626 ac

Summary for Subcatchment 1A: Watershed 1A - Parking Lot

Runoff = 1.51 cfs @ 12.08 hrs, Volume= 0.106 af, Depth= 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr WQv Parking Rainfall=2.53"

	Area (sf)	CN	Description
	6,211	61	>75% Grass cover, Good, HSG B
	2,124	80	>75% Grass cover, Good, HSG D
*	27,266	98	Parking Lot, Walkways, Buildings etc.
	35,601	90	Weighted Average
	8,335		23.41% Pervious Area
	27,266		76.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	12	0.0075	0.05		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.41"
0.1	5	0.1140	1.56		**Sheet Flow, B->C** Smooth surfaces n= 0.011 P2= 3.41"
1.1	82	0.0151	1.22		**Sheet Flow, C->D** Smooth surfaces n= 0.011 P2= 3.41"
0.6	91	0.0176	2.69		**Shallow Concentrated Flow, D->E** Paved Kv= 20.3 fps
5.6	190	Total			

Summary for Pond 2P: Catch Basin

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 1.56" for WQv Parking event
Inflow = 1.52 cfs @ 12.08 hrs, Volume= 0.106 af
Outflow = 1.52 cfs @ 12.08 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.0 min
Primary = 1.52 cfs @ 12.08 hrs, Volume= 0.106 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 301.75' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	301.07'	**15.0" Round Culvert** L= 25.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.07' / 300.56' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.52 cfs @ 12.08 hrs HW=301.75' (Free Discharge)
1=Culvert (Inlet Controls 1.52 cfs @ 2.22 fps)

Summary for Pond 3P: Organic FIlter (Type F-4) (100% WQv)

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 1.56" for WQv Parking event
Inflow = 1.52 cfs @ 12.08 hrs, Volume= 0.106 af
Outflow = 0.07 cfs @ 15.14 hrs, Volume= 0.106 af, Atten= 96%, Lag= 183.6 min
Primary = 0.07 cfs @ 15.14 hrs, Volume= 0.106 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 301.54' @ 15.14 hrs Surf.Area= 2,098 sf Storage= 2,562 cf

Plug-Flow detention time= 420.5 min calculated for 0.106 af (100% of inflow)
Center-of-Mass det. time= 420.5 min (1,236.2 - 815.6)

Volume	Invert	Avail.Storage	Storage Description
#1	300.00'	6,298 cf	**Organic Filter (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
300.00	1,262	0	0	1,262
301.00	1,794	1,520	1,520	1,812
302.00	2,381	2,081	3,601	2,420
303.00	3,026	2,697	6,298	3,091

Device	Routing	Invert	Outlet Devices
#1	Primary	296.98'	**12.0" Round 12" HDPE (OUT)** L= 17.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 296.98' / 296.25' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	302.15'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	301.55'	**0.5' long x 3.0' breadth Broad-Crested Rectangular Weir X 4.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Device 1	300.00'	**1.375 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.07 cfs @ 15.14 hrs HW=301.54' (Free Discharge)
└**1=12" HDPE (OUT)** (Passes 0.07 cfs of 6.01 cfs potential flow)
  ├**2=Grate** (Controls 0.00 cfs)
  ├**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**4=Exfiltration** (Exfiltration Controls 0.07 cfs)

Summary for Pond 6P: Hydrodynamic Separator WQv=1.52cfs, 100-year=4.34cfs

Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 1.56" for WQv Parking event
Inflow = 1.52 cfs @ 12.08 hrs, Volume= 0.106 af
Outflow = 1.52 cfs @ 12.08 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.0 min
Primary = 1.52 cfs @ 12.08 hrs, Volume= 0.106 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 301.29' @ 12.08 hrs
Flood Elev= 303.78'

Device	Routing	Invert	Outlet Devices
#1	Primary	300.52'	**12.0" Round Culvert** L= 34.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.52' / 300.00' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.52 cfs @ 12.08 hrs HW=301.29' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.52 cfs @ 2.35 fps)

Summary for Pond 9P: Bypass Manhole

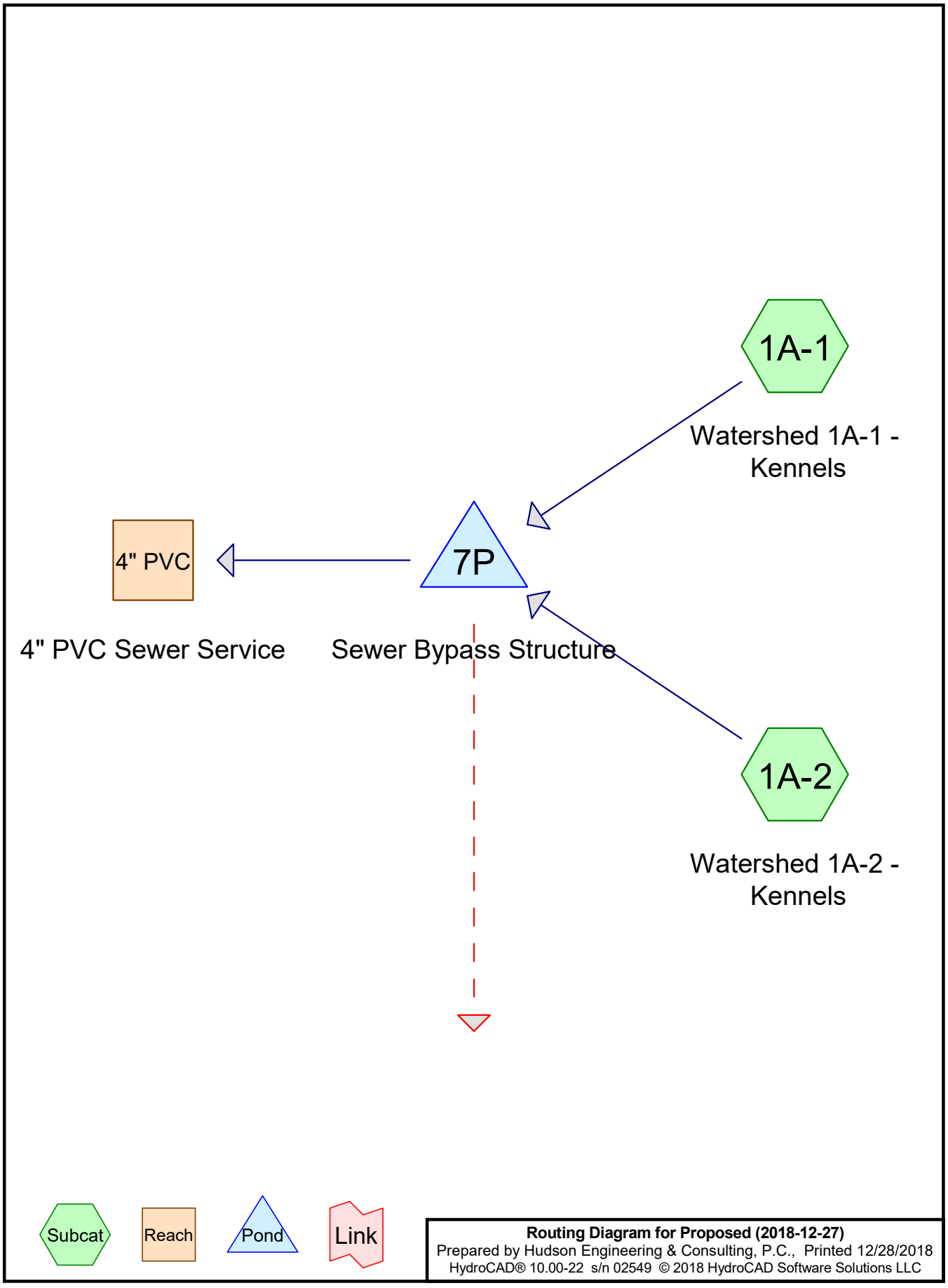
Inflow Area = 0.817 ac, 76.59% Impervious, Inflow Depth = 1.56" for WQv Parking event
Inflow = 1.52 cfs @ 12.08 hrs, Volume= 0.106 af
Outflow = 1.52 cfs @ 12.08 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.0 min
Primary = 1.52 cfs @ 12.08 hrs, Volume= 0.106 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 301.41' @ 12.08 hrs
Flood Elev= 303.84'

Device	Routing	Invert	Outlet Devices
#1	Secondary	301.45'	**12.0" Round 12" HDPE** L= 35.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.45' / 300.00' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	300.56'	**12.0" Round 12" HDPE** L= 2.7' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 300.56' / 300.52' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.52 cfs @ 12.08 hrs HW=301.41' (Free Discharge)
↑—**2=12" HDPE** (Barrel Controls 1.52 cfs @ 2.87 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=300.56' (Free Discharge)
↑—**1=12" HDPE** (Controls 0.00 cfs)



Routing Diagram for Proposed (2018-12-27)
Prepared by Hudson Engineering & Consulting, P.C., Printed 12/28/2018
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.072	98	Parking Lot, Walkways, Buildings etc. (1A-1, 1A-2)
0.072	**98**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.072	Other	1A-1, 1A-2
0.072		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
0.000	0.000	0.000	0.000	0.072	0.072	Parking Lot, Walkways, Buildings etc.	
0.000	**0.000**	**0.000**	**0.000**	**0.072**	**0.072**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A-1: Watershed 1A-1 - Runoff Area=1,328 sf 100.00% Impervious Runoff Depth=9.05"
Flow Length=171' Slope=0.0100 '/' Tc=1.2 min CN=98 Runoff=0.33 cfs 0.023 af

Subcatchment 1A-2: Watershed 1A-2 - Runoff Area=1,807 sf 100.00% Impervious Runoff Depth=9.05"
Flow Length=257' Slope=0.0100 '/' Tc=1.7 min CN=98 Runoff=0.44 cfs 0.031 af

Reach 4" PVC: 4" PVC Sewer Service Avg. Flow Depth=0.16' Max Vel=4.40 fps Inflow=0.18 cfs 0.044 af
4.0" Round Pipe n=0.010 L=184.0' S=0.0249 '/' Capacity=0.39 cfs Outflow=0.18 cfs 0.044 af

Pond 7P: Sewer Bypass Structure Peak Elev=303.00' Storage=0.000 af Inflow=0.77 cfs 0.054 af
Primary=0.18 cfs 0.044 af Secondary=0.59 cfs 0.010 af Outflow=0.77 cfs 0.054 af

Total Runoff Area = 0.072 ac Runoff Volume = 0.054 af Average Runoff Depth = 9.05"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.072 ac

Summary for Subcatchment 1A-1: Watershed 1A-1 - Kennels

Runoff = 0.33 cfs @ 12.02 hrs, Volume= 0.023 af, Depth= 9.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
*	1,328	98	Parking Lot, Walkways, Buildings etc.
	1,328		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
0.9	160	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013
1.2	171	Total			

Summary for Subcatchment 1A-2: Watershed 1A-2 - Kennels

Runoff = 0.44 cfs @ 12.02 hrs, Volume= 0.031 af, Depth= 9.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
*	1,807	98	Parking Lot, Walkways, Buildings etc.
	1,807		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
1.4	246	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013 Corrugated PE, smooth interior
1.7	257	Total			

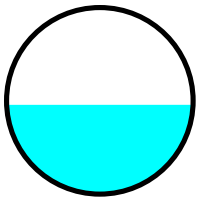
Summary for Reach 4" PVC: 4" PVC Sewer Service

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 7.30" for 100-Year event
Inflow = 0.18 cfs @ 12.02 hrs, Volume= 0.044 af
Outflow = 0.18 cfs @ 12.04 hrs, Volume= 0.044 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.40 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.15 fps, Avg. Travel Time= 1.4 min

Peak Storage= 8 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.39 cfs

4.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 184.0' Slope= 0.0249 '/'
Inlet Invert= 301.31', Outlet Invert= 296.73'



Summary for Pond 7P: Sewer Bypass Structure

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 9.05" for 100-Year event
Inflow = 0.77 cfs @ 12.02 hrs, Volume= 0.054 af
Outflow = 0.77 cfs @ 12.02 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 0.18 cfs @ 12.02 hrs, Volume= 0.044 af
Secondary = 0.59 cfs @ 12.02 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 303.00' @ 12.02 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.7 min calculated for 0.054 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (736.0 - 735.3)

Volume	Invert	Avail.Storage	Storage Description
#1	302.53'	0.001 af	**4.00'D x 2.47'H 4' Bypass Manhole**

Device	Routing	Invert	Outlet Devices
#1	Primary	302.53'	**4.0" Round 4" PVC (to sewer)** L= 26.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 300.96' S= 0.0586 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	302.53'	**12.0" Round 12" HDPE (to storm)** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 301.07' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	302.86'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.18 cfs @ 12.02 hrs HW=303.00' (Free Discharge)
└**1=4" PVC (to sewer)** (Inlet Controls 0.18 cfs @ 2.09 fps)

Secondary OutFlow Max=0.58 cfs @ 12.02 hrs HW=303.00' (Free Discharge)
└**2=12" HDPE (to storm)** (Passes 0.58 cfs of 0.67 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.58 cfs @ 1.05 fps)

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A-1: Watershed 1A-1 - Runoff Area=1,328 sf 100.00% Impervious Runoff Depth=1.42"
Flow Length=171' Slope=0.0100 '/' Tc=1.2 min CN=98 Runoff=0.06 cfs 0.004 af

Subcatchment 1A-2: Watershed 1A-2 - Runoff Area=1,807 sf 100.00% Impervious Runoff Depth=1.42"
Flow Length=257' Slope=0.0100 '/' Tc=1.7 min CN=98 Runoff=0.07 cfs 0.005 af

Reach 4" PVC: 4" PVC Sewer Service Avg. Flow Depth=0.13' Max Vel=3.99 fps Inflow=0.13 cfs 0.009 af
4.0" Round Pipe n=0.010 L=184.0' S=0.0249 '/' Capacity=0.39 cfs Outflow=0.13 cfs 0.009 af

Pond 7P: Sewer Bypass Structure Peak Elev=302.84' Storage=0.000 af Inflow=0.13 cfs 0.009 af
Primary=0.13 cfs 0.009 af Secondary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.009 af

Total Runoff Area = 0.072 ac Runoff Volume = 0.009 af Average Runoff Depth = 1.42"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.072 ac

Summary for Subcatchment 1A-1: Watershed 1A-1 - Kennels

Runoff = 0.06 cfs @ 12.02 hrs, Volume= 0.004 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr WQv Kennels Rainfall=1.64"

	Area (sf)	CN	Description
*	1,328	98	Parking Lot, Walkways, Buildings etc.
	1,328		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
0.9	160	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013
1.2	171	Total			

Summary for Subcatchment 1A-2: Watershed 1A-2 - Kennels

Runoff = 0.07 cfs @ 12.02 hrs, Volume= 0.005 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr WQv Kennels Rainfall=1.64"

	Area (sf)	CN	Description
*	1,807	98	Parking Lot, Walkways, Buildings etc.
	1,807		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	11	0.0100	0.69		**Sheet Flow, A->B** Smooth surfaces n= 0.011 P2= 3.41"
1.4	246	0.0100	2.86	0.56	**Pipe Channel, B->C** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.013 Corrugated PE, smooth interior
1.7	257	Total			

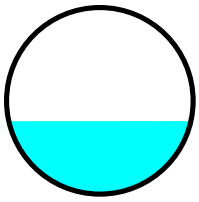
Summary for Reach 4" PVC: 4" PVC Sewer Service

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 1.42" for WQv Kennels event
Inflow = 0.13 cfs @ 12.03 hrs, Volume= 0.009 af
Outflow = 0.13 cfs @ 12.05 hrs, Volume= 0.009 af, Atten= 2%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.99 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 2.4 min

Peak Storage= 6 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.39 cfs

4.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 184.0' Slope= 0.0249 '/'
Inlet Invert= 301.31', Outlet Invert= 296.73'



Summary for Pond 7P: Sewer Bypass Structure

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 1.42" for WQv Kennels event
Inflow = 0.13 cfs @ 12.02 hrs, Volume= 0.009 af
Outflow = 0.13 cfs @ 12.03 hrs, Volume= 0.009 af, Atten= 1%, Lag= 0.5 min
Primary = 0.13 cfs @ 12.03 hrs, Volume= 0.009 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 302.84' @ 12.03 hrs Surf.Area= 0.000 ac Storage= 0.000 af

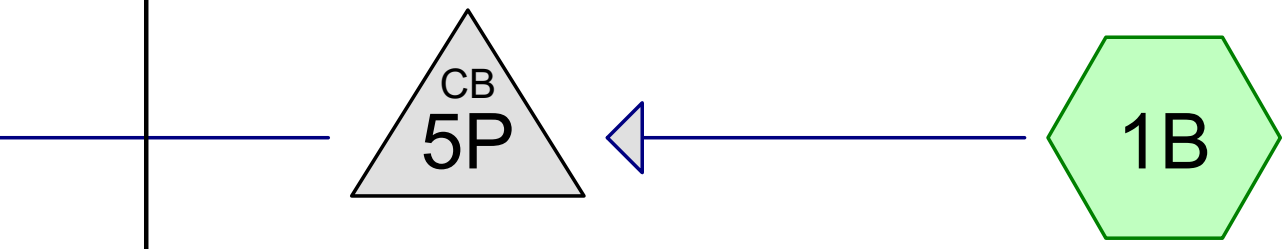
Plug-Flow detention time= 1.7 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (770.2 - 768.6)

Volume	Invert	Avail.Storage	Storage Description
#1	302.53'	0.001 af	**4.00'D x 2.47'H 4' Bypass Manhole**

Device	Routing	Invert	Outlet Devices
#1	Primary	302.53'	**4.0" Round 4" PVC (to sewer)** L= 26.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 300.96' S= 0.0586 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	302.53'	**12.0" Round 12" HDPE (to storm)** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 302.53' / 301.07' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	302.86'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.13 cfs @ 12.03 hrs HW=302.84' (Free Discharge)
└**1=4" PVC (to sewer)** (Inlet Controls 0.13 cfs @ 1.51 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=302.53' (Free Discharge)
└**2=12" HDPE (to storm)** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)



Hydrodynamic Separator
WQv=0.89cfs, 100-year=5.21cfs

Watershed 1B - Roof Area

Subcat Reach Pond Link

Routing Diagram for Proposed (2018-12-27)
Prepared by Hudson Engineering & Consulting, P.C., Printed 12/28/2018
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.479	98	Proposed Building (1B)
0.479	**98**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.479	Other	1B
0.479		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.479	0.479	Proposed Building	1B
0.000	**0.000**	**0.000**	**0.000**	**0.479**	**0.479**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1B: Watershed 1B - Roof Runoff Area=20,865 sf 100.00% Impervious Runoff Depth=9.05"
Tc=1.0 min CN=98 Runoff=5.21 cfs 0.361 af

Pond 5P: Hydrodynamic Separator WQv=0.89cfs, Peak Elev=304.88' Inflow=5.21 cfs 0.361 af
12.0" Round Culvert n=0.013 L=123.1' S=0.0413 '/' Outflow=5.21 cfs 0.361 af

Total Runoff Area = 0.479 ac Runoff Volume = 0.361 af Average Runoff Depth = 9.05"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.479 ac

Summary for Subcatchment 1B: Watershed 1B - Roof Area

Runoff = 5.21 cfs @ 12.01 hrs, Volume= 0.361 af, Depth= 9.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=9.29"

	Area (sf)	CN	Description
*	20,865	98	Proposed Building
	20,865		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Pond 5P: Hydrodynamic Separator WQv=0.89cfs, 100-year=5.21cfs

Inflow Area = 0.479 ac,100.00% Impervious, Inflow Depth = 9.05" for 100-Year event
Inflow = 5.21 cfs @ 12.01 hrs, Volume= 0.361 af
Outflow = 5.21 cfs @ 12.01 hrs, Volume= 0.361 af, Atten= 0%, Lag= 0.0 min
Primary = 5.21 cfs @ 12.01 hrs, Volume= 0.361 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 304.88' @ 12.01 hrs
Flood Elev= 307.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	301.34'	**12.0" Round 12" HDPE (OUT)** L= 123.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.34' / 296.25' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.17 cfs @ 12.01 hrs HW=304.84' (Free Discharge)
↑—**1=12" HDPE (OUT)** (Inlet Controls 5.17 cfs @ 6.59 fps)

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1B: Watershed 1B - Roof Runoff Area=20,865 sf 100.00% Impervious Runoff Depth=1.43"
Tc=1.0 min CN=98 Runoff=0.89 cfs 0.057 af

Pond 5P: Hydrodynamic Separator WQv=0.89cfs, Peak Elev=301.89' Inflow=0.89 cfs 0.057 af
12.0" Round Culvert n=0.013 L=123.1' S=0.0413 '/' Outflow=0.89 cfs 0.057 af

Total Runoff Area = 0.479 ac Runoff Volume = 0.057 af Average Runoff Depth = 1.43"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.479 ac

Summary for Subcatchment 1B: Watershed 1B - Roof Area

Runoff = 0.89 cfs @ 12.01 hrs, Volume= 0.057 af, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr WQv Roof Rainfall=1.65"

	Area (sf)	CN	Description
*	20,865	98	Proposed Building
	20,865		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Pond 5P: Hydrodynamic Separator WQv=0.89cfs, 100-year=5.21cfs

Inflow Area = 0.479 ac,100.00% Impervious, Inflow Depth = 1.43" for WQv Roof event
Inflow = 0.89 cfs @ 12.01 hrs, Volume= 0.057 af
Outflow = 0.89 cfs @ 12.01 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min
Primary = 0.89 cfs @ 12.01 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 301.89' @ 12.01 hrs
Flood Elev= 307.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	301.34'	**12.0" Round 12" HDPE (OUT)** L= 123.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 301.34' / 296.25' S= 0.0413 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.88 cfs @ 12.01 hrs HW=301.89' (Free Discharge)
↑—**1=12" HDPE (OUT)** (Inlet Controls 0.88 cfs @ 1.99 fps)

10.) State of Maryland Department of the Environment (MDE) List of Approved Stormwater Practices (August 2017)

Alternative/Innovative Technology List of Approved Stormwater Practices (August 2017)

Practice Name	Manufacturer	Practice Type	Approval Type	BMP Category	BMP Code	Approval Date
StormCap™	Flex Membrane International /Stormwater Capture Co.	Green Roof	Alternative Surface	A	AGRE	7 /21/2017
Silva Cell Pavement System	DeepRoot Green Infrastructure LLC	Bioretention/Pavement System	ESD-All, Structural WQv, Structural Component	E, S	MMBR, FBIO	6 /16/2017
KBI FlexiPave	K.B. Industries	Permeable Pavement	Alternative Surface	A	APRP	5 /17/2017
StormTreat System	StormTreat Systems, Inc.	Submerged Gravel Wetland & Bioretention/Filter	ESD-All, Structural WQv	E, S	MSGW, MMBR, FBIO	5 /15/2017
LiveRoof Hybrid Green Roof System	LiveRoof Global, LLC	Green Roof	Alternative Surface	A	AGRE	2 /28/2017
StormPro	Environment 21, LLC	Hydrodynamic Separator	Pretreatment	X	XOGS	2 /7 /2017
VR Max Vegetated Roof System	Tremco Incorporated	Green Roof	Alternative Surface	A	AGRE	11/4 /2016
FocalPoint Bioretention Systems	ACF-Convergent Alliance	Bioretention	MS4 Retrofit, ESD WQv Only	E, S	MMBR, FBIO	9 /8 /2016
Suntree Nutrient Separating Baffle Box	Suntree Technologies	Hydrodynamic Separator	Pretreatment	S	XOGS	9 /8 /2016

Practice Name	Manufacturer	Practice Type	Approval Type	BMP Category	BMP Code	Approval Date
Columbia Green Technologies Green Roof Systems	Columbia Green Roof Technologies	Green Roof System	Alternative Surface	A	AGRE	9 /2 /2016
PaverGuide	PaverGuide, Inc.	Base/Storage Reservoir for Permeable Pavers	Alternative Surface	A	APRP	8 /29/2016
HydroBlox	HydroBlox Technologies, Inc.	Drainage/Conveyance Alternative	Structural Component	X	XOTH	5 /31/2016
Henry Green Roof Products	Henry Company	Green Roof System	Alternative Surface	E	AGRE	2 /5 /2016
Opti RTC Continuous Monitoring and Adaptive Control (CMAC)	OptiRTC, Inc.	Structural control component for wet ponds	Structural Component	X	XOTH	1 /27/2016
PerkFilter	Oldcastle Precast	Cartridge (Sand) Filter	Structural WQv	S	FSND	9 /16/2015
Hydropack Green Roof System	Vegetal i.D. Inc.	Green Roof	Alternative Surface	A	AGRE	9 /10/2015
Modular Wetland System - Linear	Modular Wetland Systems, Inc.	Bioretention/Micro-Bioretention/Submerged Gravel Wetland	MS4 Retrofit, ESD WQv Only, Structural WQv	E, S	MMBR, MSWG, FBIO	9 /8 /2015
AWD SITEDRAIN Strip 9624	American Wick Drain	Underdrain Alternative	Structural Component	X	XOTH	4 /6 /2015
MP Eco-Grid	USA EcoSystems	Reinforced Turf System	Alternative Surface	E	ARTF	1 /22/2015
Rotondo Bio-Filter	Rotondo Env. Solutions, LLC	Bioretention System	MS4 Retrofit	E, S	MMBR, FBIO	1 /9 /2015
Hydrotech Green Roofing System	American Hydrotech, LLC	Green Roof System	Alternative Surface	E	AGRE	1 /9 /2015
Stormcrete	Porous Technologies, LLC	Permeable Pavement	Alternative Surface	E	AGRE	12/9 /2014
Green Roof Outfitters Modular Roof System	Green Roof Outfitters, LLC	Modular Green Roof	Alternative Surface	E	AGRE	11/20/2014

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Practice Name	Manufacturer	Practice Type	Approval Type	BMP Category	BMP Code	Approval Date
Eco-Roof	Eco-Roofs, LLC	Green Roof System	Alternative Surface	E	AGRE	4 /18/2014
StormTank StormShield	Brentwood Industries, Inc.	Vault/Filter System	Pretreatment	S	XOGS	3 /5 /2014
Rotondo Bio-Pod	Rotondo Env. Solutions, LLC	Permeable Pavement/Vault System	Pretreatment	S	XOTH	1 /7 /2014
AquaLok GLU	FGP Enterprises, LLC	Rainwater Harvesting	ESD-All	E	MRWH	1 /7 /2014
Clay Brick Pavers	The Brick Industry	Permeable Pavement	Alternative Surface	E	APRP	8 /12/2013
CrystalClean Separator	CrystalStream Technologies	Hydrodynamic Device	Pretreatment	S	XOGS	5 /30/2013
Aqua Bric/Bio-Pave	Filterra Bioretention Systems	Interlocking Paving System	Alternative Surface, ESD-All, Structural WQv	E	APRP	3 /19/2013
SAFL Baffle	Upstream Technologies	OGS/Filter System	Pretreatment	S	XOGS	3 /12/2013
COREgravel	Core Systems	Reinforced Turf	Alternative Surface	E	ARTF	3 /12/2013
EZ Roll Grass and Gravel Pavers	NDS, Inc.	Reinforced Turf	Alternative Surface	E	ARTF	3 /12/2013
EcoCline Living Roof System	Furbish Company	Green Roof	Alternative Surface	E	AGRE, AGRI	2 /25/2013
Filterra Bioretention System	Filterra Bioretention Systems	Bioretention	ESD WQv Only, Structural WQv	E, S	MMBR, FBIO	2 /22/2013
Grasscrete	Storm-Services, LLC	Reinforced Turf	Alternative Surface	E	ARTF	12/3 /2012
Nicolock Pavers	Nicolock Paving Stones	Permeable Paver	Alternative Surface	E	APRP	8 /3 /2012
AquaLok Panels	FGP Enterprises, LLC	Green Roof/ Rainwater Harvesting	Alternative Surface, ESD-All	E	AGRE, MRWH	6 /20/2012

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Practice Name	Manufacturer	Practice Type	Approval Type	BMP Category	BMP Code	Approval Date
PaveDrain	Ernest Maier, Inc.	Permeable Pavement	Alternative Surface	E	APRP	3 /29/2012
Jellyfish Filter	Imbrium Systems Corporation	Cartridge/Membrane Filter	Structural WQv	S	FUND	3 /12/2012
Floating Treatment Wetlands	BlueWing Env. Solutions	Modular Wetland	Pretreatment	S	XOTH	3 /8 /2012
StormBasin	Fabco Industries, Inc.	OGS/Filter	Pretreatment	S	XOGS	2 /13/2012
StormSafe	Fabco Industries, Inc.	Vault/Filter System	Pretreatment	S	XOGS	2 /13/2012
StormSack	Fabco Industries, Inc.	Catch Basin Insert	Pretreatment	S, A	XOGS, CBC	2 /13/2012
PhosphoSorb Media	ConTech Construction	Filter Media	Structural WQv	S	FUND	11/18/2011
BaySeparator	BaySaver Technologies, Inc.	Hydrodynamic Device	Pretreatment	S	XOGS	8 /10/2011
FlexStorm	Nyloplast	Catch Basin Insert	Pretreatment	S, A	XOGS, CBC	5 /17/2011
V2B1 Hydrodynamic Separator	Environment 21	Hydrodynamic Device	Pretreatment	S	XOGS	10/6 /2010
Flo-Gard	Oldcastle Precast	Inlet Filter	Pretreatment	S	XOTH	8 /19/2010
Sorbtive Media	Imbrium Systems Corporation	Filtering Media	Structural WQv	S	ND, FPER, FO	10/21/2009
Sorbtive Filter	Imbrium Systems Corporation	Filter	Structural WQv	S	ND, FUND, FP	9 /11/2009
UrbanGreen	Contech Construction Product	Filter	Structural WQv	S	FBIO	6 /3 /2009
StormTank	Brentwood Industries	Storage Tank	Pretreatment	S	XFLD	11/6 /2008
FloGard Dual Vortex Separator (DVS)	Oldcastle Precast	Hydrodynamic Device	Pretreatment	X	XOGS	3 /25/2008
ADS/Hancor WQU	ADS Hancor	Hydrodynamic Device	Pretreatment	S	XOGS	3 /25/2008
StormTech Isolator	StormTech, LLC	Storage Tank	Structural Component	S	XFLD	11/7 /2007
No Fault/Smarte Surface	Human & Rohde	Permeable Surfaces	Alternative Surface	E	APRP, ARTF	6 /1 /2007
Flo-Guard Plus	Oldcastle	Catch Basin Insert	Pretreatment	S, A	XOGS, CBC	3 /27/2007

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Practice Name	Manufacturer	Practice Type	Approval Type	BMP Category	BMP Code	Approval Date
Up-Flo Filter	Hydro International	Catch Basin Insert	Pretreatment	S, A	XOGS, CBC	2 /6 /2007
Storm-Pure	Nyloplast	Catch Basin Insert	Pretreatment	S, A	XOGS, CBC	11/20/2006
BayFilter	BaySaver Technologies, Inc.	Cartridge Filter	Structural WQv	S	FUND	10/12/2006
Aqua Swirl	AquaShield, Inc.	Hydrodynamic Device	Pretreatment	S	XOGS	5 /5 /2006
Stormfilter	Stormwater Management, Inc.	Cartridge Filter	Structural WQv	S	FUND	4 /11/2005
Terre Kleen	Terre Hill Concrete Products	Hydrodynamic Device	Pretreatment	S	XOGS	3 /28/2005
Ultra-Urban Filter	Abtech Industries	Catch Basin Insert	Pretreatment	S, A	XOGS, CBC	2 /15/2005
Vortfilter	Vortechnics, Inc.	Cartridge Filter	Pretreatment	S	FUND	1 /6 /2005
CDS Media Filtration System	CDS Technologies, Inc	Cartridge Filter	Structural WQv	S	FUND	12/30/2004
FirstDefense	Hydro International	Hydrodynamic Device	Pretreatment	S	XOGS	11/30/2004
Vortechs & Vort Sentry	Vortechnics, Inc.	Hydrodynamic Device	Pretreatment	S	XOGS	6 /1 /2004
Downstream Defender	Hydro International	Hydrodynamic Device	Pretreatment	S	XOGS	5 /4 /2004
CDS Oil / Grit Separator	CDS Technologies, Inc	Hydrodynamic Device	Pretreatment	S	XOGS	8 /15/2003
Aqua Filter	AquaShield, Inc.	Cartridge Filter	Structural WQv	S	FUND	6 /23/2003
BaySaver	BaySaver, Inc.	Hydrodynamic Device	Pretreatment	S	XOGS	6 /11/2002
Stormceptor	Imbrium Systems Corporation	Hydrodynamic Device	Pretreatment	S	XOGS	4 /16/2001

Please contact each vendor/manufacturer for approval letters and more specific product information for each of the above-listed practices. Any formal request to MDE concerning an alternative/innovative technology should be submitted to MDE's Sediment, Stormwater, and Dam Safety Program, 1800 Washington Boulevard, Baltimore, MD 21230. If there are any questions concerning these practices, please contact the Maryland Department of the Environment, Water and Science Administration at 410-537-3543 or at www.mde.maryland.gov.

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11.) Stormwater Management Construction Checklists

APPENDIX H

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Table of Contents

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.

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name _____

Permit No. _____ **Date of Authorization** _____

Name of Operator _____

Prime Contractor _____

a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

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?

2. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page _____
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? _____

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.

CONSTRUCTION DURATION INSPECTIONS **Page 1 of _____**

SITE PLAN/SKETCH

Inspector (print name)	**Date of Inspection**
Qualified Professional (print name)	**Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

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

Runoff Control Practices (continued)

4. Stone Check Dam
Yes No NA
[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles
Yes No NA
[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation
Yes No NA
[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Stabilized Construction Entrance
Yes No NA
[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence
Yes No NA
[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

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 1acre 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.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:
1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

III. Monthly Summary of Site Inspection Activities

Name of Permitted Facility:	Today's Date:	Reporting Month:
Location:	Permit Identification #:	
Name and Telephone Number of Site Inspector:		

Date of Inspection	Regular / Rainfall based Inspection	Name of Inspector	Items of Concern

Owner/Operator 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. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Signature of Permittee or Duly Authorized Representative

Name of Permittee or Duly Authorized Representative Date

Duly authorized representatives must have written authorization, submitted to DEC, to sign any permit documents.

NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity
Permit Number GP-02-01
Monthly Summary of Site Inspection Activities

Name of Permitted Facility:	**Permit Identification #:**	
Location:	**Today's Date:**	**Reporting Month:**
Name and Telephone Number of Site Inspector:	**Name and Telephone Number of Site Inspector:**	

Permit Reference; Part III.D.3.b (page 15):

"The operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis."

Date of Inspection	Type of Inspection and 24 hr Rainfall	Name of Qualified Professional conducting Site Inspections	Major items of concern related to compliance of the SWPPP with all conditions of the general permit	Date Corrected

Owner/Operator 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. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Signature of Permittee or Duly Authorized Representative | Name of Permittee or Duly Authorized Representative | Date

Duly authorized representatives of the Permittee (Owner/Operator) must have written authorization, submitted to DEC, to sign any permit documents.

Inspection and Maintenance Checklist
Catch Basins, Manholes, and Inlets

Date: _____

Type of Inspection: Storm ☐ Weekly ☐ Monthly ☐ Annual ☐

Site: _____ Inspector(s): _____

Description or location of Project: _____

Defect	Conditions when Maintenance is Needed	Maintenance (1 or 2)*	Comments
General			
Trash and Debris	Trash and debris which are located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%.		
	Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe.		
	Trash or debris in any inlet or outlet pipe blocking more then 1/3 of its height.		
	Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).		
Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.		
Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider then ¼ inch.		
	Frame not sitting flush on top slab, i.e., separation of more than ¾ inch of the frame from the top slab. Frame not securely attached.		

*Maintenance: Enter 1 if maintenance is needed. Enter 2 if maintenance was preformed same day.

Defect	Conditions when Maintenance is Needed	Maintenance (1 or 2)*	Comments
Fractures or Cracks in Basin Walls/Bottom	Maintenance person judges that structure is unsound.		
	Grout fillet has separated or cracked wider then ½ inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.		
Settlement/Misalignment	If failure of basin has created a safety, function, or design problem.		
Vegetation	Vegetation growing across and blocking more than 10% of the basin opening.		
	Vegetation growing in inlet/outlet pipe joints that is more than 6 inches tall and less than 6 inches apart.		
Contamination and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.		
Catch Basin Cover			
Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.		
Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than ½ inch of thread.		
Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance).		
Ladder			
Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.		
Metal Grates (If Applicable)			
Grate opening Unsafe	Grate with opening wider than 7/8 inch.		
Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.		
Damaged or Missing	Grate missing or broken member(s) of the grate.		

*Maintenance: Enter 1 if maintenance is needed. Enter 2 if maintenance was preformed same day.

Inspection and Maintenance Checklist
Conveyance Systems (Pipes & Ditches)

Date: _____

Type of Inspection: Storm ☐ Weekly ☐ Monthly ☐ Annual ☐

Site: _____ Inspector(s): _____

Defect	Conditions When Maintenance is Needed	Maintenance (1 or 2)*	Comments
Pipes			
Sediment & Debris	Accumulated Sediment that exceeds 20% of the diameter of the pipe.		
Vegetation	Vegetation that reduces free movement of water through pipes		
Damaged Pipe	Protective coating is damaged; rust is causing more than 50% deterioration to any part of pipe.		
	Any dent that decreases the cross section area of pipe by more than 20% or puncture that impacts performance.		
Open Ditches			
Trash and Debris	Trash and debris > 5 cf/1000 sf (one standard size garbage can) Visual evidence of dumping		
Sediment	Accumulated sediment that exceeds 20% of the design depth.		
Vegetation	Vegetation that reduces free movement of water through ditches.		
Erosion Damage to Slopes and Channel Bottom	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.		
Rock Lining Out of Place or Missing (If Applicable)	Maintenance person can see native soil beneath the rock lining.		

*Maintenance: Enter 1 if maintenance is needed. Enter 2 if maintenance was preformed same day.