INSITE
ENGINEERING, SURVEYING &
LANDSCAPE ARCHITECTURE, P.C.

STORMWATER POLLUTION PREVENTION PLAN

For

1 Croton Point

Croton Point Ave.
Croton-On-Hudson, New York

April 30, 2025

Applicant Information:

WBP Development, LLC
480 Bedford Road
Chappaqua, NY 10514

Note: This report in conjunction with the project plans make up the complete Stormwater Pollution Prevention Plan.

STATE OF NEW YORK
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1.0 INTRODUCTION

1.1 Project Description

The project consists of a proposed 100-unit, for sale affordable condominium development consisting of 46 one-bedroom and 54 two-bedroom homes in a to be constructed 5-story building with requisite parking and amenities (the "Development") to be located on lands fronting on Croton Point Avenue consisting of (i) Tax Map Parcels 79.17-1-5 & 3 owned by the Village ("Lot A"); and (ii) Tax Map Parcel 79.17-1-3 owned by Croton Point Realty Inc (the "CPR Parcel"). Lot A is currently in use as a Village commuter parking lot. The CPR Parcel is improved with an office building which is proposed to be demolished for the Development.

The proposed brick and metal panel building will be served by 100 parking spaces to be located in a below grade parking level and two outdoor parking areas, including five (5) Level 2 EV charging stations. Amenities within the building will include a community room, a fitness center, a co-working lounge, a bike storage room and a roof-top deck providing expansive scenic views overlooking Croton Point Bay and the Hudson River.

Sustainable building design features will likely include full electrification, solar readiness, high efficiency HVAC equipment (cold climate air source heat pumps) and appliances (Energy Star Multifamily New Construction Program) and low-flow water fixtures.

In total the property consist of 1.8 ± acres and is located in the LI (Light Industrial with a Transoriented Development Overlay) zoning district, the Village of Corton-on-Hudson Water District and the Ossining Sanitary Sewer District.

1.2 Existing Site Conditions

The subject project is located on Croton Point Avenue across from Veterans Plaza in the Village of Croton-On-Hudson. As previously stated, the site currently exists as a commercial development with several buildings, parking areas, walkways, and other appurtenances. The stormwater runoff from the existing property generally drains from a high point in the center of the property north and south towards the existing drain inlets and their collection system, which discharge to the west and east respectively. The northern drain inlet flows west onto MTA property and the southern drain inlet flows east onto NYSDOT property.

The two drain inlets discussed above have been designed as Design Points for the purpose of stormwater quantity analysis contained herein, and are shown on Figures 2 and 3. Design Point 1 represents the existing drainage structure at the corner of Croton Point Avenue and NYS Route 9 that flows east. Design Point 2 represents the drainage structure that is part of the existing collection system that discharges west towards the Metro North Railroad property.

Onsite soils belong to the Hydrologic Group B. Pursuant to the National Resource Conservation Service Web Soil Survey, the soil designations of the onsite soils consist of Urban land (Uf) and Udorthents (Ub). The soil boundaries are shown on the enclosed pre- and post-development drainage figures, Figures 2 and 3 of this report.

1.3 Proposed Site Conditions

It is proposed to construct a 21,500 sf ± (footprint area) affordable condominium with associated parking and various site appurtenances. The new five-story building will contain one hundred apartments. There will be 46 one-bedroom apartments and 54 two-bedroom apartments. Amenity spaces will also be constructed which will be used by the residents of the building only.

This project is a redevelopment project with an overall decrease in impervious area. The project results in a net decrease of 0.2 acres +/-.

It is proposed to maintain the overall drainage boundaries to the maximum extent practicable and tie into the existing onsite collection system in the proposed condition. New drainage structures will capture the runoff from the redeveloped site and will discharge into the hydrodynamic separators for treatment of the new impervious areas. The intent is to capture and treat the stormwater runoff from the redeveloped area of the site and treat it in accordance with the NYSDEC standards for quality and quantity prior to discharging to the existing stormwater collection systems, such there is no impact to the surrounding stormwater design. Two hydrodynamic separators are proposed in total, one tributary to each design point.

As shown in the following sections of this report, the stormwater quality and quantity for the proposed development have been treated in accordance with the requirements of the General Permit, GP-0-25-001. Additionally, an erosion and sediment control plan has been prepared in accordance with the *New York State Standards and Specifications for Erosion and Sediment Control* (Blue Book) to protect the existing waterbodies and drainage features during construction activities.

Based on discussions with the owner, a Phase 1/Phase 2 study was completed for the site. Based on the study, there is no known contamination or other restrictions on the property that would prevent the normal discharge of the footings. The 2025 GCP defines dewatering as the act of draining rainwater and/or groundwater from building foundations, vaults, or excavations / trenches. As the footing drains are defined as dewatering operations and there is no knows contamination, it is confirmed the footing drains meet the 2025 GCP definition for Uncontaminated discharges from dewatering operations.

2.0 STORMWATER MANAGEMENT

The proposed stormwater management system for the project has been designed to meet the requirements of the state stormwater ordinances and guidelines, including but not limited to those of the NYSDEC.

As noted in Part III.A.2 of the General Permit GP-0-25-001, consideration of future physical risks due to climate change pursuant to Community Risk and Resiliency Act (CRRA), 6 NYCRR Part 490 shall be considered. First, the CRRA primarily focuses on areas subject to flooding and areas at risk of sea level rise. The proposed project is not in an area for flood risk due to sea level rise and there are no FEMA regulated Floodways or Floodplains on the subject property or within the surrounding vicinity. Additionally, there is no immediate downstream infrastructure such as dams or major road culvert crossings that are potentially impacted by the proposed project. There are no known flood issues that have occurred in or around the project site. See below the current rainfall data obtained from the Northeast Regional Climate Center (NRCC) and the Natural Resources Conservation Service (NRCS) utilized in this report. This rainfall data which is updated annually allows designers to account for the most recent climate data recorded and allows for site specific distribution curves to be utilized. Based on the foregoing, it is believed the requirements of Part III.A.2 of General Permit GP-0-25-001 are addressed through this project SWPPP.

In accordance with the GP-0-25-001, Part III.B.2.b.iii., as the subject project SWPPP was submitted for review as part of the Site Plan application to the Village of Croton-on-Hudson Planning Board prior to the issuance of the GP-0-25-001 and was developed using the 2015 NYSDEC *New York State Stormwater Management Design Manual* (Design Manual), the subject project may continue to design the post-construction stormwater management practices in conformance with the performance criteria in the 2015 Design Manual.

Since the subject project proposes the disturbance of more than one (1) acre, coverage under the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit No. GP-0-25-001 (General Permit) is required. Chapter 4 of the NYSSMDM specifies five design criteria that are Water Quality Volume (WQ_v), Runoff Reduction Volume (RR_v), Stream Channel Protection Volume (CP_v), Overbank Flood Control (Q_p), and Extreme Storm Control (Q_f). The first two of these requirements relates to treating water quality, while the later pertain to stormwater quantity (peak flow) attenuation. As noted in previous sections of this report, this project is a redevelopment project with an increase in impervious area. As such the RRv requirements and CPv requirements are not required. Per Chapter 9, the proposed hydrodynamic separators

have been designed as a flow through practice. As such, the flow through practices have been sized for the peak rate of runoff from 100% of the WQv design storm, as defined Chapter 4 to treat the WQv in accordance with the NYSSMDM.

To meet the above referenced requirements, the following post construction stormwater management practices are proposed for the project:

Table 2.0.1 – Proposed SMP Design Criteria Summary Table

Proposed SMP ID	NYSSMDM Ch. 9 Design Designation	NYSDEC Uniform Stormwater Sizing Criteria Satisfied
HDS 1.1	Hydrodynamic Separator (Alt. Practice)	WQ_v
HDS 2.1	Hydrodynamic Separator (Alt. Practice)	WQ_v

Sizing calculations for the hydrodynamic separators have been provided in Appendix A. Information regarding the sizing and maintenance of the proposed hydrodynamic separators can be in Appendix F. As noted above the hydrodynamic separators result in treatment of the entire site and will be sized to treat the WQv peak flow as required by Chapter 9.

To address stormwater quantity requirements of the NYSDEC, the “HydroCAD” Stormwater Modeling System,” by HydroCAD Software Solutions LLC in Tamworth, New Hampshire, was used to model and assess the peak stormwater flows for the subject project. HydroCAD is a computer aided design program for modeling the hydrology and hydraulics of stormwater runoff. It is based primarily on hydrology techniques developed by the United States Department of Agriculture, Soil Conservation Service (USDA, SCS) TR-20 method combined with standard hydraulic calculations. For details on the input data for the subcatchments and design storms, please refer to Appendices B and C.

The input requirements for the HydroCAD computer program are as follows:

Subcatchments (contributing watershed/sub-watersheds)

- Design storm rainfall in inches
- CN (runoff curve number) values which are based on soil type and land use/ground cover
- T_c (time of concentration) flow path information
- Watershed Area in Acres

Stormwater Basins

- Surface area at appropriate elevations
- Flood elevation
- Outlet structure information

The following is a general description of the input data used to calculate the pre- and post-development stormwater runoff values. For detailed information for each subcatchment and stormwater management practice, see Appendices B & C. The 1-year, 10-year, and 100-year 24-hour design storm were obtained from the New York State Stormwater Management Design Manual. The values provided are for 24-hour design storms.

Table 2.0.1 – Precipitation Values for Corresponding Design Storms

Design Storm	24-Hour Rainfall
1.1S WQv Storm	1.87”
2.1S WQv Storm	1.66”
1-Year	2.34”
10-Year	4.66”
25-Year	6.50”
100-Year	8.82”

The CN (runoff curve number) values utilized in this report were referenced from the USDA, SCS publication *Urban Hydrology for Small Watersheds*. The following is a summary of the various land uses/ground covers and their associated CN values utilized in this report.

Table 2.0.2 – Project Ground Cover and Associated Curve Numbers (CN)

Land Use/Ground Cover	CN Value
Paved Parking and Roofs, All Soils	98
>75% Grass Cover, D Soils	80
Woods, Good, HSG D	77
>75% Grass Cover, B Soils	61
Woods, Good, HSG B	55

2.1 NYSDEC Runoff Reduction Volume, RR_v

The Runoff Reduction Volume (RR_v) criterion is intended to replicate pre-development hydrology by maintaining preconstruction infiltration, peak flow runoff, discharge volume, as well as minimizing concentrated stormwater flow. As noted above, meeting the Runoff Reduction Volume (RRv) sizing criteria is not required for redevelopment projects with a reduction in overall impervious cover.

2.2 NYSDEC Water Quality Volume, WQ_v

The stormwater management practice has been designed in accordance with the *Water Quality Volume (*WQ_v*)* Section (Chapter 4.2) of the NYSSMDM. As outlined in Chapter 4.2, the WQ_v is the runoff volume generated from the entire 90th percentile rain event. As previously stated, partitions of the proposed impervious surfaces will overlap existing impervious surfaces within the site area. Per Section 9.2.1.B.III of the NYSSMDM, 100% WQv is captured and treated, for a minimum of 75% of the disturbed redevelopment area. A calculation is provided below for the Total WQv required based on Section 9.2.1.B.III of the NYSSMDM and included in Appendix A:

The water quality volume shall be $WQ_v = \frac{\mathbf{(0.75)}\,(P)(R_v)(A)}{12}$

Where,

WQ_v = water quality volume (in acre-feet)
P = 90% Rainfall Event Number
R_v = 0.05 + 0.009(I), where I is percent impervious cover
A = disturbed redeveloped area

Total WQv Required = 5,097 cf (See Calculation in Appendix A)

The proposed hydrodynamic separators (HDS 1.1 & HDS 2.1) have been designed as a flow through practice, per Chapter 9 of the NYSSMDM. As such, the flow through alternative practices have been sized for the peak rate of runoff from 100% of the WQv design storm, as defined Chapter 4 to treat the WQv in accordance with the NYSSMDM. In Appendix A of this report the calculation for the WQ_v to be treated.

Table 2.2.1 below summarizes the WQv treatment and Required Elements for the proposed Hydrodyanmic Separators (HDS 1.1 & HDS 2.1). The hydrodynamic separators have been designed in accordance with the Chapter 9 of the Design Manual for an alternative practice. As shown on the project plans, a Hydro-Shield Advance Hydrodynamic Separator by Oldcastle are proposed. The Hydr-Shield Advance is an NJCAT verified proprietary practice. The table below summarizes the required and provided WQv treatment rates. See Appendix A and F for more sizing information.

Table 2.2.1 Alternative Practice Sizing Summary

Subcatchment ID	HDS ID	100% WQ_v* (C.F)	100%WQ_v Peak Flow (C.F.S)	Hydrodynamic Separator Model	Maximum Treatment Flow Rate (C.F.S.)	Peak Flow (C.F.S.)	25-Year Peak Flow (C.F.S)
1.1S	HDS 1.1	4,165	1.48	4-ft Hydro-Shield	1.49 CFS	7.4 CFS	5.06 CFS
2.1S	HDS 2.1	2,586	0.88	4-ft Hydro-Shield	1.49 CFS	7.4 CFS	2.89 CFS

* The total WQv required represents 75% of the WQv from onsite areas only. The 100% WQv from 1.1S & 2.1S if summed exceeds the total WQv required because it includes 100% of the volume not 75% and includes offsite areas tributary to the practice.

Table 2.2.2 WQv Provided Summary

Total WQv Required (C.F.)	Total WQv Provided (C.F.)
5,097	6,751

It should be noted that the above tables illustrate the water quality volume requirements set forth in the NYSSWDM have been met for the Hydrodynamic Separators (HDS 1.1 & HDS 2.1). By meeting the Water Quality Volume requirements through employment of an alternative practice, the water quality objectives of the NYSDEC to treat the water quality volume will be met.

2.3 NYSDEC Stream Channel Protection Volume, CP_v

The Stream Channel Protection (CP_v) criterion is intended to protect stream channels from erosion and is accomplished by the 24-hour extended detention of the center-of-mass of the one-year, 24-hour storm event. As per the NYSSWDM Chapter 9, if the post-construction 1-year 24 hour discharge rate and velocities are less than or equal to the pre-construction design rate, providing 24 hours detention of the 1 year storm to meet CPv criteria is not required. Table 2.3.1 below summarizes the peak flows discharging for the 1-Year 24-Hour design storm and demonstrates that the 1-Year 24-Hour post development rate is less than the predevelopment rate.

Table 2.4.1– Pre and Post-Development Peak Flows at the Design Point

	1-YEAR (Channel Protection Volume)	
	Pre	**Post**
Design Point 1	3.0	2.6
Design Point 2	2.2	2.1

The data for the table above was taken from Appendix B & C of this SWPPP. As shown in the table above the peak flows discharging to the design point have beem mitigated for the 1-Year 24-Hour Storm. By providing a reduction in peak flows during the 1-Year, 24-hour storm, the NYSDEC requirements for Stream Channel Protection (Cpv) have been met.

2.4 NYSDEC Overbank Flood Control, Q_p, and Extreme Flood Control, Q_f

The Overbank Flood Control (Q_p) requirement is intended to prevent an increase in the frequency and magnitude of out-of-bank flooding events generated by urban development. Overbank control requires storage to attenuate the post-development 10-year, 24-hour peak discharge to pre-development rates. The Extreme Flood Control (Q_f) requirement is intended to prevent the increased risk of flood damage from large storm events, maintain the boundaries of the pre-development 100-year flood plain, and protect the physical integrity of stormwater management practices. Extreme flood control requires storage to attenuate the post-development 100-year, 24-hour peak discharge to pre-development rates. As shown in Table 2.4.1 attenuation for both the 10-year and 100-year 24-hour storms has been provided thus satisfying the Q_p and Q_f requirements.

Table 2.4.1– Pre and Post-Development Peak Flows at the Design Point

24-HOUR DESIGN STORM PEAK FLOWS (c.f.s.)				
	10-YEAR (Overbank Flood Control)		100-YEAR (Extreme Flood Control)	
	Pre	**Post**	**Pre**	**Post**
Design Point 1	5.2	5.0	8.6	8.4
Design Point 2	4.8	4.7	8.9	8.8

As shown in the above table the peak flows discharging to the design point in the proposed condition have been mitigated to below the existing condition levels, therefore the receiving downstream drainage systems will see a reduction in peak flows during the storm events shown above and as such satisfy the Overbank and Extreme Overbank Flood Control requirements.

3.0 STORMWATER CONVEYANCE SYSTEM

The stormwater collection and conveyance systems for the project will consist of catch basins, drain inlets, yard drains, and HDPE pipe. The pipe conveyance system will be sized to collect and convey at minimum the 25-year, 1-hour design storm using the Rational Method. The Rational Method is a standard method used by engineers to develop flow rates for sizing collection systems. The Rational Method calculates flows based on a one-hour design storm. See Appendix G for Pipe Sizing Calculations

4.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control should be accomplished by four basic principles: diversion of clean water, containment of sediment, treatment of dirty water, and stabilization of disturbed areas. Diversion of clean water should be accomplished with swales. This diverted water should be safely conveyed around the construction area as necessary and discharged downstream of the disturbed areas. Sediment should be contained with the use of silt fence at the toe of disturbed slopes and excavation of the temporary sediment

basin. Disturbed areas should be permanently stabilized within 14 days of final grading to limit the required length of time that the temporary facilities must be utilized. The owner will be responsible for the maintenance of the temporary erosion control facilities.

4.1 Temporary Erosion and Sediment Control Facilities

Temporary erosion and sediment control facilities should be installed and maintained as required to reduce the impacts to off-site properties. The owner will be required to provide maintenance for the temporary erosion and sediment control facilities. In general, the following temporary methods and materials should be used to control erosion and sedimentation from the project site:

- Stabilized Construction Entrance
- Silt Fence Barriers
- Storm Drain Inlet Protection

A stabilized construction entrance should be installed at the entrance to the site. The design drawings will include details to guide the contractor in the construction of this entrance. The intent of the stabilized construction entrance is to prevent the “tracking” of soil from the site. Dust control should be accomplished with water sprinkling trucks if required. During dry periods, sprinkler trucks should wet all exposed earth surfaces as required to prevent the transport of air-borne particles to adjoining areas.

Siltation barriers constructed of geosynthetic filter cloth should be installed at the toe of all disturbed slopes. The intent of these barriers is to contain silt and sediment at the source and inhibit its transport by stormwater runoff. The siltation barriers will also help reduce the rate of runoff by creating filters through which the stormwater must pass.

Storm drain inlet protection in the form of stone drop inlet protection will be installed around all proposed inlets. The stone drop inlet protection will serve to filter stormwater runoff before it enters the collection system. Throughout construction the concrete drainage structures, associated piping and inlet protections shall be inspected weekly and after a rainfall event. These items shall be cleaned, repaired and/or replaced when needed.

4.2 Permanent Erosion and Sediment Control Facilities

Permanent erosion and sediment control will be accomplished by diverting stormwater runoff from steep slopes, controlling/reducing stormwater runoff velocities and volumes, and vegetative and structural surface stabilization. All of the permanent facilities are relatively maintenance free and only require periodic inspections. The owner will provide maintenance for all the permanent erosion and sediment control facilities.

Other than the buildings and paved surfaces, disturbed surfaces will be stabilized with vegetation. The vegetation will control stormwater runoff by preventing soil erosion, reducing runoff volume and velocities, and providing a filter medium. Permanent seeding should optimally be undertaken in the spring from March 21st through May 20th and in late summer from August 15th to October 15th.

5.0 IMPLEMENTATION, MAINTENANCE & GENERAL HOUSEKEEPING

5.1 Construction Phase

Details associated with the implementation and maintenance of the proposed stormwater facilities and erosion control measures during construction are shown on the project drawings. A construction sequence has been provided to guide the contractor in the installation of the erosion control measures as well as the site plan features. The erosion control plan, includes associated details and notes to aid the contractor in implementing the plan.

During construction, a Site Log Book, Appendix E, is required to be kept per NYSDEC SPDES General Permit GP-0-25-001. Erosion and sediment control inspections are required to be conducted as necessary under coverage of the permit (minimum once a week, two times a week should the overall disturbance exceed five acres) and an updated logbook and a copy of the SWPPP is required to be kept on site for the duration of the construction activities. The Construction Site Log Book is an appendix taken from the *New York Standards and Specifications for Erosion and Sediment Control* (Blue Book).

In addition to the proposed erosion and sediment control facilities, the following good housekeeping best management practices shall be implemented to mitigate potential pollution during the construction phase of the project. The general contractor overseeing the day-to-day site operation shall be responsible for the good housekeeping best management practices included in the following general categories:

- Material Handling and Waste Management
- Establishment of Building Material Staging Areas
- Establishment of Washout Areas
- Proper Equipment Fueling and Maintenance Practices
- Spill Prevention and Control Plan

All construction waste materials shall be collected and removed from the site regularly by the general contractor. The general contractor shall supply waste barrels for proper disposal of waste materials. All personnel working on the site shall be instructed of the proper procedures for construction waste disposal.

Although it is not anticipated any hazardous waste materials will be utilized during construction, any hazardous waste materials shall be disposed of in accordance with federal, state, and local regulations. No hazardous waste shall be disposed of on-site. Hazardous waste materials shall be stored in appropriate and clearly marked containers and segregated from the other non-waste materials. All hazardous waste shall be stored in structurally sound and sealed shipping containers located in the staging areas. Material safety data sheets, material inventory, and emergency contact numbers will be maintained in the office trailer. All personnel working on the site shall be instructed of the proper procedures for hazardous waste disposal.

Temporary sanitary facilities (portable toilets) shall be provided on site during the entire length of construction. The sanitary facilities shall be located in an alternate area away from the construction activities on the site. The portable toilets shall be inspected weekly for evidence of leaking holding tanks.

All recyclables, including wood pallets, cardboard boxes, and all other recyclable construction scraps shall be disposed of in a designated recycling barrel provided by the contractor and removed from the site regularly. All personnel working on the site shall be instructed of the proper procedures for construction waste recycling.

All construction equipment and maintenance materials shall be stored in a designated staging area. Silt fence shall be installed down gradient of the construction staging area. Shipping containers shall be utilized to store hand tools, small parts, and other construction materials, not taken off site daily. Construction waste barrels, recycling barrels and if necessary hazardous waste containers shall be located within the limits of the construction staging area.

Throughout the construction of the project, several types of vehicles and equipment will be used on-site. Fueling of the equipment shall occur within the limits of the construction staging area. Fuel will be delivered to the site as needed, by the general contractor, or a party chosen by the general contractor. Only minor vehicle equipment maintenance shall occur on-site, all major maintenance shall be performed off-site. All equipment fluids generated from minor maintenance activities shall be disposed of into designated drums and stored in accordance with the hazardous waste storage as previously discussed.

Vehicles and equipment shall be inspected on each day of use. Any leak discovered shall be repaired immediately. All leaking equipment unable to be repaired shall be removed from the site. Ample supplies of

absorbent, spill-cleanup materials, and spill kits shall be located in the construction staging area. All spills shall be cleaned up immediately upon discovery. Spent absorbent materials and rags shall be hauled off-site immediately after the spill is cleaned for disposal at a local landfill. All personnel working on the site shall be instructed of the proper procedures for spill prevention and control.

During the construction phase of the project the subsurface infiltration system shall be cordoned off with construction fence to prevent undue compaction of the surrounding soils. The infiltration areas shall not be allowed to receive runoff until the contributing area to the system is completely stabilized in accordance with the erosion and sediment control notes on the project drawings. Installation of the system after the contributing area is stable will help to prevent any sediment from entering the SMP.

5.2 Long Term Maintenance Plan

Each spring the paved areas should be cleaned to remove the winter's accumulation of traction sand. After this is completed, all drain inlets sumps and the stormwater basins should be cleaned. All pipes should be checked for debris and blockages and cleaned as required. During the cleaning process, the drain inlets, catch basins, and pipes should be inspected for structural integrity and overall condition; repairs and/or replacement will be made as required.

The stormwater facilities for the subject project have been designed to minimize the required maintenance. This section discusses the minimum maintenance requirements to insure long-term performance of the stormwater facilities. Initially the stormwater facilities will require an increased maintenance and inspection schedule until all portions of the site are stable. Generally, the stormwater facilities consist of either collection and conveyance components or treatment components.

The stormwater collection and conveyance system is composed of HDPE, drainage pipe and precast concrete drainage structures. The owner will assume the maintenance responsibilities for the drainage system. Minimal maintenance is typically required for these facilities. All pipes should be checked for debris and blockages and cleaned as required. All drain inlet sumps shall be cleaned to removed deposited sediment. During the cleaning process, the pipes should be inspected for structural integrity and overall condition; repairs and/or replacement should be made as required.

Additionally, the hydrodynamic separators shall be checked for deposited sediment. Visual inspection of the bioretention filter shall take place after major storm events. Visual inspection of the hydrodynamic separator shall take place yearly.

APPENDIX A

NYSDEC Water Quality Volume WQv Calculations Worksheet

WQv Flow Calculation Worksheet

Project: 1 Croton Point
Project #: 24154.100
Date: 8/1/2024

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The following calculation determines the water quality flow rate for the 90% Water Quality Event using the Small Storm Hydrology Method specified in Appendix B of the New York State Stormwater Management Design Manual.

Total WQv Required

1.Water Quality Volume $= WQ_v = \frac{0.75 * P * R_v * A}{12}$

P = WQv 24-hour Rainfall Amount	=	1.5	in.
A = Subcatchment Area	=	69696	SF
Ai= Impervious Area within Subcatchment Area	=	56628	
I = Ai/A	=	81.3	%
Rv = 0.05 + 0.009 (I%)	=	0.78	
WQv = Water Quality Volume	=	5,097	CF

WQv Flow Calculation Worksheet

Project: 1 Croton Point
Project #: 24154.100
Date: 5/1/2025

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The following calculation determines the water quality flow rate for the 90% Water Quality Event using the Small Storm Hydrology Method specified in Appendix B of the New York State Stormwater Management Design Manual.

HDS ID: 1.1S

1.Water Quality Volume $= WQ_v = \frac{P * R_v * A}{12}$

P = WQv 24-hour Rainfall Amount	=	1.5	in.
A = Subcatchment Area	=	39204	SF
Ai= Impervious Area within Subcatchment Area	=	34848	
I = Ai/A	=	88.9	%
Rv = 0.05 + 0.009 (I%)	=	0.85	
WQv = Water Quality Volume	=	**4,165**	CF

2.Water Quality Peak Flow

The WQv Peak flow is determined using HydroCAD. However, the rainfall depth (P90) Value utilized is determined from the calculation below:

P90 = Calculated rainfall value (in)			
CNw = Weighted Curve Number	=	94	
S = Maximum basin retention (in)			
S= (1000/CNw) - 10	=	0.64	
Q = runoff generator over contributing area [Q = WQv/A]	=	1.27	
P90 $= \frac{S+2.5Q+(6.25Q^2+25SQ)^{0.5}}{5}$	=	**1.86**	in

WQv Flow Calculation Worksheet

Project: 1 Croton Point
Project #: 24154.100
Date: 8/1/2024

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The following calculation determines the water quality flow rate for the 90% Water Quality Event using the Small Storm Hydrology Method specified in Appendix B of the New York State Stormwater Management Design Manual.

HDS ID: 2.1S

1.Water Quality Volume $= WQ_v = \frac{P * R_v * A}{12}$

P = WQv 24-hour Rainfall Amount	=	1.5	in.
A = Subcatchment Area	=	21780	SF
Ai= Impervious Area within Subcatchment Area	=	21780	
I = Ai/A	=	100.0	%
Rv = 0.05 + 0.009 (I%)	=	0.95	
WQv = Water Quality Volume	=	2,586	CF

2.Water Quality Peak Flow

The WQv Peak flow is determined using HydroCAD. However, the rainfall depth (P90) Value utilized is determined from the calculation below:

P90 = Calculated rainfall value (in)	=	
CNw = Weighted Curve Number	=	98
S = Maximum basin retention (in)		
S= (1000/CNw) - 10	=	0.2041
Q = runoff generator over contributing area [Q = WQv/A]	=	1.4250
P90 $= \frac{S+2.5Q+(6.25Q^2+25SQ)^{0.5}}{5}$	=	1.65

Summary for Subcatchment 1.1S: WQV

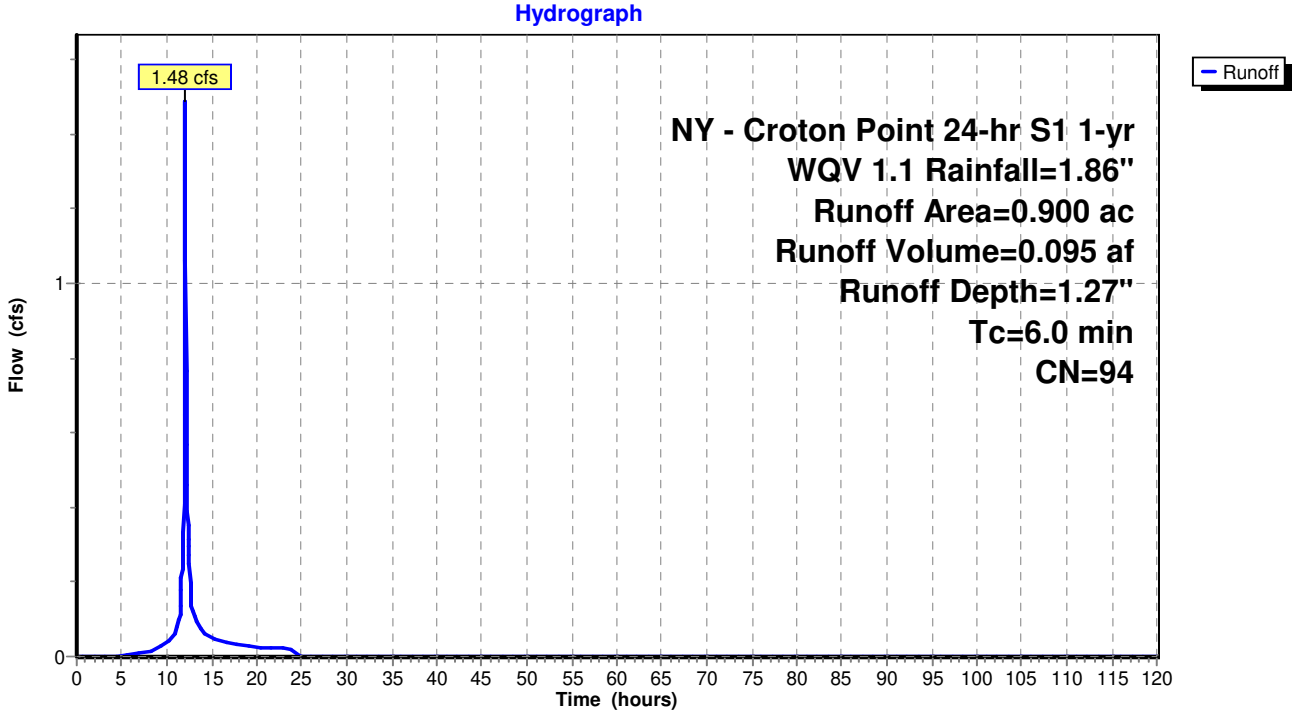
Runoff = 1.48 cfs @ 12.04 hrs, Volume= 0.095 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 1-yr WQV 1.1 Rainfall=1.86"

	Area (ac)	CN	Description
*	0.800	98	Impervious
	0.100	61	>75% Grass cover, Good, HSG B
	0.900	94	Weighted Average
	0.100		11.11% Pervious Area
	0.800		88.89% Impervious Area

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

Subcatchment 1.1S: WQV



Summary for Subcatchment 1.1S: WQV

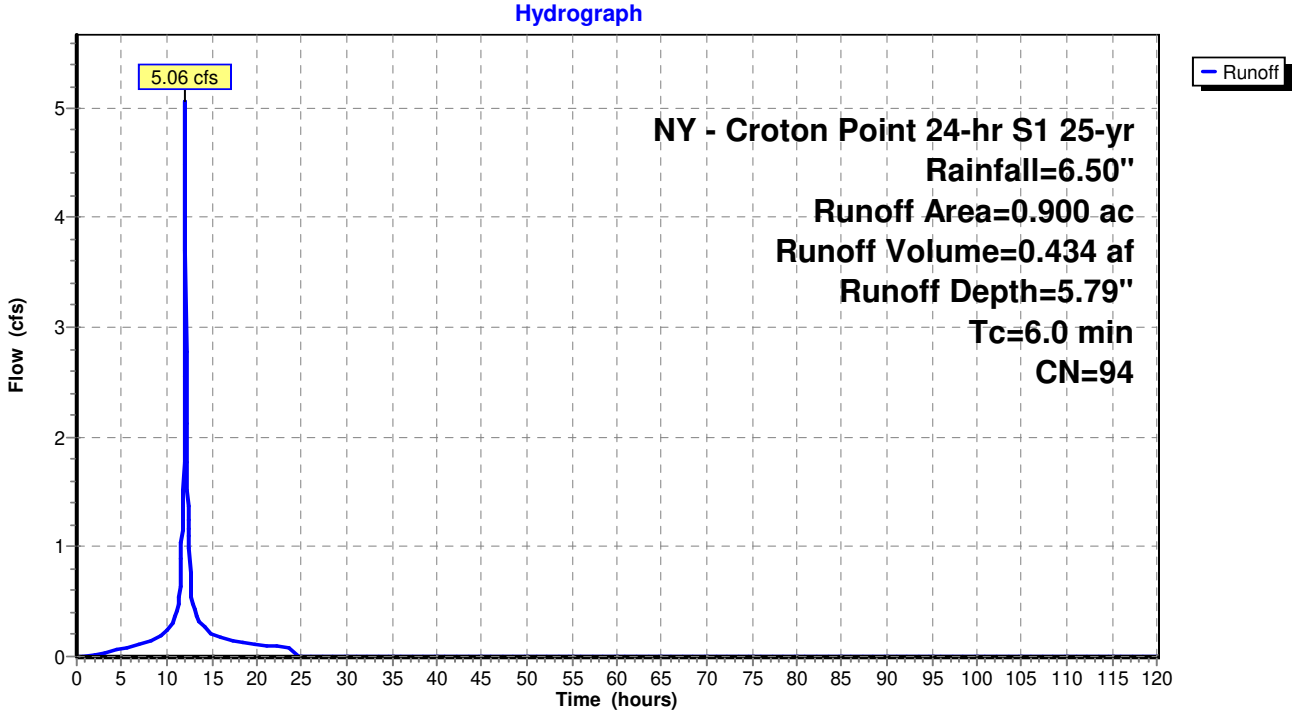
Runoff = 5.06 cfs @ 12.04 hrs, Volume= 0.434 af, Depth= 5.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 25-yr Rainfall=6.50"

	Area (ac)	CN	Description
*	0.800	98	Impervious
	0.100	61	>75% Grass cover, Good, HSG B
	0.900	94	Weighted Average
	0.100		11.11% Pervious Area
	0.800		88.89% Impervious Area

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

Subcatchment 1.1S: WQV



Summary for Subcatchment 2.1S: WQv

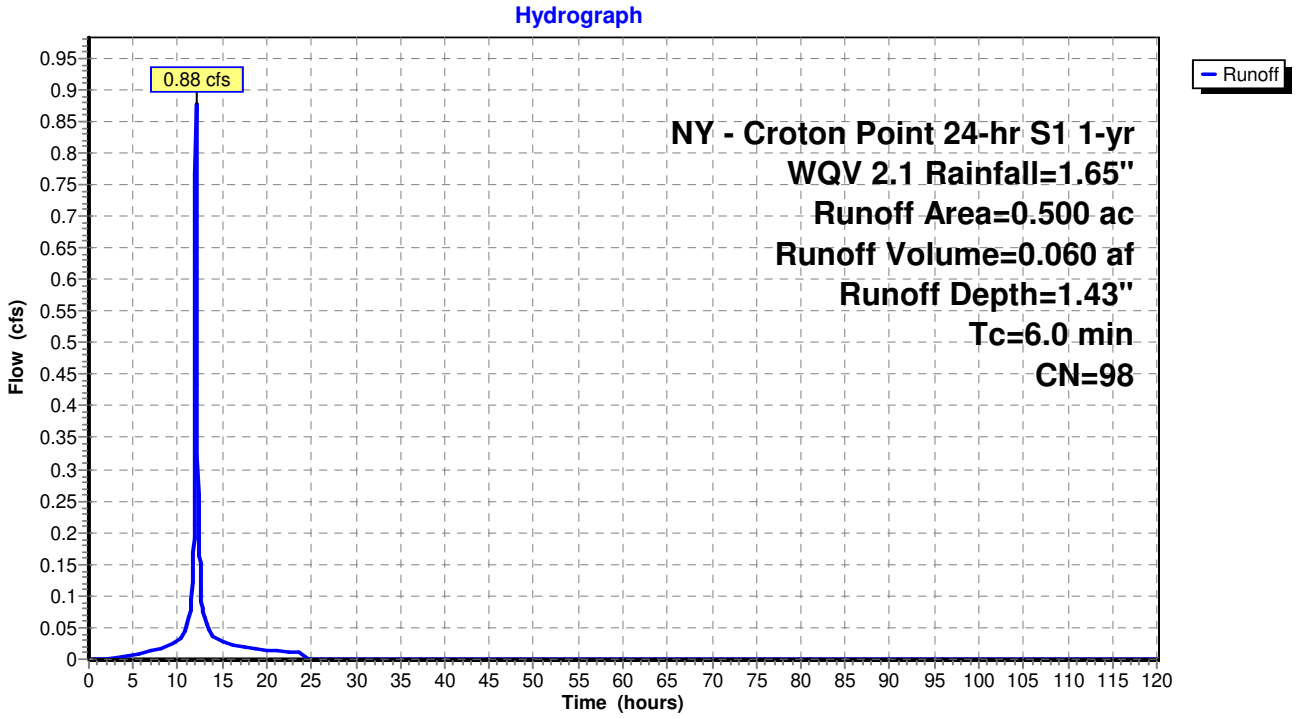
Runoff = 0.88 cfs @ 12.04 hrs, Volume= 0.060 af, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 1-yr WQV 2.1 Rainfall=1.65"

	Area (ac)	CN	Description
*	0.500	98	Impervious
	0.500		100.00% Impervious Area

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

Subcatchment 2.1S: WQv



Summary for Subcatchment 2.1S: WQv

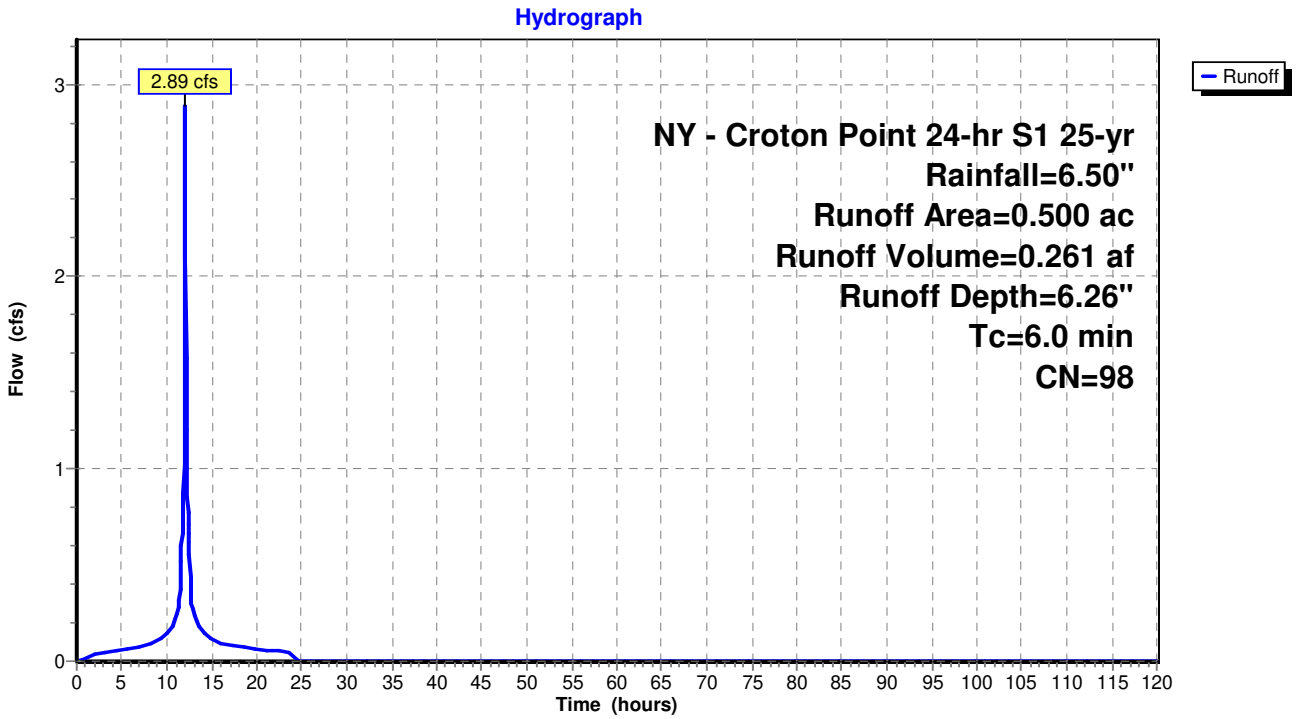
Runoff = 2.89 cfs @ 12.04 hrs, Volume= 0.261 af, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 25-yr Rainfall=6.50"

	Area (ac)	CN	Description
*	0.500	98	Impervious
	0.500		100.00% Impervious Area

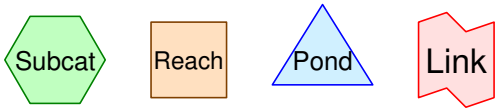
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2.1S: WQv



APPENDIX B

Pre-Development Computer Data



Routing Diagram for App B - Pre Development - Croton Point

Prepared by Insite Engineering, Surveying and Landscape Architecture, P.C., Printed 7/31/2024

HydroCAD® 10.00-15 s/n 00891 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment PRE 1:

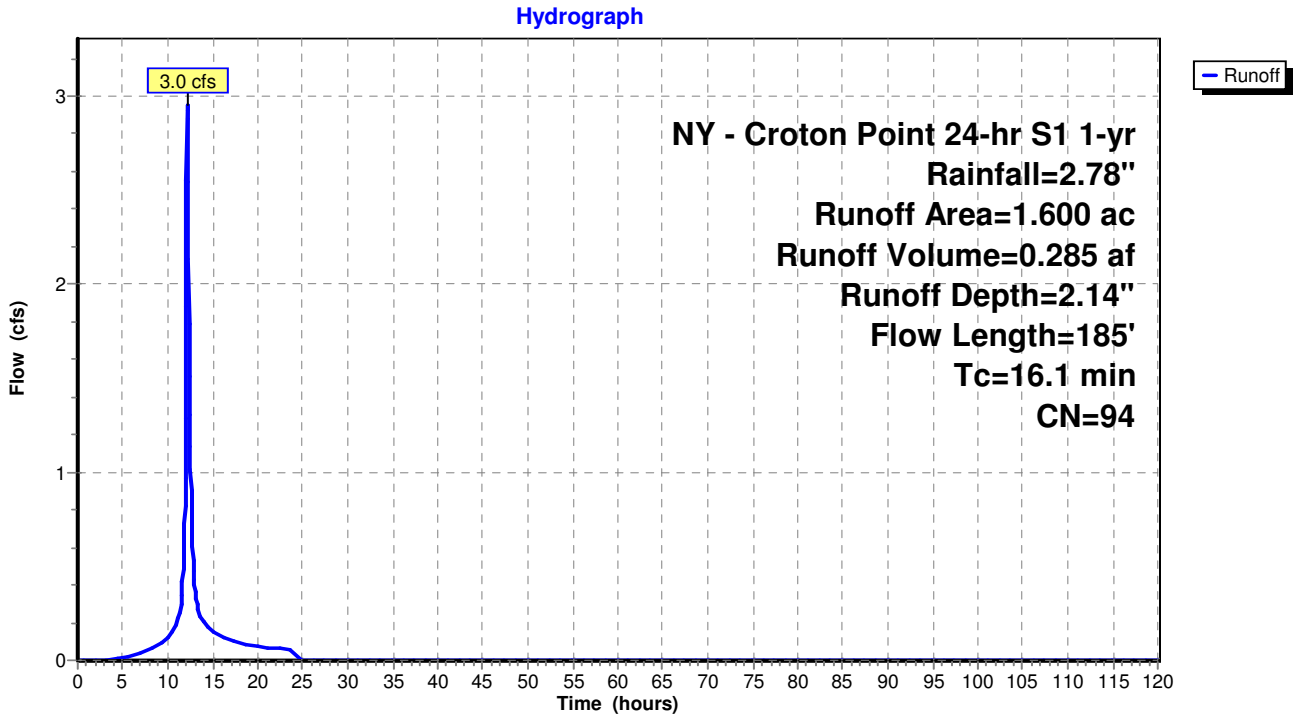
Runoff = 3.0 cfs @ 12.17 hrs, Volume= 0.285 af, Depth= 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 1-yr Rainfall=2.78"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
1.450	98	Paved parking, HSG D
0.050	55	Woods, Good, HSG B
1.600	94	Weighted Average
0.150		9.38% Pervious Area
1.450		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
1.6	85	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.1	185	Total			

Subcatchment PRE 1:



Summary for Subcatchment PRE 2:

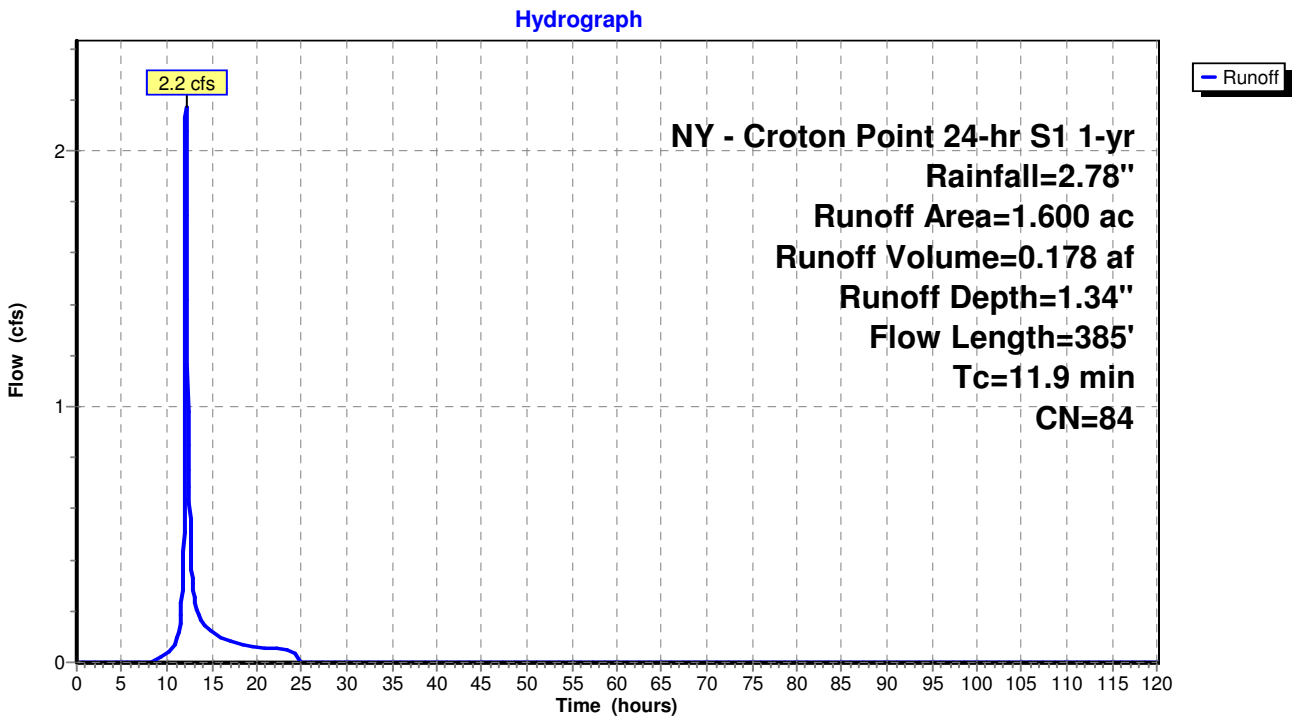
Runoff = 2.2 cfs @ 12.12 hrs, Volume= 0.178 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 1-yr Rainfall=2.78"

Area (ac)	CN	Description
0.100	80	>75% Grass cover, Good, HSG D
0.150	77	Woods, Good, HSG D
0.250	61	>75% Grass cover, Good, HSG B
0.200	55	Woods, Good, HSG B
0.900	98	Paved parking, HSG D
1.600	84	Weighted Average
0.700		43.75% Pervious Area
0.900		56.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	40	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
3.8	60	0.0700	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.37"
0.4	38	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	90	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	73	0.2100	3.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	56	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	28	0.2000	25.50	31.30	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.9	385	Total			

Subcatchment PRE 2:



Summary for Subcatchment PRE 1:

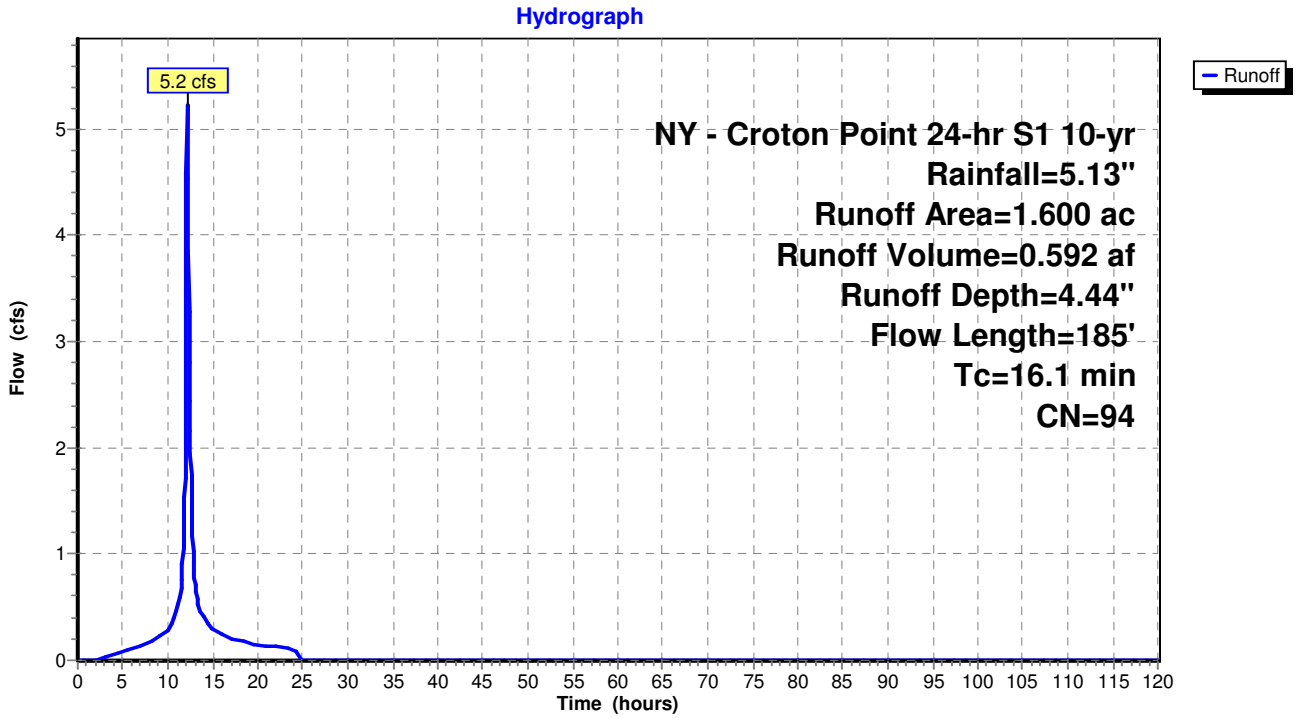
Runoff = 5.2 cfs @ 12.17 hrs, Volume= 0.592 af, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 10-yr Rainfall=5.13"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
1.450	98	Paved parking, HSG D
0.050	55	Woods, Good, HSG B
1.600	94	Weighted Average
0.150		9.38% Pervious Area
1.450		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
1.6	85	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.1	185	Total			

Subcatchment PRE 1:



Summary for Subcatchment PRE 2:

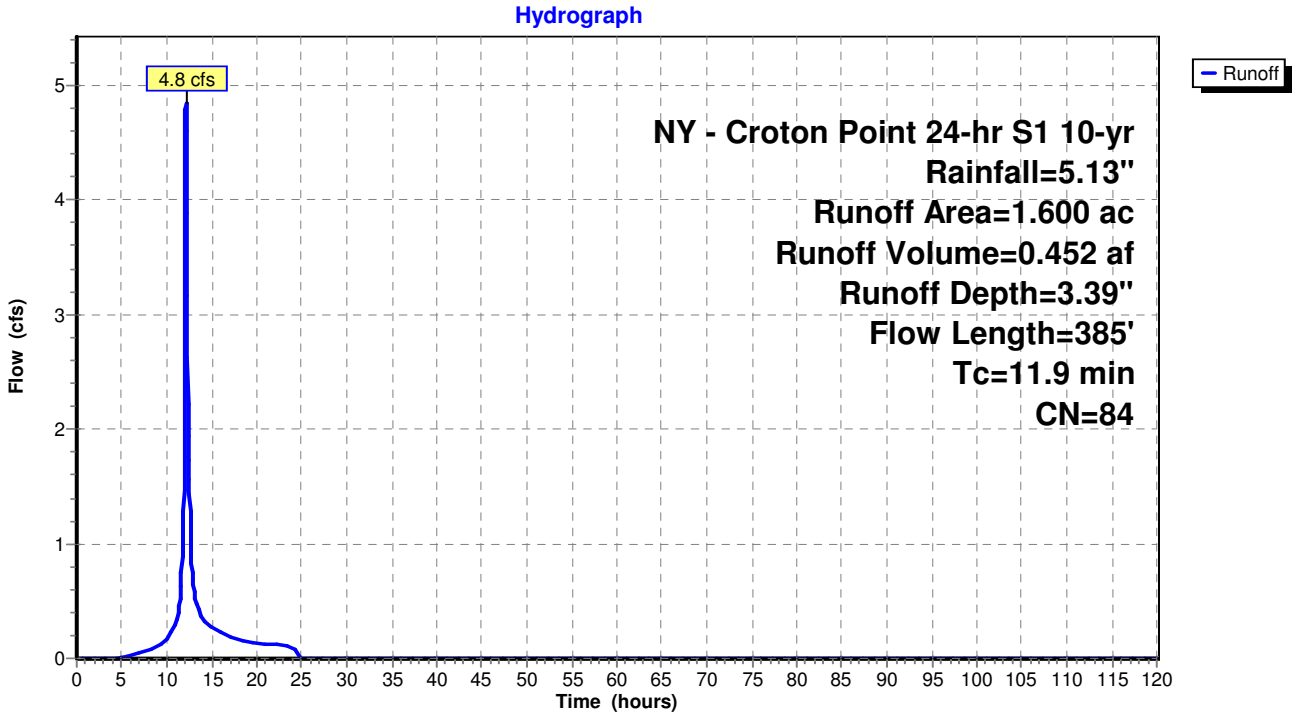
Runoff = 4.8 cfs @ 12.12 hrs, Volume= 0.452 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 10-yr Rainfall=5.13"

Area (ac)	CN	Description
0.100	80	>75% Grass cover, Good, HSG D
0.150	77	Woods, Good, HSG D
0.250	61	>75% Grass cover, Good, HSG B
0.200	55	Woods, Good, HSG B
0.900	98	Paved parking, HSG D
1.600	84	Weighted Average
0.700		43.75% Pervious Area
0.900		56.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	40	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
3.8	60	0.0700	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.37"
0.4	38	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	90	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	73	0.2100	3.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	56	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	28	0.2000	25.50	31.30	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.9	385	Total			

Subcatchment PRE 2:



Summary for Subcatchment PRE 1:

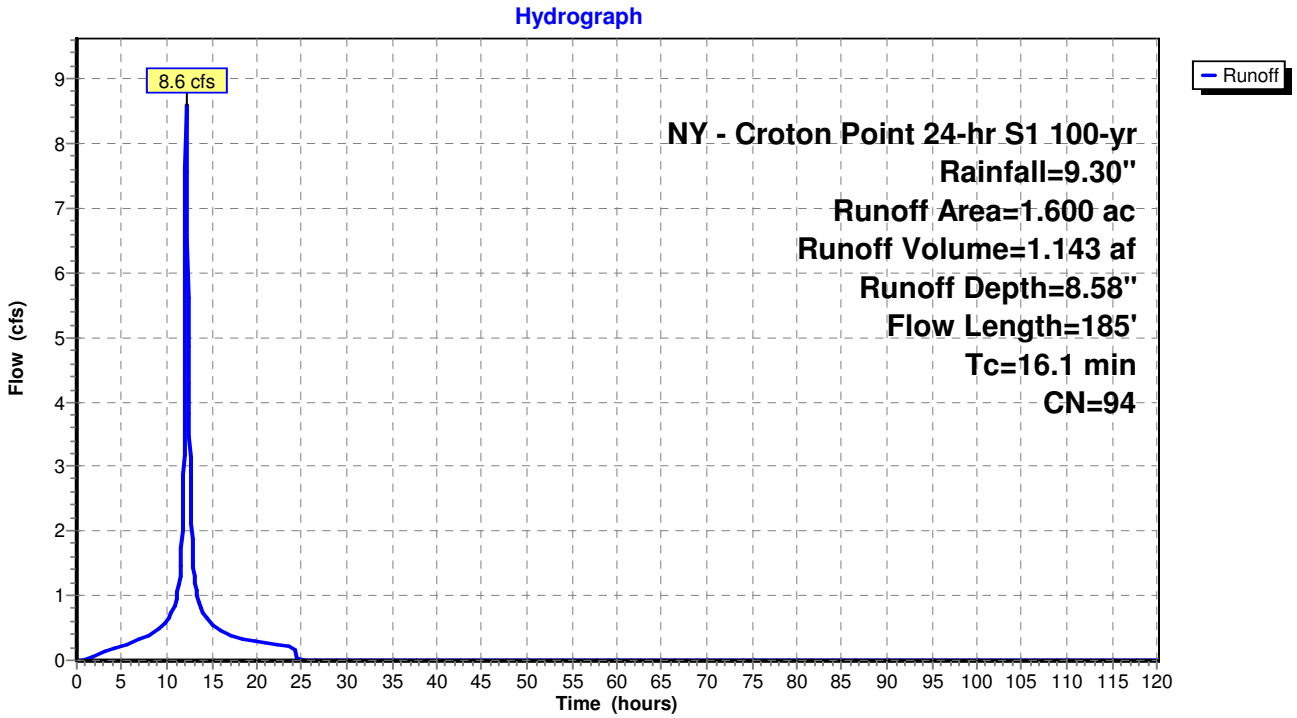
Runoff = 8.6 cfs @ 12.17 hrs, Volume= 1.143 af, Depth= 8.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 100-yr Rainfall=9.30"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
1.450	98	Paved parking, HSG D
0.050	55	Woods, Good, HSG B
1.600	94	Weighted Average
0.150		9.38% Pervious Area
1.450		90.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
1.6	85	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.1	185	Total			

Subcatchment PRE 1:



Summary for Subcatchment PRE 2:

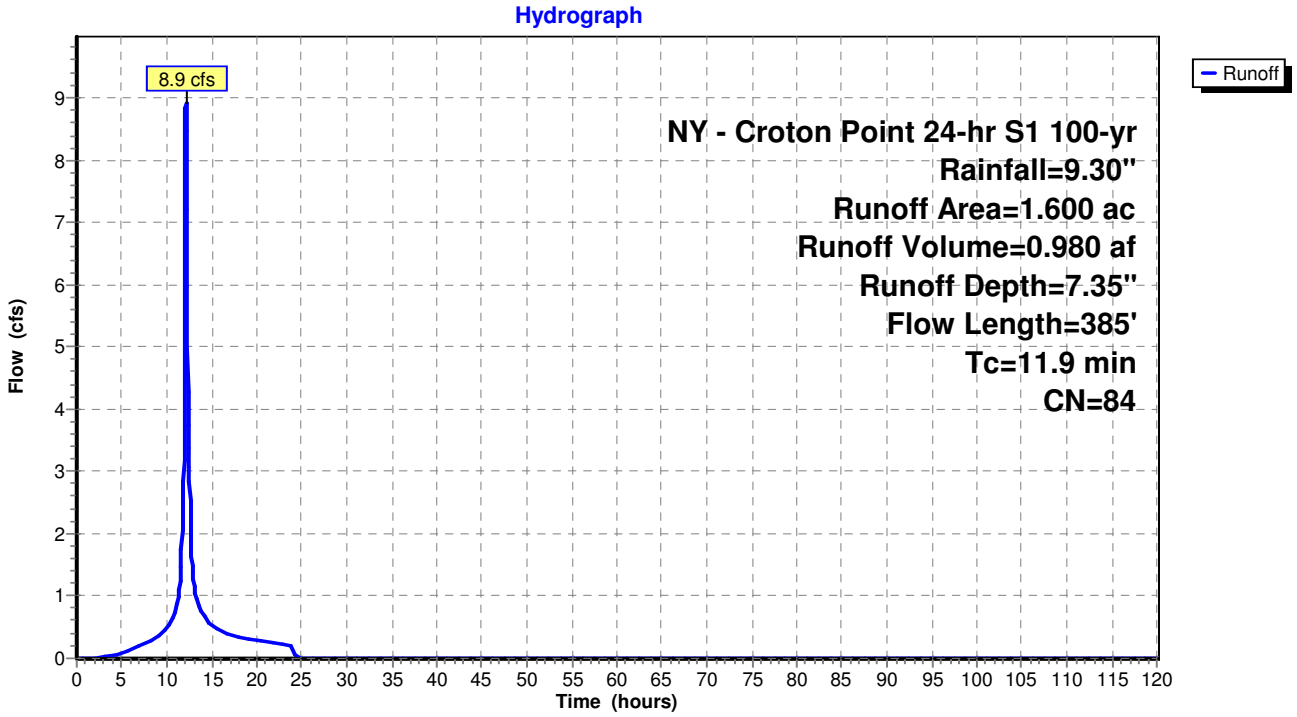
Runoff = 8.9 cfs @ 12.11 hrs, Volume= 0.980 af, Depth= 7.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 100-yr Rainfall=9.30"

Area (ac)	CN	Description
0.100	80	>75% Grass cover, Good, HSG D
0.150	77	Woods, Good, HSG D
0.250	61	>75% Grass cover, Good, HSG B
0.200	55	Woods, Good, HSG B
0.900	98	Paved parking, HSG D
1.600	84	Weighted Average
0.700		43.75% Pervious Area
0.900		56.25% Impervious Area

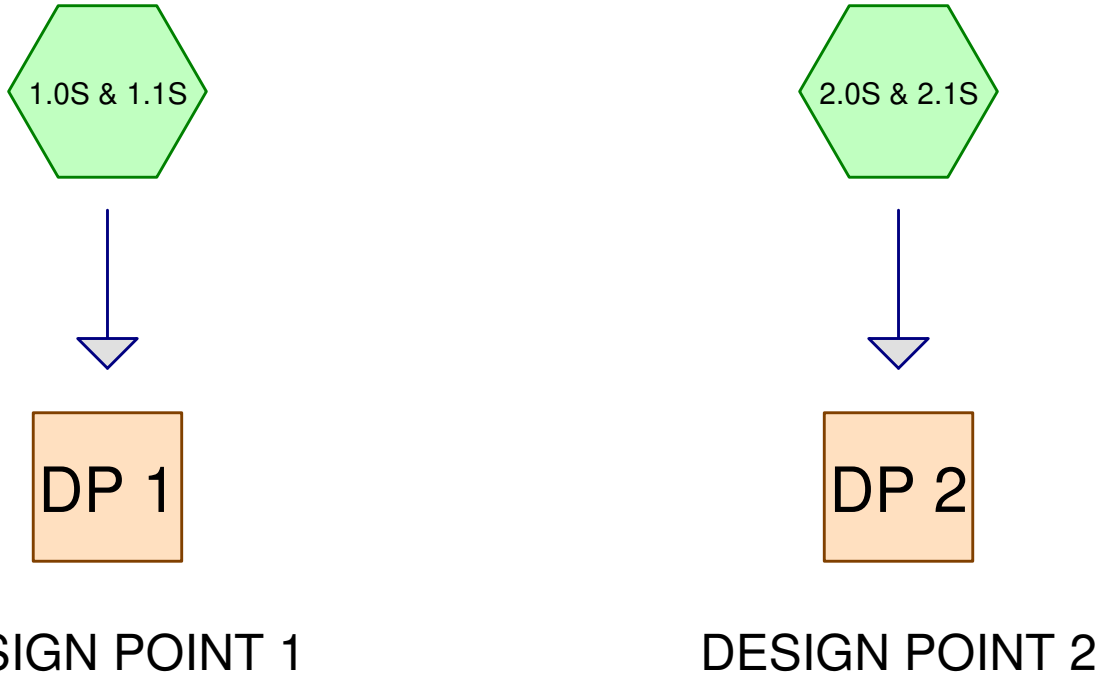
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	40	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
3.8	60	0.0700	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.37"
0.4	38	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	90	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	73	0.2100	3.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	56	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	28	0.2000	25.50	31.30	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.9	385	Total			

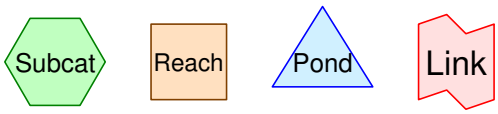
Subcatchment PRE 2:



APPENDIX C

Post-Development Computer Data





Routing Diagram for App C - Post Development - Croton Point
Prepared by {enter your company name here}, Printed 3/26/2025
HydroCAD® 10.00-15 s/n 02171 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 1.0S & 1.1S:

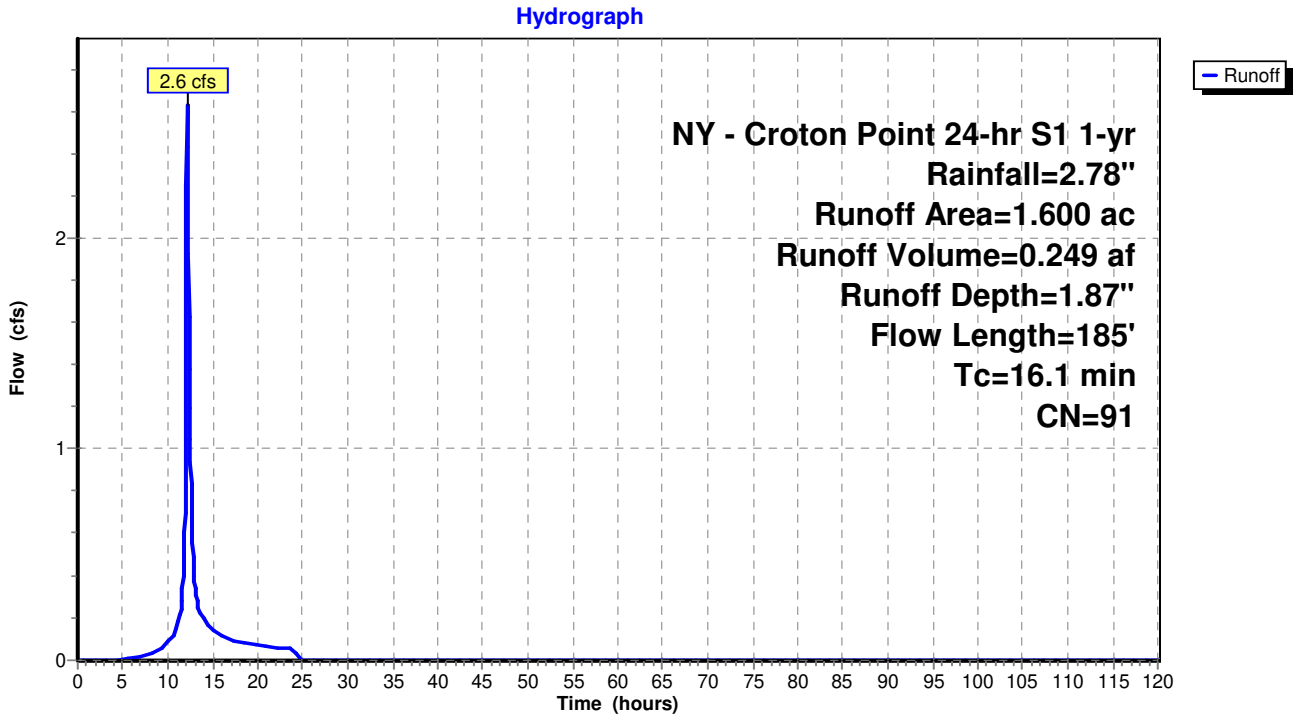
Runoff = 2.6 cfs @ 12.17 hrs, Volume= 0.249 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 1-yr Rainfall=2.78"

Area (ac)	CN	Description
0.250	61	>75% Grass cover, Good, HSG B
0.050	55	Woods, Good, HSG B
1.300	98	Paved parking, HSG D
1.600	91	Weighted Average
0.300		18.75% Pervious Area
1.300		81.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
1.6	85	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.1	185	Total			

Subcatchment 1.0S & 1.1S:



Summary for Subcatchment 2.0S & 2.1S:

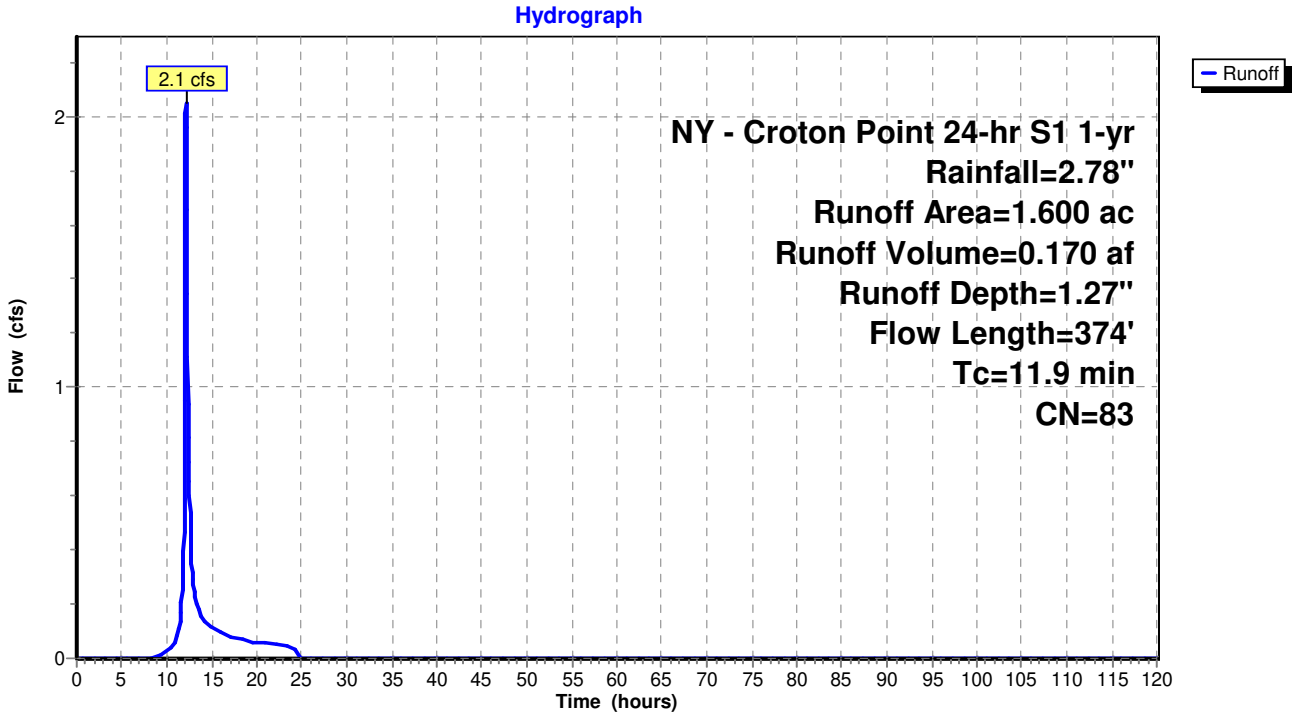
Runoff = 2.1 cfs @ 12.12 hrs, Volume= 0.170 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 1-yr Rainfall=2.78"

Area (ac)	CN	Description
0.150	80	>75% Grass cover, Good, HSG D
0.100	77	Woods, Good, HSG D
0.300	61	>75% Grass cover, Good, HSG B
0.200	55	Woods, Good, HSG B
0.850	98	Paved parking, HSG D
1.600	83	Weighted Average
0.750		46.88% Pervious Area
0.850		53.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	40	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
3.8	60	0.0700	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.37"
0.4	38	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	90	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	73	0.2100	3.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	22	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	36	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	15	0.0010	1.80	2.21	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.9	374	Total			

Subcatchment 2.0S & 2.1S:

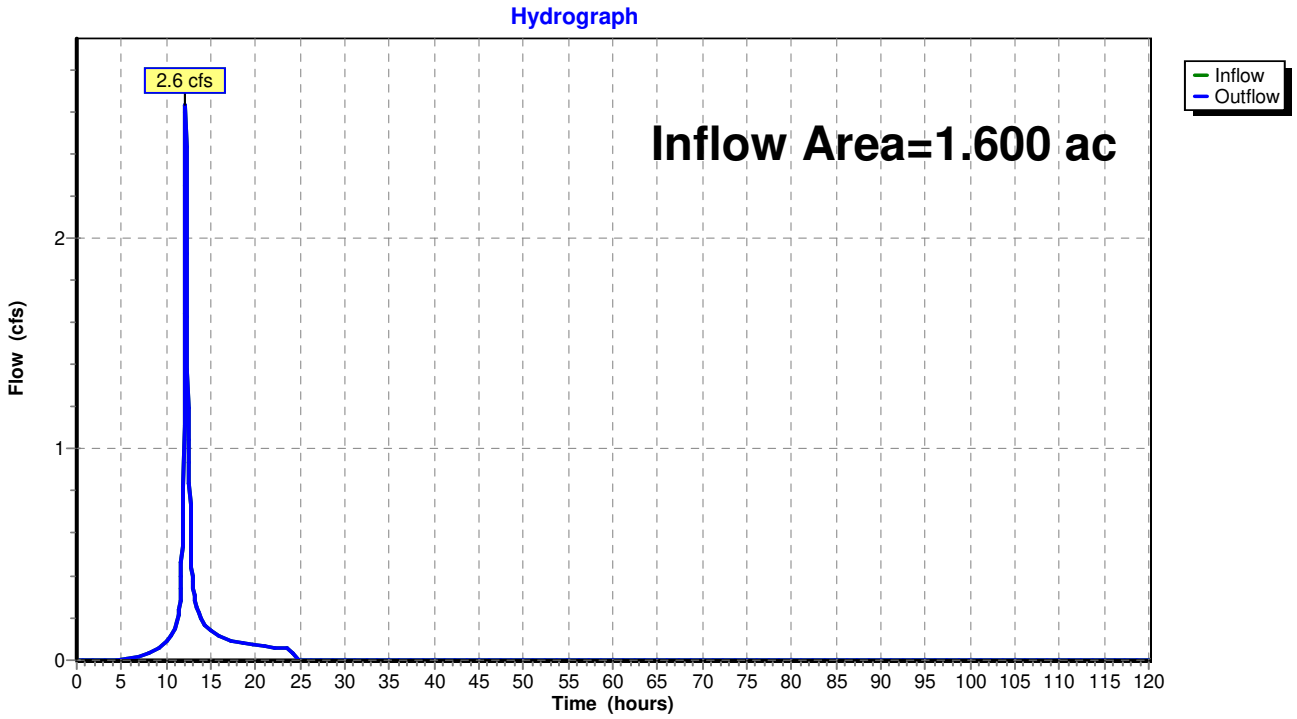


Summary for Reach DP 1: DESIGN POINT 1

Inflow Area = 1.600 ac, 81.25% Impervious, Inflow Depth = 1.87" for 1-yr event
Inflow = 2.6 cfs @ 12.17 hrs, Volume= 0.249 af
Outflow = 2.6 cfs @ 12.17 hrs, Volume= 0.249 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP 1: DESIGN POINT 1

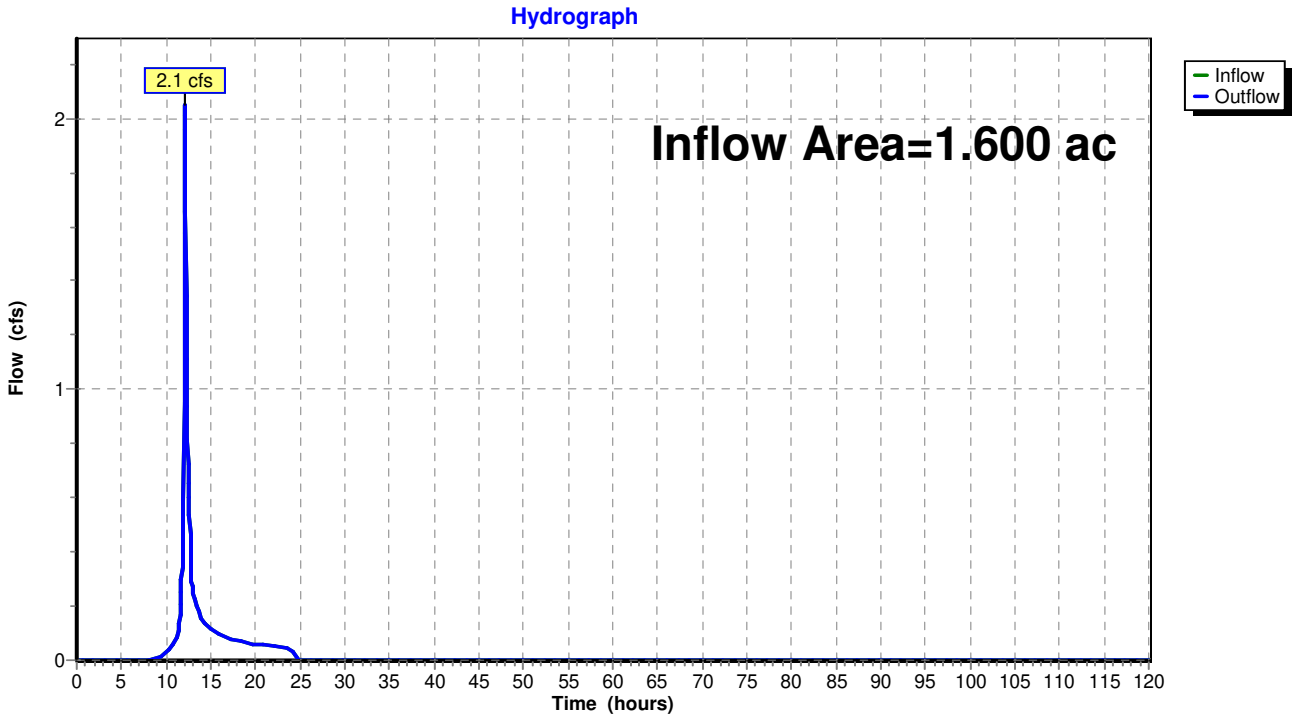


Summary for Reach DP 2: DESIGN POINT 2

Inflow Area = 1.600 ac, 53.13% Impervious, Inflow Depth = 1.27" for 1-yr event
Inflow = 2.1 cfs @ 12.12 hrs, Volume= 0.170 af
Outflow = 2.1 cfs @ 12.12 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP 2: DESIGN POINT 2



Summary for Subcatchment 1.0S & 1.1S:

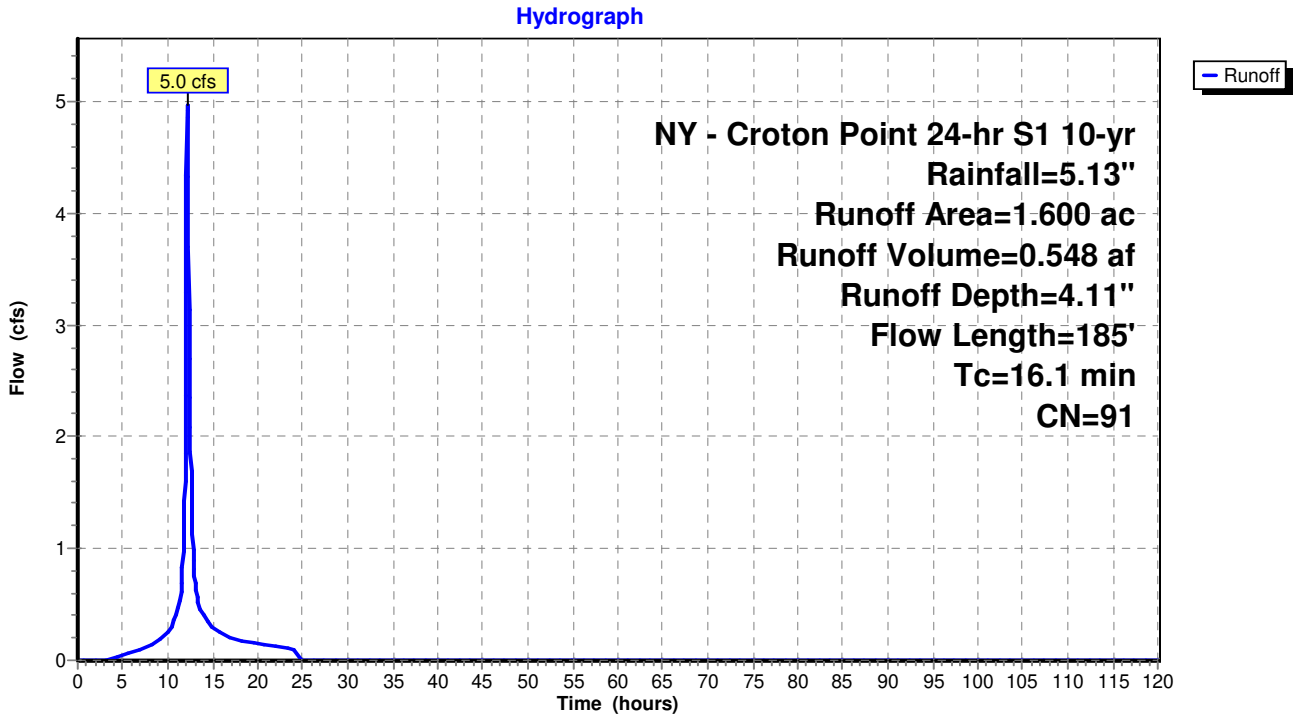
Runoff = 5.0 cfs @ 12.17 hrs, Volume= 0.548 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 10-yr Rainfall=5.13"

Area (ac)	CN	Description
0.250	61	>75% Grass cover, Good, HSG B
0.050	55	Woods, Good, HSG B
1.300	98	Paved parking, HSG D
1.600	91	Weighted Average
0.300		18.75% Pervious Area
1.300		81.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
1.6	85	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.1	185	Total			

Subcatchment 1.0S & 1.1S:



Summary for Subcatchment 2.0S & 2.1S:

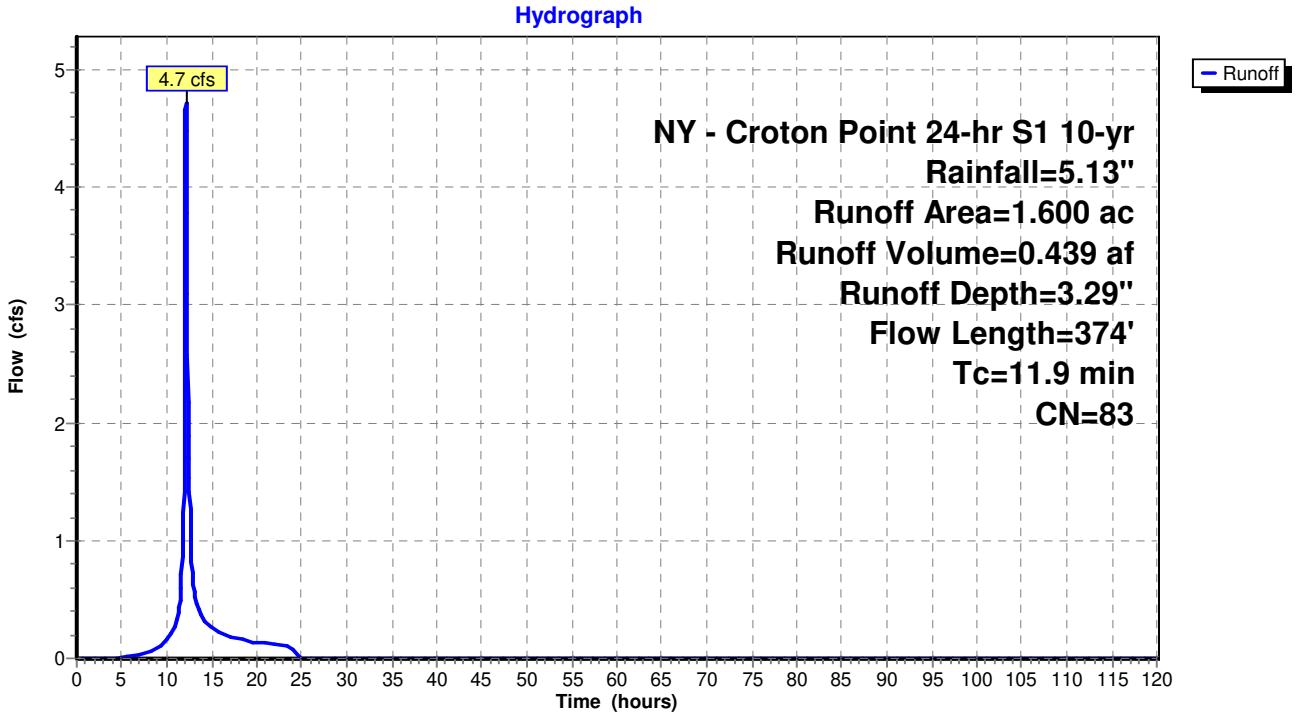
Runoff = 4.7 cfs @ 12.12 hrs, Volume= 0.439 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 10-yr Rainfall=5.13"

Area (ac)	CN	Description
0.150	80	>75% Grass cover, Good, HSG D
0.100	77	Woods, Good, HSG D
0.300	61	>75% Grass cover, Good, HSG B
0.200	55	Woods, Good, HSG B
0.850	98	Paved parking, HSG D
1.600	83	Weighted Average
0.750		46.88% Pervious Area
0.850		53.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	40	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
3.8	60	0.0700	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.37"
0.4	38	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	90	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	73	0.2100	3.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	22	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	36	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	15	0.0010	1.80	2.21	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.9	374	Total			

Subcatchment 2.0S & 2.1S:

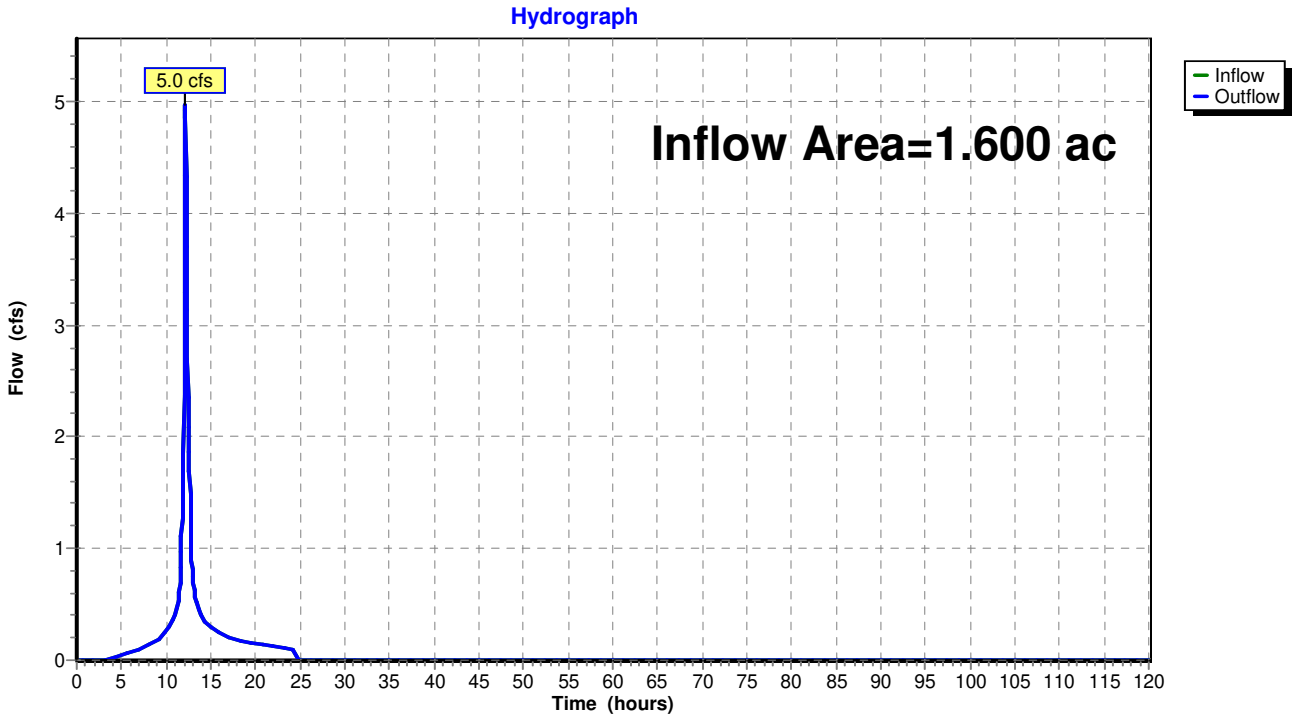


Summary for Reach DP 1: DESIGN POINT 1

Inflow Area = 1.600 ac, 81.25% Impervious, Inflow Depth = 4.11" for 10-yr event
Inflow = 5.0 cfs @ 12.17 hrs, Volume= 0.548 af
Outflow = 5.0 cfs @ 12.17 hrs, Volume= 0.548 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP 1: DESIGN POINT 1

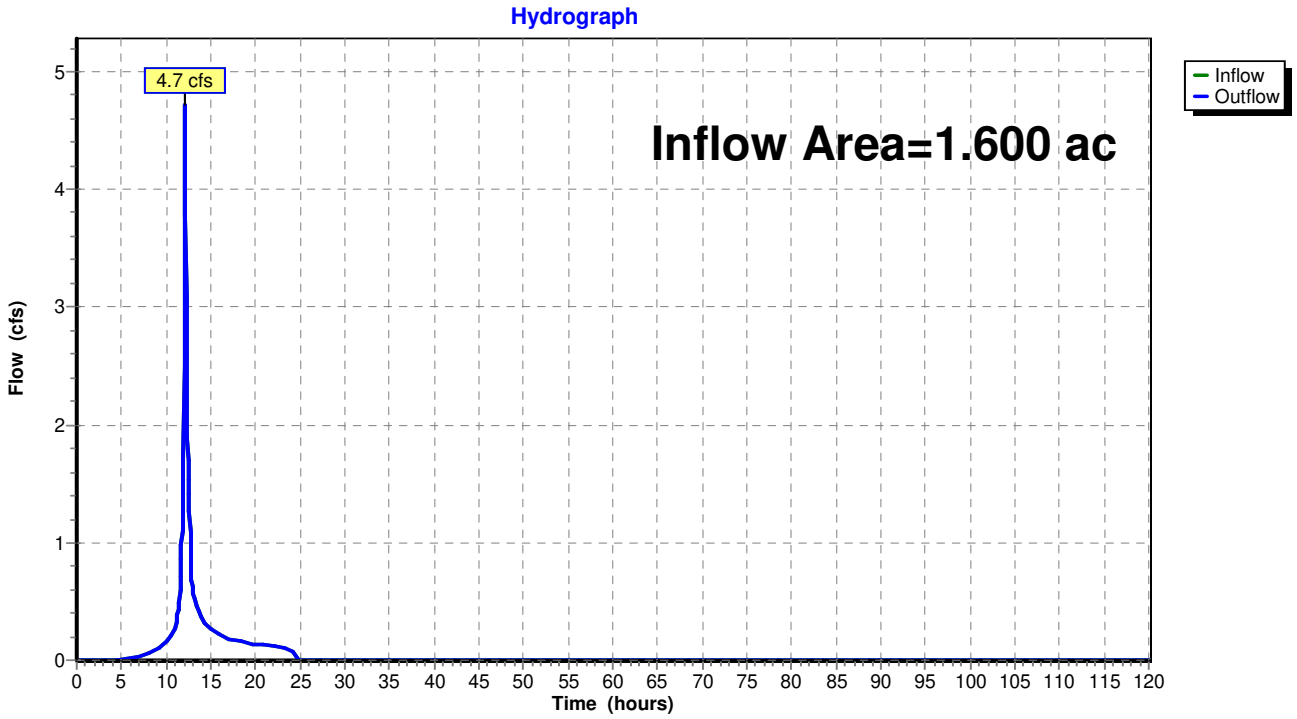


Summary for Reach DP 2: DESIGN POINT 2

Inflow Area = 1.600 ac, 53.13% Impervious, Inflow Depth = 3.29" for 10-yr event
Inflow = 4.7 cfs @ 12.12 hrs, Volume= 0.439 af
Outflow = 4.7 cfs @ 12.12 hrs, Volume= 0.439 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP 2: DESIGN POINT 2



Summary for Subcatchment 1.0S & 1.1S:

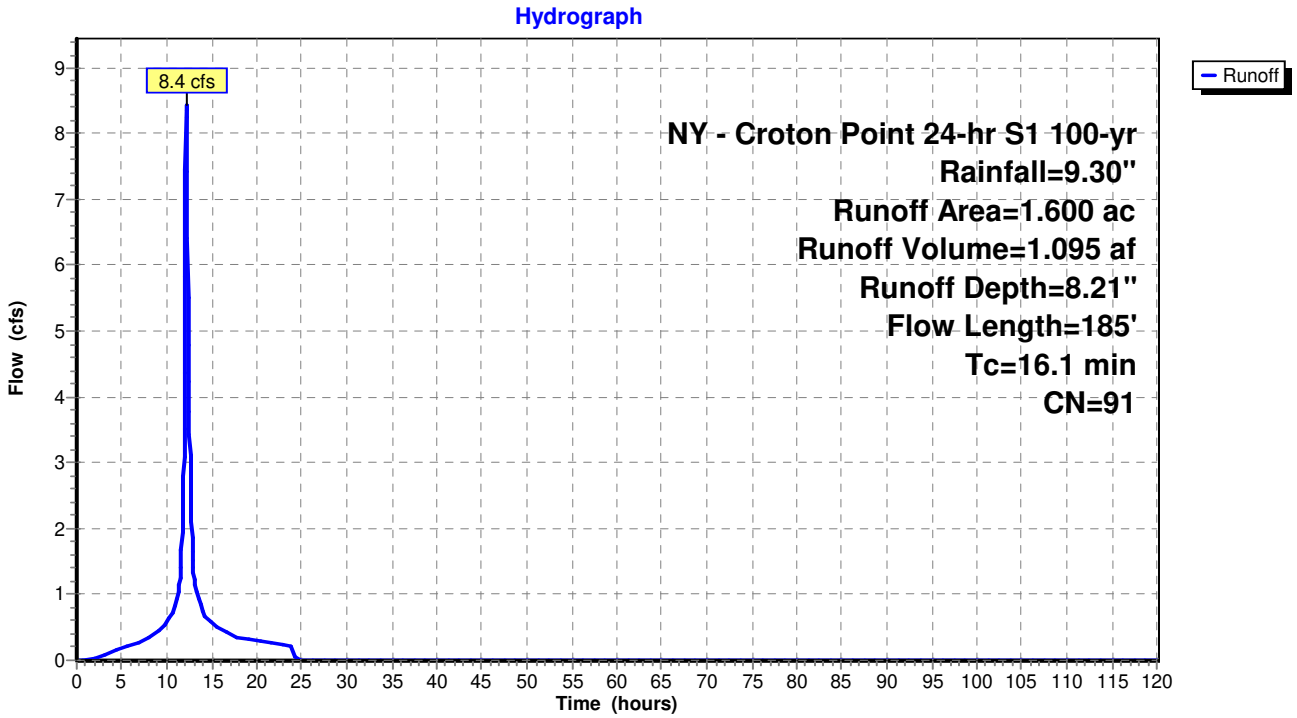
Runoff = 8.4 cfs @ 12.17 hrs, Volume= 1.095 af, Depth= 8.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 100-yr Rainfall=9.30"

Area (ac)	CN	Description
0.250	61	>75% Grass cover, Good, HSG B
0.050	55	Woods, Good, HSG B
1.300	98	Paved parking, HSG D
1.600	91	Weighted Average
0.300		18.75% Pervious Area
1.300		81.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
1.6	85	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.1	185	Total			

Subcatchment 1.0S & 1.1S:



Summary for Subcatchment 2.0S & 2.1S:

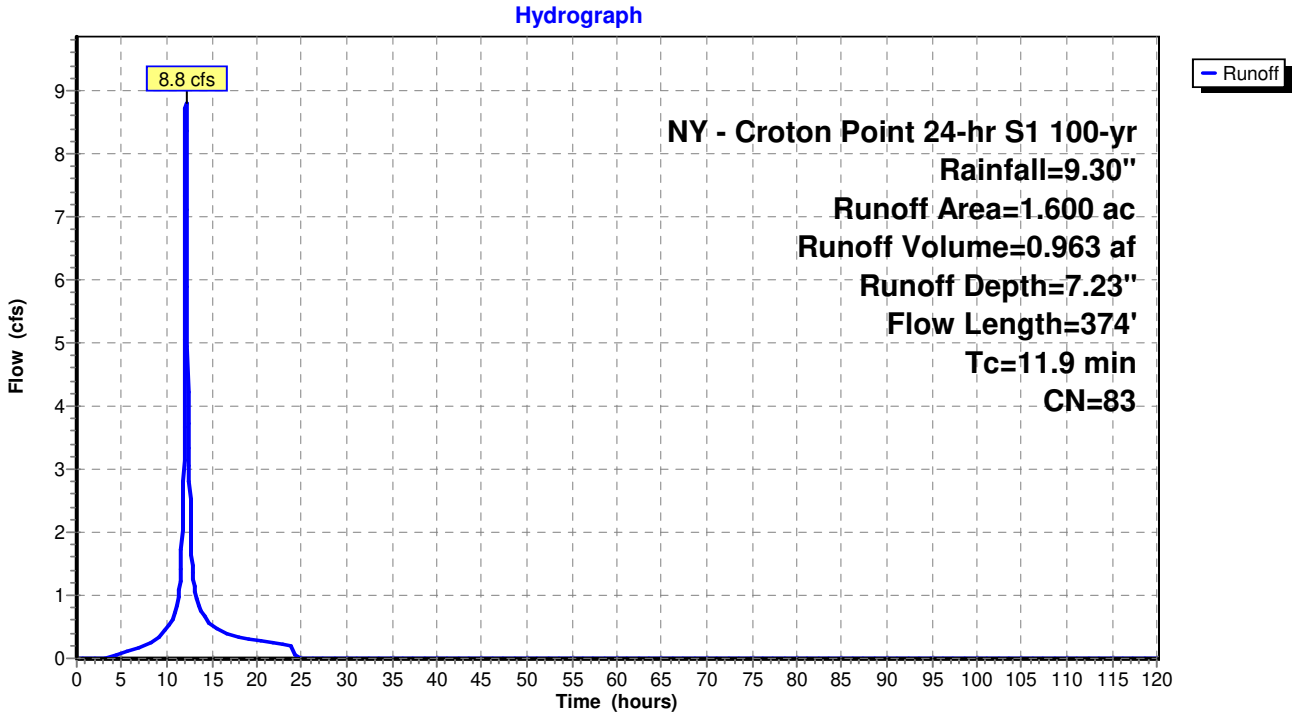
Runoff = 8.8 cfs @ 12.11 hrs, Volume= 0.963 af, Depth= 7.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Croton Point 24-hr S1 100-yr Rainfall=9.30"

Area (ac)	CN	Description
0.150	80	>75% Grass cover, Good, HSG D
0.100	77	Woods, Good, HSG D
0.300	61	>75% Grass cover, Good, HSG B
0.200	55	Woods, Good, HSG B
0.850	98	Paved parking, HSG D
1.600	83	Weighted Average
0.750		46.88% Pervious Area
0.850		53.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	40	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.37"
3.8	60	0.0700	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.37"
0.4	38	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	90	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	73	0.2100	3.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	22	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	36	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	15	0.0010	1.80	2.21	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
11.9	374	Total			

Subcatchment 2.0S & 2.1S:

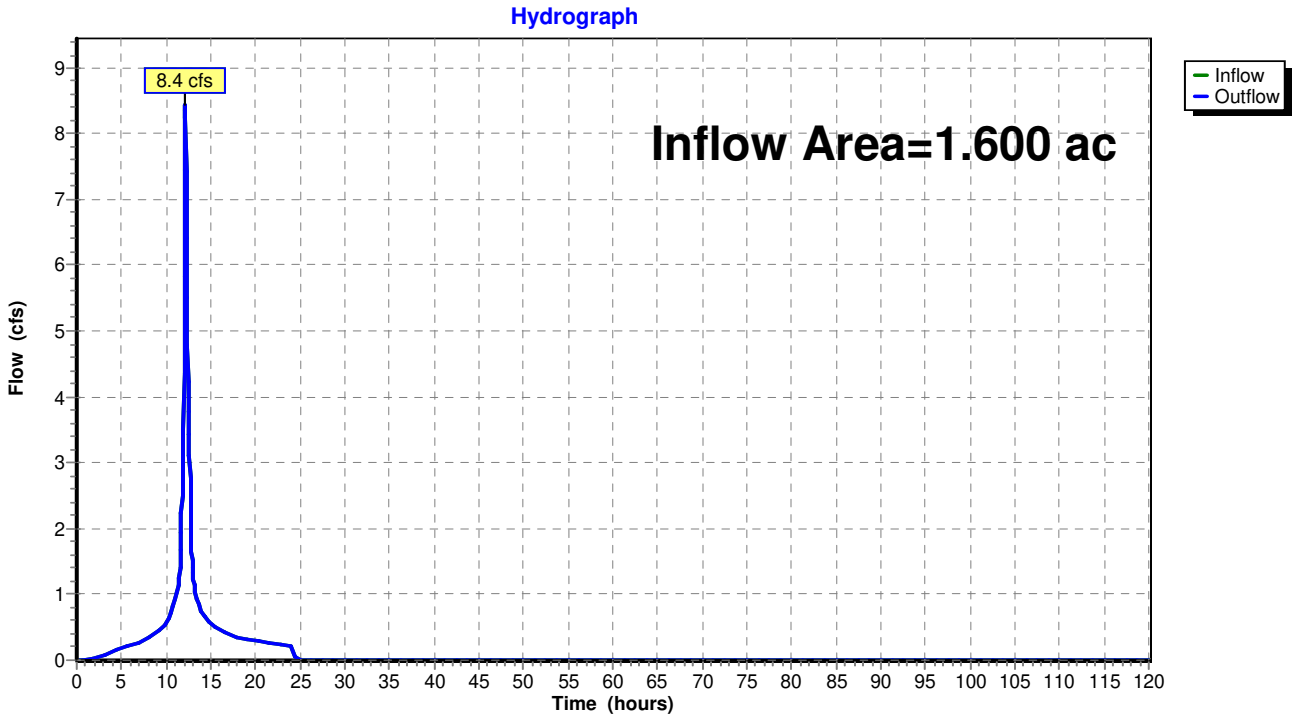


Summary for Reach DP 1: DESIGN POINT 1

Inflow Area = 1.600 ac, 81.25% Impervious, Inflow Depth = 8.21" for 100-yr event
Inflow = 8.4 cfs @ 12.17 hrs, Volume= 1.095 af
Outflow = 8.4 cfs @ 12.17 hrs, Volume= 1.095 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP 1: DESIGN POINT 1

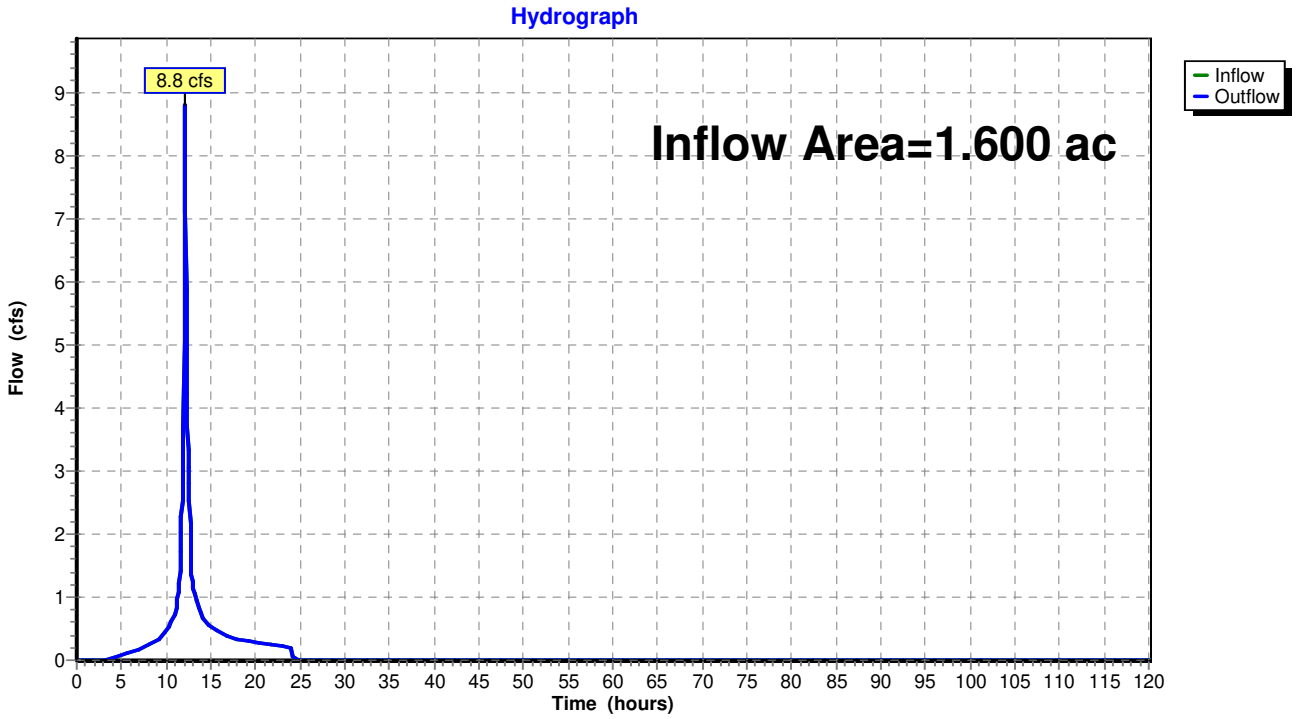


Summary for Reach DP 2: DESIGN POINT 2

Inflow Area = 1.600 ac, 53.13% Impervious, Inflow Depth = 7.23" for 100-yr event
Inflow = 8.8 cfs @ 12.11 hrs, Volume= 0.963 af
Outflow = 8.8 cfs @ 12.11 hrs, Volume= 0.963 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP 2: DESIGN POINT 2



APPENDIX D

Project and Owner Information

Site Data:

Croton Point Ave. & Veterans Plaza
Croton-On-Hudson, New York 10520

Applicant Information:

WBP Development LLC
480 Bedford Road
Chappaqua, NY 10514

Party Responsible for Implementation of the Stormwater Pollution Prevention Plan:

To be determined prior to construction

Qualified Professional Responsible for Inspection of the Stormwater Pollution Prevention Plan:

Inspector to be determined at time of construction

APPENDIX E

NYSDEC SPDES General Permit for Construction Activities Construction Site Log Book

APPENDIX F
CONSTRUCTION SITE INSPECTION AND MAINTENANCE LOG BOOK

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

SAMPLE CONSTRUCTION SITE LOG BOOK

Table of Contents

I. Pre-Construction Meeting Documents
   a. Preamble to Site Assessment and Inspections
   b. Pre-Construction Site Assessment Checklist

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

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 inspector[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. A preconstruction meeting should be held to review all of the SWPPP requirements with construction personnel.

When construction starts, site inspections shall be conducted by the qualified inspector at least every 7 calendar days. 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.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified inspector perform a final site inspection. The qualified inspector 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 Refer to "Qualified Inspector" inspection requirements in the current SPDES General Permit for Stormwater Discharges from Construction Activity for complete list of inspection requirements.
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. 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 Access

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. 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.

SITE PLAN/SKETCH

_____	_____
Inspector (print name)	**Date of Inspection**
_____	_____
Qualified Inspector (print name)	**Qualified Inspector 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 at the outfalls?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease at the outfalls?
[ ] [ ] [ ] 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, debris and spoils 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.

3. Stabilized Construction Access

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?

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.

Runoff Control Practices (continued)

2. Flow 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

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. Silt Fence and Linear Barriers

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)

2. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated; Filter Sock or Manufactured 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.
[ ] [ ] [ ] Manufactured insert fabric is free of tears and punctures.
[ ] [ ] [ ] Filter Sock is not torn or flattened and fill material is contained within the mesh sock.
Sediment accumulation ___% of design capacity.

3. 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 trap slopes and disturbed areas are stabilized.
Sediment accumulation is ___% of design capacity.

4. 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 basin dewatering pool is dewatering at appropriate rate.
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. All practices shall be maintained in accordance with their respective standards.

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:

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. Contractors Certification Statement

"I hereby certify 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 understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings."

_____

Signature of Contractor Date

_____

Print Name Title

_____

Signature of Trained Contractor Date

_____

Print Name of Trained Contractor Title

Name of Contracting Firm _____

Street Address _____

City, State, Zip _____

Telephone No. _____

A copy of this statement shall be retained as part of the Stormwater Pollution Prevention Plan (SWPPP) for a period off at least five (5) years after the subject property is stabilized.

APPENDIX F

Hydrodynamic Separator Sizing and Maintenance Information

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATERSHED PROTECTION AND RESTORATION
BUREAU OF NJPDES STORMWATER PERMITTING & WATER QUALITY MANAGEMENT
P.O. Box 420 Mail Code 501-02A
Trenton, New Jersey 08625-0420
609-633-7021 / Fax: 609-777-0432
https://dep.nj.gov/stormwater/

PHILIP D. MURPHY
Governor

TAHESHA L. WAY
Lt. Governor

SHAWN M. LATOURETTE
Commissioner

October 3, 2024

Jeremy Fink, P.E.
Associate Director of Product Development
Hydro International
94 Hutchins Drive
Portland, ME 04102

Re: MTD Lab Certification
Hydro-Shield Advance Plus Hydrodynamic Separator
Online Installation

TSS Removal Rate 50%

Dear Mr. Fink:

The Stormwater Management rules under N.J.A.C. 7:8-5.2(f) and 5.2(j) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Hydro International has requested a Laboratory Certification for the Hydro-Shield Advance Plus Hydrodynamic Separator (Hydro-Shield Advance Plus).

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated August 4, 2021. The applicable protocol is the "New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" dated January 1, 2021, and last updated April 25, 2023.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated September 2024) for this device is published online at http://www.njcat.org/verification-process/technology-verification-database.html.

The NJDEP certifies the use of the Hydro-Shield Advance Plus by Hydro International at a TSS removal rate of 50% when designed, operated and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5.

2. The Hydro-Shield Advance Plus stormwater treatment device shall be installed using the same configuration reviewed by NJCAT and shall be sized in accordance with the criteria specified in item 6 below.

3. This Hydro-Shield Advance Plus stormwater treatment device cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. Additional design criteria for MTDs can be found in Chapter 11.3 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual which can be found on-line at https://dep.nj.gov/stormwater/.

5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the Hydro-Shield Advance Plus. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at https://hydro-int.com/sites/default/files/2024-09/HSA_OandM_.pdf for any changes to the maintenance requirements.

6. Sizing Requirements:

   The example below demonstrates the sizing procedure for the Hydro-Shield Advance Plus:

   Example: A 0.25-acre impervious site with a slope of 5% is to be treated to 50% TSS removal using a Hydro-Shield Advance Plus. The hydraulically most distant point to the inlet of the Hydro-Shield Advance Plus is 110 feet. The site is located in an area for which the projected 2-year storm rainfall depth was calculated to be 3.84 inches.

   Maximum Treatment Flow Rate (MTFR) Evaluation:

   The site runoff (Q) was based on the following:

   CN = 98 (Curve Number for impervious)
   Dimensionless Unit Hydrograph (DUH) = SCS Standard DUH (peak rate factor of 484)
   Time of concentration = 0.8 minutes
   Q = 0.77 cfs

   Given the site runoff is 0.77 cfs and based on Table 1 below, the Hydro-Shield Advance Plus 4-ft Model with an MTFR of 1.49 cfs would be the smallest model approved that could be used for this site that could remove 50% of the TSS from the impervious area without exceeding the MTFR.

   The sizing table corresponding to the available system models is noted below. Additional specifications regarding each model can be found in the Verification Appendix.

Table 1: Hydro-Shield Advance Plus Models and Associated MTFRs

Hydro-Shield Advance Plus Model	Diameter (ft)	Maximum Treatment Flow Rate (cfs)	Effective Treatment Area (sq. ft.)	Hydraulic Loading Rate (gpm/sq. ft.)
4-ft	4	1.49	12.6	53.1
6-ft	6	3.35	28.3	53.1
8-ft	8	5.95	50.3	53.1

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

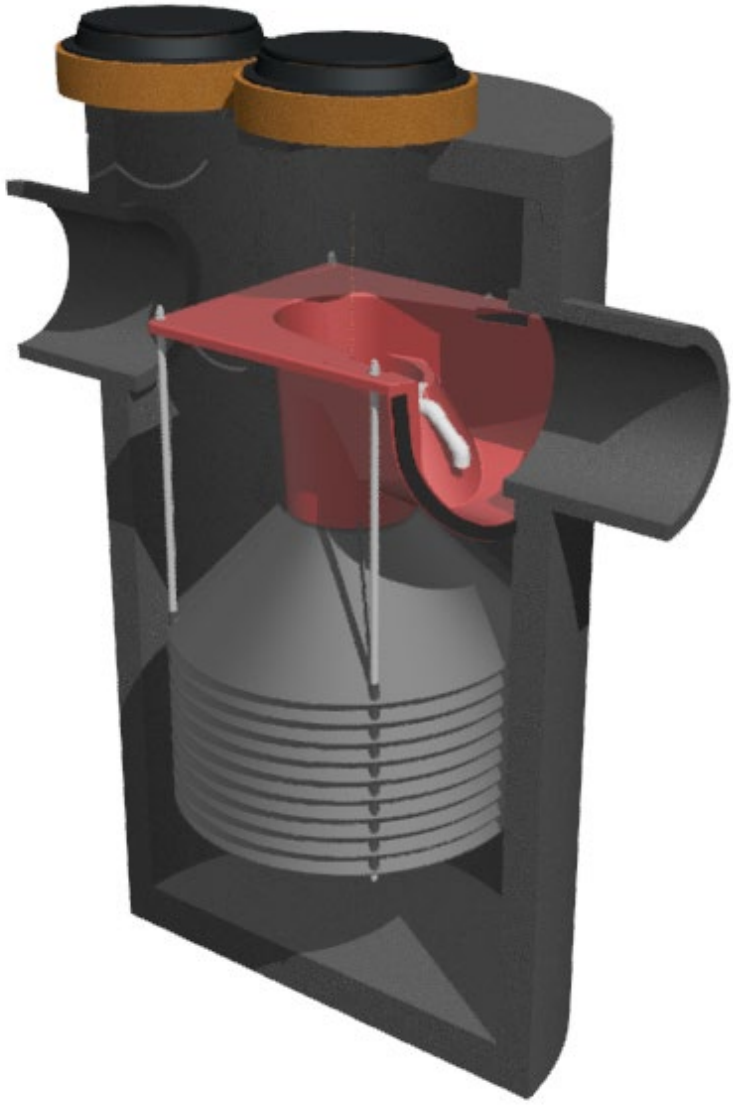
If you have any questions regarding the above information, please contact Lisa Schaefer of my office at lisa.schaefer@dep.nj.gov.

Sincerely,

Gabriel Mahon, Chief
Bureau of NJPDES Stormwater Permitting & Water Quality Management
Division of Watershed Protection and Restoration
New Jersey Department of Environmental Protection

Attachment: Maintenance Plan

c: Richard Magee, NJCAT



Operation and Maintenance Manual

Hydro-Shield™ Advance

Hydrodynamic Separator for Stormwater Treatment

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3 Hydro-Shield™ Advance by Hydro International

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- Pollutant Capture and Retention

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DISCLAIMER: Information and data contained in this manual is exclusively for the purpose of assisting in the operation and maintenance of Hydro International plc's First Defense®. No warranty is given nor can liability be accepted for use of this information for any other purpose. Hydro International plc has a policy of continuous product development and reserves the right to amend specifications without notice.

I. Hydro-Shield™ Advance by Hydro International

Introduction

The Hydro-Shield™ Advance leads a new generation of hydrodynamic separator for stormwater treatment that utilize lamella technology for optimal settling performance. It efficiently removes total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants while providing an internal peak flow bypass. The Hydro-Shield™ Advance is available in multiple model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints.

Operation

The Hydro-Shield™ Advance operates on simple fluid hydraulics combined with a lamella treatment module for increased efficiency. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The Hydro-Shield™ Advance has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

Pollutant Capture and Retention

The internal components of the Hydro-Shield™ Advance have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit (Fig.1).

The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the Hydro-Shield™ Advance retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events.

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Integral bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes
- Advanced Treatment module for effective sediment capture
- Easy installation and maintenance
- Accommodates large pipe diameters

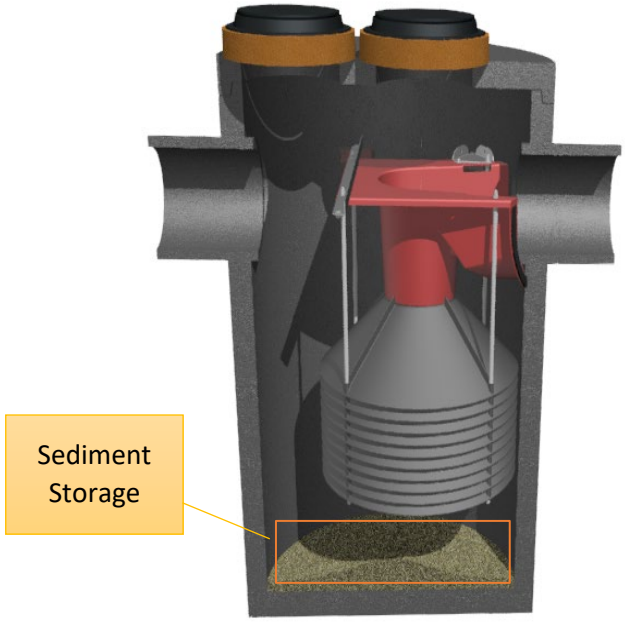


Figure 1: Pollutant storage volume in the Hydro-Shield™ Advance

II. Model Sizes & Configurations

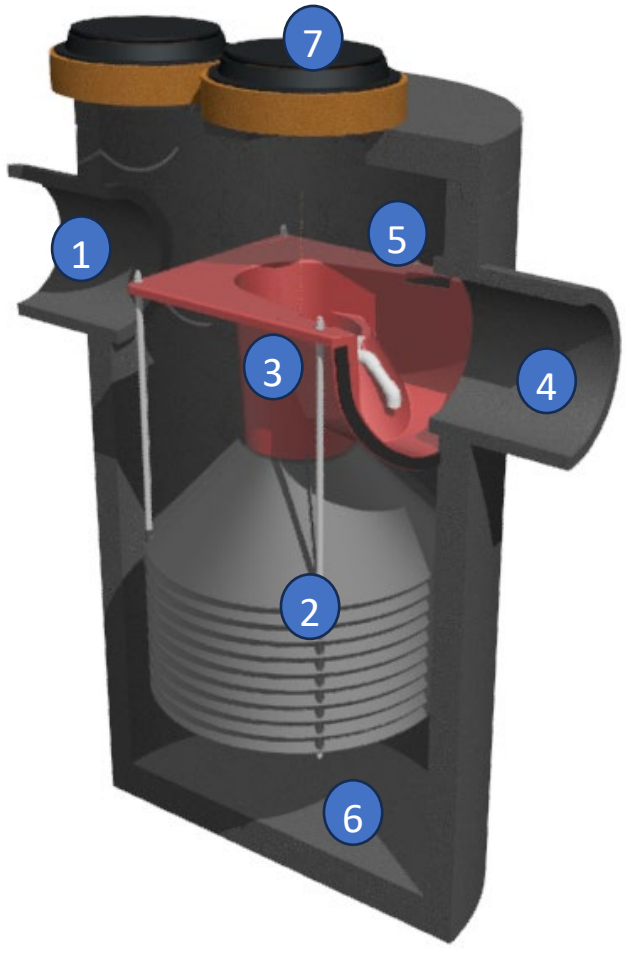
The Hydro-Shield™ Advance inlet and internal bypass arrangements are available in several model sizes and configurations.
All Hydro-Shield™ Advance models include the internal components that are designed to remove and retain total suspended solids (TSS), (Fig.2).
Hydro-Shield™ Advance model sizes (diameter) are shown in Table 1.

III. Maintenance

Hydro-Shield™ Advance Model Sizes (MH Dia.)
HSA-4ft
HSA-6ft
HSA-8ft

Hydro-Shield™ Advance Components

1. **Inlet Pipe**
2. **Treatment Module**
3. **Outlet Module**
4. **Outlet Pipe**
5. **Internal Bypass**
6. **Sediment Storage**
7. **Cover(s)**



Overview

The Hydro-Shield™ Advance protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the Hydro-Shield™ Advance. The unit will efficiently capture and retain sediment until the stated sediment storage capacity has been reached. The Hydro-Shield™ Advance will continue to operate afterwards but prolonged operation will reduce removal efficiency and may cause damage to the equipment.

The Hydro-Shield™ Advance allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove the captured sediment. Access ports are located in the top of the manhole. Maintenance events may include inspection, floatables removal, or sediment removal. Maintenance events do not require entry into the manhole, nor do they require the internal components of the Hydro-Shield™ Advance to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include sediment removal.

Maintenance Equipment Considerations

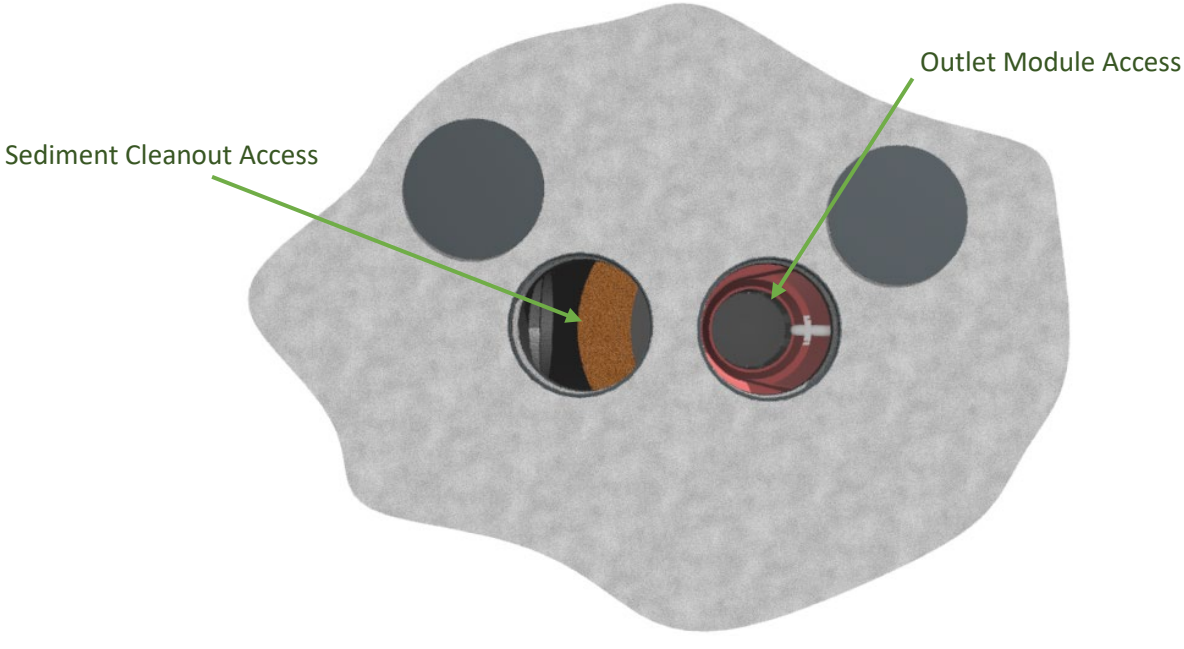
The internal components of the Hydro-Shield™ Advance have a dedicated area on the perimeter through which the sediment storage sump can be accessed with a sump vac hose. Access to the Outlet Module is also provided. (Fig.3). On 4ft units, access is via a shared manhole cover. Larger units are provided with 2 separate covers.

Determining Your Maintenance Schedule

The frequency of clean-out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and floatables removal, for Hydro-Shield™ Advance typically takes less than 30 minutes

Fig.3 Hydro-Shield™ Advance maintenance access.



Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the Hydro-Shield™ Advance as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the manhole lid(s).

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. Fig.4 shows the standing water level that should be observed.

4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the components and water surface.

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel.

6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

7. Securely replace the grate or lid.

8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection

Floatables and Sediment Clean Out

Floatables clean out is typically done in conjunction with sediment removal.

A commercially or municipally owned sump-vac is used to remove captured sediment
and floatables (Fig.4).

Floatables and loose debris can also be netted with a skimmer and pole.

The access port located at the top of the manhole provides unobstructed access
for a vactor hose to be lowered to the base of the sump.

Scheduling

- Floatables and sump clean out are typically conducted once a year during any season.
- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.

Recommended Equipment

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (flexible hose recommended)
    - Spray hose or wand and clean water
- Hydro-Shield™ Advance Maintenance Log

Fig.4 Floatables are removed with a vactor hose

Procedures Floatables and Sediment Clean Out Procedures

1. Set up any necessary safety equipment around the access port or grate of the Hydro-Shield™ Advance as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the lid(s) to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.

4. Remove floatables on the surface of the water with the vactor hose or with the skimmer or net

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).

6. Once all floatables have been removed, drop the vactor hose to the base of the sump. Vactor out the sediment and gross debris off the sump floor

7. Once the water level is below the Treatment Module, visually inspect the Outlet Module and inside of the Treatment Module

8. If necessary, use a spray hose or wand to dislodge any debris or silt and flush them into the sump.

9. Retract the vactor hose from the vessel.

10. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components, blockages, or irregularly high or low water levels.

11. Securely replace the lid(s).

Maintenance at a Glance

- Regularly during first year of installation
- Every 6 months after the first year of installation
- Once per year, with sediment removal
- Following a spill in the drainage area
- Once per year or as needed
- Following a spill in the drainage area

Inspection

Floatables Removal

Sediment Removal

NOTE: For most clean outs the entire volume of liquid does not need to be removed from the manhole. Only remove the first few inches of oils and floatables from the water surface to reduce the total volume of liquid removed during a clean out

Hydro-Shield™ Advance Installation Log

HYDRO INTERNATIONAL REFERENCE NUMBER:	
SITE NAME:	
SITE LOCATION:	
OWNER:	CONTRACTOR:
CONTACT NAME:	CONTACT NAME:
COMPANY NAME:	COMPANY NAME:
ADDRESS:	ADDRESS:
TELEPHONE:	TELEPHONE:
FAX:	FAX:

INSTALLATION DATE: / /

MODEL SIZE (CIRCLE ONE):

INLET :

Hydro-Shield™ Advance Inspection and Maintenance Log

Date	Initials	Depth of Floatables and Oils	Sediment Depth Measured	Volume of Sediment Removed	Site Activity and Comments

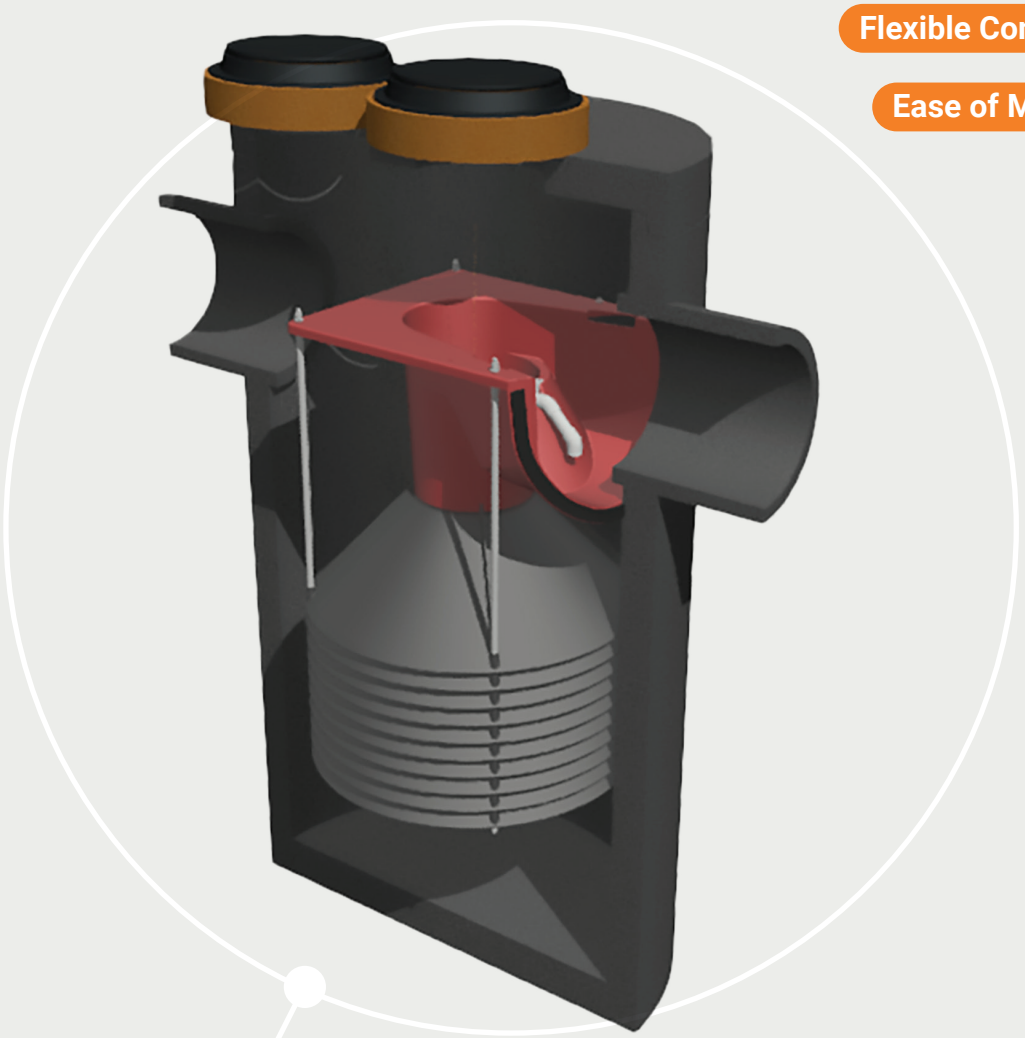
Hydro-Shield™ Advance

Advanced Hydrodynamic Separation

Highest Flow Rates on the Market

Flexible Configurations

Ease of Maintenance



The Hydro-Shield™ Advance is a next generation hydrodynamic separator designed for optimal stormwater treatment, utilizing lamella technology to remove pollutants. With flexible design options it effectively prevents pollutant washout during high-flow storm events, ensuring reliable performance under varying conditions.

Advanced Hydrodynamic Separation

Oldcastle Infrastructure™
A CRH COMPANY

Power Flow, High Removal Efficiency.

Leveraging over 40 years of engineering excellence, the Hydro-Shield™ Advance was designed by the leading water experts from Hydro International, developers of Downstream Defender® and First Defense®. With NJCAT2021 protocol approval, utilize the advanced hydrodynamic separator with the highest treatment flow rate available on the market.

Applications

- Removal of total suspended solids (TSS) and floatable trash from stormwater runoff
- New construction or redevelopment of commercial and residential sites
- Pollutant hotspots such as maintenance yards, parking lots, gas stations, streets, highways, airports and transportation hubs
- Site constrained LID or green infrastructure-based developments
- LEED® development projects

Technical Specifications

Hydro-Shield™ Advance - Sizing Table

Unit Size	Configuration	Model Number	Max WQ Flow [cfs]	Peak Flow[1] [cfs]	Max Pipe Size [in]
4 FT	Shallow	HSA-4S	0.44	7.4	18
	Standard	HSA-4	0.96	7.4	18
	Plus	HSA-4P	1.48	7.4	18
6 FT	Shallow	HSA-6S	0.98	15	24
	Standard	HSA-6	2.16	15	24
	Plus	HSA-6P	3.33	15	24

1. Governed by peak hydraulic flow of max pipe size.
2. If exceeded, system will enter bypass at lower flow rates than the stated MTF.
3. Current NJ approval for a single inlet pipe, co-linear with outlet pipe (no inlet pipe angle).
4. Recommended maintenance intervals, based on 50% full sump:
   Shallow 154 months
   Standard 70 months
   Plus 45 months

Feature	Benefit
Highest treatment flow rate available on the market.	Smaller Footprint for lower costs.
Bypass flow only limited by pipe size.	Easy retrofit design and online use to reduce number of structures and manage cost.
Configurable cone stacks by manhole size and depth.	More flexible depth and footprint configurations when working in space constrained sites, especially rock or high ground water.
Model size overlap.	Pipe size, peak flows, and treatment flows are not locked to one size chamber, allowing for optimized design and cost control.
Treatment flow overlap.	Engineers don't have to specify the exact model, allowing contractors to work with us based on site conditions and other factors to get the best value option.

Trusted partnerships.
Full scale solutions.

Oldcastle Infrastructure™
A CRH COMPANY

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APPENDIX G

Pipe Sizing Calculations

INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

DRAINAGE SYSTEM CALCULATIONS
Design Storm: 25-Year

PROJECT: **Croton Point**
JOB NUMBER: **24154.100**
BY: CMS DATE: 4-30-2025
CHK: JWM DATE: 4-30-2025

STRUCTURE		IMPERVIOUS AREA			PERVIOUS AREA			CA	TIME OF CONC. (min.)			I	Q (cfs)		PIPE DESIGN					STRUCTURE	
FROM	TO	A (ac.)	C	CA	A (ac.)	C	CA		INLET	PIPE	TOTAL		DESIGN	CAP.	V(ft/s)	n	s (%)	L (ft)	DIA (in)	FROM	TO
CB 3C	CB 3B	**0.15**	0.9	0.14	**0.00**	0.3	0.00	0.14	**6**	-	6	**7.2**	1.0	4.2	4.4	**0.012**	**1.2**	**83**	**12**	CB 3C	CB 3B
CB 3B	CB 3A	**0.05**	0.9	0.05	**0.00**	0.3	0.00	0.19	**6**	-	6	**7.2**	1.4	5.2	5.6	**0.012**	**1.8**	**44**	**12**	CB 3B	CB 3A
CB 3A	CB 3	**0.09**	0.9	0.08	**0.02**	0.3	0.01	0.28	**6**	-	6	**7.2**	2.0	6.0	6.9	**0.012**	**2.4**	**62**	**12**	CB 3A	CB 3
CB 3	CB 2	**0.05**	0.9	0.05	**0.02**	0.3	0.01	0.34	**6**	-	6	**7.2**	2.4	6.6	7.8	**0.012**	**2.9**	**68**	**12**	CB 3	CB 2
CB 2	HDS 1.1	**0.47**	0.9	0.42	**0.06**	0.3	0.02	0.78	**6**	-	6	**7.2**	5.6	11.9	9.6	**0.012**	**2.9**	**22**	**15**	CB 2	HDS 1.1
HDS 1.1	EX DI	**0.00**	0.9	0.00	**0.00**	0.3	0.00	0.78	**6**	-	6	**7.2**	5.6	24.1	11.2	**0.012**	**4.5**	**22**	**18**	HDS 1.1	EX DI
CB 8	CB 7	**0.10**	0.9	0.09	**0.00**	0.3	0.00	0.09	**6**	-	6	**7.2**	0.6	5.5	4.7	**0.012**	**2.0**	**55**	**12**	CB 8	CB 7
CB 7	DMH 6	**0.10**	0.9	0.09	**0.00**	0.3	0.00	0.18	**6**	-	6	**7.2**	1.3	3.0	3.7	**0.012**	**0.6**	**72**	**12**	CB 7	DMH 6
DMH 6	HDS 2.1	**0.00**	0.9	0.00	**0.00**	0.3	0.00	0.33	**6**	-	6	**7.2**	2.4	4.9	4.0	**0.012**	**0.5**	**205**	**15**	DMH 6	HDS 2.1
HDS 2.1	DI 5	**0.00**	0.9	0.00	**0.00**	0.3	0.00	0.33	**6**	-	6	**7.2**	2.4	7.3	5.4	**0.012**	**1.1**	**9**	**15**	HDS 2.1	DI 5
DI 5	DI 4	**0.15**	0.9	0.14	**0.00**	0.3	0.00	0.69	**6**	-	6	**7.2**	5.0	7.7	6.7	**0.012**	**1.2**	**8**	**15**	DI 5	DI 4
CB 6B	CB 6A	**0.05**	0.9	0.05	**0.00**	0.3	0.00	0.05	**6**	-	6	**7.2**	0.4	3.0	2.6	**0.012**	**0.6**	**17**	**12**	CB 6B	CB 6A
CB 6A	DMH 6	**0.05**	0.9	0.05	**0.00**	0.3	0.00	0.10	**6**	-	6	**7.2**	0.7	3.7	3.6	**0.012**	**0.9**	**11**	**12**	CB 6A	DMH 6
CB 6C	DMH 6	**0.05**	0.9	0.05	**0.00**	0.3	0.00	0.05	**6**	-	6	**7.2**	0.4	3.7	3.0	**0.012**	**0.9**	**11**	**12**	CB 6C	DMH 6
DI 5A	DI 5	**0.05**	0.9	0.05	**0.57**	0.3	0.17	0.22	**6**	-	6	**7.2**	1.6	3.0	3.9	**0.012**	**0.6**	**54**	**12**	DI 5A	DI 5

APPENDIX H

OPRHP/SHPO Determination Letter

New York State
Parks, Recreation and
Historic Preservation

KATHY HOCHUL
Governor

RANDY SIMONS
Commissioner Pro Tempore

September 03, 2024

Jan Johannessen, RLA, AICP
Principal
KSCJ Consulting
500 Main Street
Armonk, NY 10504

Re: SEQRA
1 Croton Point
1 Croton Point Ave, Croton On Hudson, NY 10520
24PR07889

Dear Jan Johannessen, RLA, AICP:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the project in accordance with the New York State Historic Preservation Act of 1980 (Section 14.09 of the New York Parks, Recreation and Historic Preservation Law). These comments are those of the OPRHP and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project.

Based upon this review, it is the opinion of OPRHP that no properties, including archaeological and/or historic resources, listed in or eligible for the New York State and National Registers of Historic Places will be impacted by this project.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above. If you have any questions, please contact Chelsea Towers at the following email address:

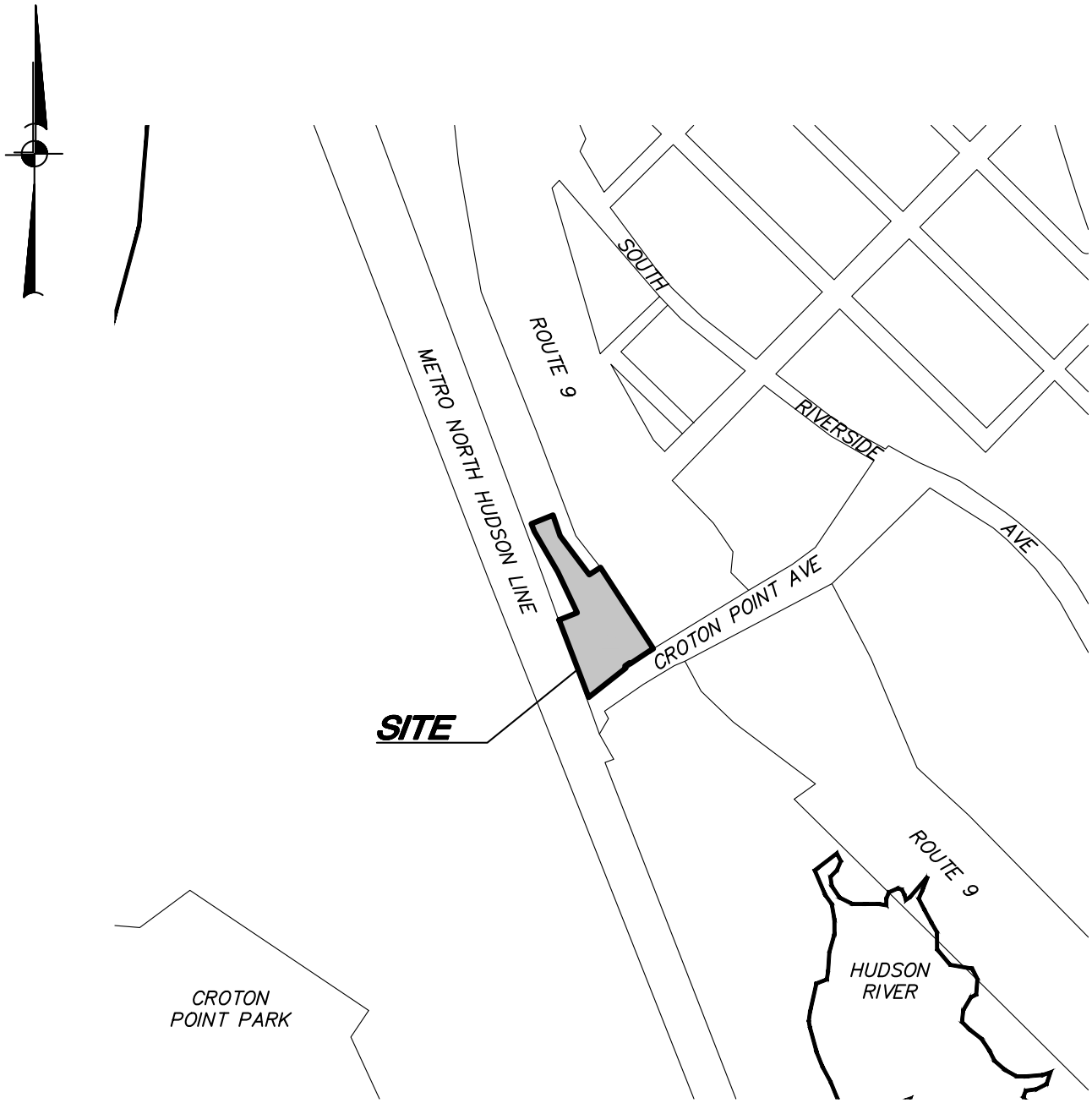
Chelsea.Towers@parks.ny.gov

Sincerely,

R. Daniel Mackay

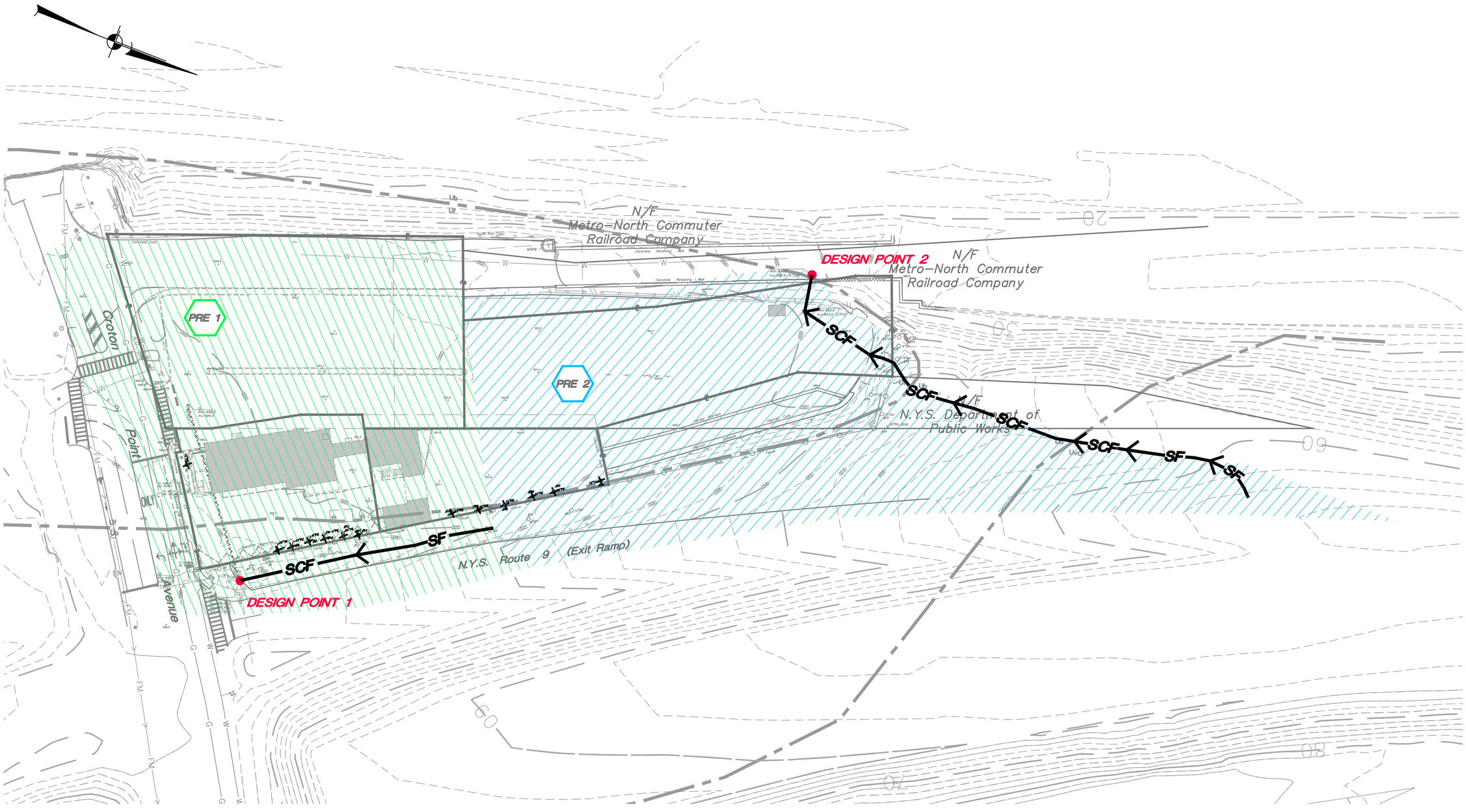
Deputy Commissioner for Historic Preservation
Division for Historic Preservation

FIGURES



PROJECT: 1 CROTON POINT CROTON POINT AVE. & VETERANS PLAZA, VILLAGE OF CROTON-ON-HUDSON, WESTCHESTER CO., NY	PREPARED BY: INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C. 3 Garrett Place • Carmel, New York 10512 Phone (845) 225-9690 • Fax (845) 225-9717 www.insite-eng.com	DATE: 7-11-24
DRAWING: LOCATION MAP		SCALE: 1"=500'
		PROJECT NO.: 24154.100
		FIGURE: FIGURE-1

Z:\E\24154100 WBP Croton Point Ave\Stormwater\Figures\Figure 1 - Location Map.dwg, 4/28/2025 6:33:37 PM, jmcmanus, 1:1



SOILS LEGEND

SOILS	DESCRIPTION	HYDROLOGICAL GROUP
Uf	Urban land	D
Ub	Udorthents, smoothed	B
UvC	Urban land–Riverhead complex	D
	NRCS Soil Boundary Line	

LEGEND

PRE 1	SUBCATCHMENT
SF	TIME OF CONCENTRATION SHEET FLOW
SCF	TIME OF CONCENTRATION SHALLOW CONCENTRATED FLOW
DESIGN POINT	DESIGN POINT
	SUBCATCHMENT CONTRIBUTING AREA

GRAPHIC SCALE

0 25 50 100

(IN FEET)
1 inch = 50 ft.

NO.	DATE	REVISION	BY

INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place
Carmel, NY 10512
(845) 225–9690
(845) 225–9717 fax
www.insite–eng.com

PROJECT:

1 CROTON POINT

CROTON POINT AVE. & VETERANS PLAZA, VILLAGE OF CROTON–ON–HUDSON, WSTCHESTER CO., NY

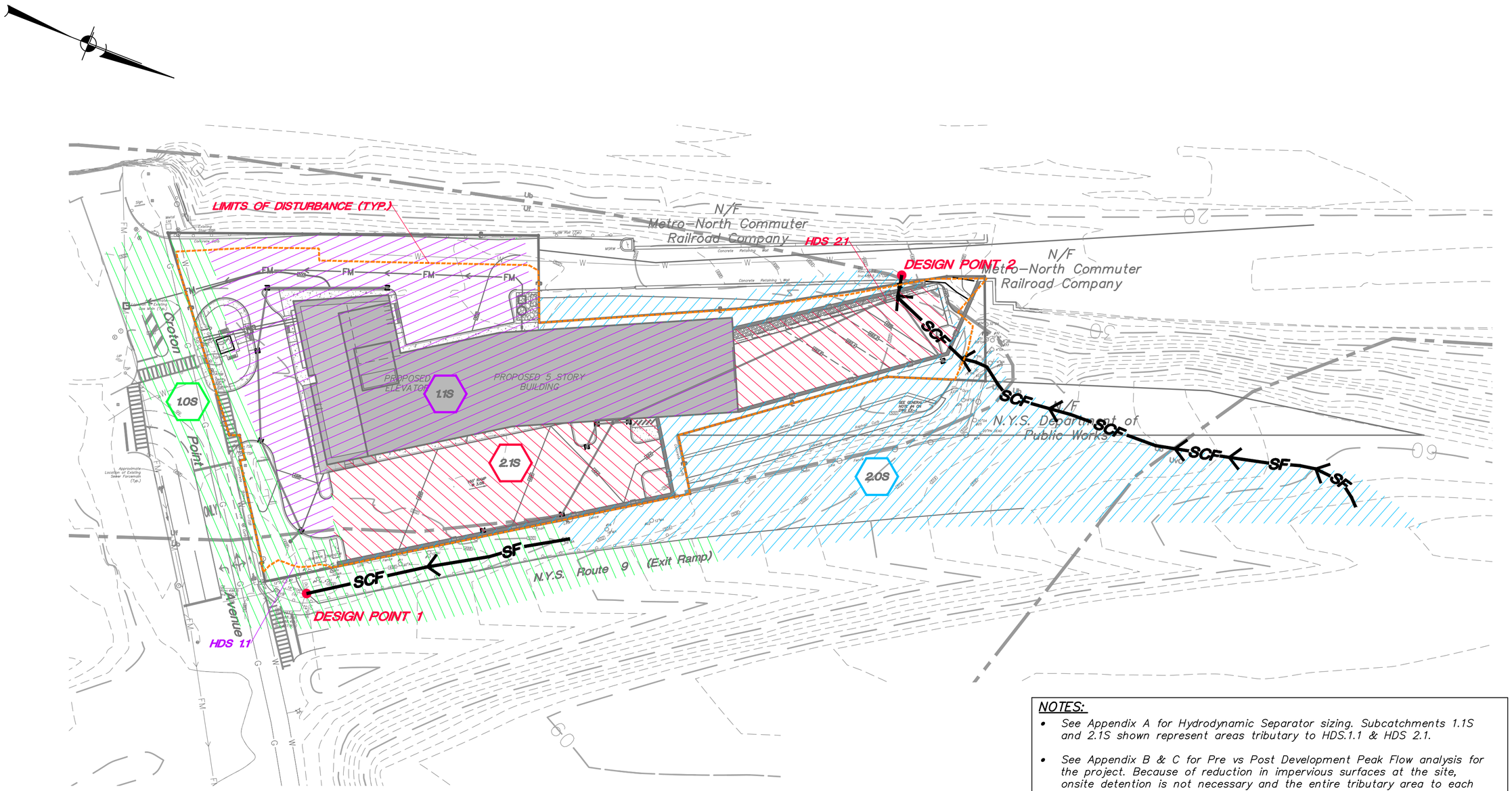
DRAWING:

PRE–DEVELOPMENT MAP

PROJECT NUMBER	24154.100	PROJECT MANAGER	R.D.W.	DRAWING NO.	SHEET
DATE	7–11–24	DRAWN BY	C.M.S.	FIG–2	2 / 3
SCALE	1" = 50'	CHECKED BY	J.W.M.		

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.

Z:\E\24154100 WBP Croton Point Ave\Stormwater\Figures\Figure 2 - Pre Development Map.dwg, 4/28/2025 6:35:14 PM, jmcmanus, 1:1



NOTES:

- See Appendix A for Hydrodynamic Separator sizing. Subcatchments 1.1S and 2.1S shown represent areas tributary to HDS.1.1 & HDS 2.1.
- See Appendix B & C for Pre vs Post Development Peak Flow analysis for the project. Because of reduction in impervious surfaces at the site, onsite detention is not necessary and the entire tributary area to each design point was modeled as a single Subcatchment (ie. 1.0S and 1.1S were combined as a single Subcatchment tributary to Design Point 1.)

LEGEND

1.0S	SUBCATCHMENT
SF	TIME OF CONCENTRATION SHEET FLOW
SCF	TIME OF CONCENTRATION SHALLOW CONCENTRATED FLOW
PF	TIME OF CONCENTRATION PIPE FLOW
DESIGN POINT	DESIGN POINT
	SUBCATCHMENT CONTRIBUTING AREA

DISTURBANCE/IMPERVIOUS AREA SUMMARY TABLE

DESCRIPTION		
Total Limits of Disturbance:	1.6± acres (70,000± s.f.)	
	DP 1 AREA	DP 2 AREA
Pre-Development Impervious Area (within Limits of Disturbance):	1.0± acres (44,000± s.f.)	0.60± acres (26,100± s.f.)
Post-Development Impervious Area (within Limits of Disturbance):	0.85± acres (37,200± s.f.)	0.55± acres (23,900± s.f.)
Net Impervious Area (within Limits of Disturbance):	-0.15± acres (6,800± s.f.)	-0.05± acres (2,200± s.f.)

SOILS LEGEND

SOILS	DESCRIPTION	HYDROLOGICAL GROUP
Uf	Urban land	D
Ub	Udorthents, smoothed	B
UvC	Urban land-Riverhead complex	D
	NRCS Soil Boundary Line	

GRAPHIC SCALE

0 25 50 100

(IN FEET)
1 inch = 50 ft.

NO.	DATE	REVISION	BY
3	4-30-25	REVISED PER VILLAGE COMMENTS	JWM
2	3-26-25	REVISED PER VILLAGE COMMENTS	JWM
1	8-1-24	REVISED PER VILLAGE COMMENTS	JWM

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PROJECT:

1 CROTON POINT

CROTON POINT AVE. & VETERANS PLAZA, VILLAGE OF CROTON-ON-HUDSON, WSTCHESTER CO., NY

DRAWING:

POST-DEVELOPMENT MAP

PROJECT NUMBER	24154.100	PROJECT MANAGER	R.D.W.	DRAWING NO.	SHEET
DATE	7-11-24	DRAWN BY	C.M.S.	FIG-3	3 / 3
SCALE	1" = 50'	CHECKED BY	J.W.M.		

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Z:\E\24154100 WBP Croton Point Ave\Stormwater\Figures\Figure 3 - Post Development Map.dwg, 5/1/2025 10:24:50 AM, cstepkoski, 1:1