Preliminary Stormwater Pollution Prevention Plan: for River Ridge

Prepared for:
River Ridge View, LLC
445 Main Street
Beacon, NY 12508

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Prepared by:
Hudson Land Design Professional Engineering, P.C.
174 Main Street
Beacon, NY 12508

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1.0 INTRODUCTION

1.1 Overview

This Stormwater Pollution Prevention Plan (SWPPP) has been developed in accordance with NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-15-002, dated May 1, 2015 which authorizes stormwater discharges to surface waters of the State from the following construction activities identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. Construction activities located in the New York City, East of Hudson watershed, that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.
2. Construction activities involving soil disturbances of less than one (1) acre where the Department has determined that a SPDES permit is required for stormwater discharges based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to surface waters of the State.
3. Construction activities involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a larger common plan of development or sale that will ultimately disturb one or more acres of land; excluding routine maintenance activity that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

This project qualifies for SPDES coverage under provision 3 as stated above.

The objectives of this SWPPP are as follows:

- To develop a sediment and erosion control plan in accordance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, latest edition, which implements best management practices to stabilize disturbed areas, protect off site areas and sensitive areas and minimize the transport of sediment.
- To demonstrate that the resulting stormwater runoff from the development exiting the site will not adversely impact offsite properties, stormwater conveyance systems or receiving water bodies, and that temporary and permanent stormwater systems and facilities are designed in accordance with the latest revision to the New York State Stormwater Management Design Manual, January 2015.
- To demonstrate that a minimum of 90% of the average annual stormwater runoff from the development is captured and treated through approved water quality measures.

A copy of the Permit, SWPPP, Notice of Intent (NOI), NOI acknowledgment letter, inspection reports and accompanying plans shall be maintained on-site from the date of initiation of construction activities to the date of final stabilization. This SWPPP shall be kept on-site in accordance with the above requirement upon mobilization and start of construction activities.

1.2 Land Disturbance

Per the General Permit, no more than five (5) acres of land disturbance may occur at any one time without written approval from the NYSDEC. At a minimum, the owner or operator must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

a. The owner or operator shall have a qualified inspector conduct at least two (2) site inspections every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has been temporarily or permanently ceased and is located in one of the watersheds [NYCDEP], the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity has ceased. The soil stabilization measures selected shall be in conformance with the current version most of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.

c. The owner or operator shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The owner or operator shall install any additional site-specific practices needed to protect water quality.

The project calls for clearing of trees, installation of utilities and associated grading for the construction of eighteen townhouse units, ingress and egress and parking lot areas. The overall project area is approximately 2.95 acres and the limits of disturbance has been calculated to be 2.35 acres; therefore, a phasing plan for erosion control purposes will not be developed.

2.0 PROJECT DESCRIPTION

2.1 Project Location

The project site is located at Wolcott Avenue (NYS Route 9D), with additional street frontage to Ferry Street and Beekman Street, in the City of Beacon, Dutchess County, New York, and is located on the west side of the road. The total parcel area is approximately 2.95 acres (3 parcels make up the project area). The project study area, regarding storm water pollution prevention, consists of approximately 3.93 acres (total area contributing to the various design points identified in the SWPPP), and consists of mostly wooded area, grassed landscaped areas, parking areas and impervious rooftops from the church.

2.2 Project Scope and Description

The construction project entails the construction eighteen townhouse units, along with access and egress roads, parking lots, green spaces, and stormwater management areas.

The proposed project will disturb approximately 2.11 acres of on-site area. Approximately 0.84 acres of the parcel will remain undisturbed. Development of a phasing plan is not necessary due to less than 5.0-acres of disturbance, however, the project will be phased to facilitate construction.

2.3 Surface Water Bodies

2.3.1 Wetlands

The NYSDEC and USACE wetland maps do not indicate that wetlands are present within the project area.

2.3.2 Streams

NYSDEC mapping indicates that there are no regulated streams located on the property.

2.3.3 Floodplains

Based upon a review of the National Flood Insurance Program Flood Insurance Rate Map panel 36027C 0463E for the City of Beacon, New York, the entire site lies within Zone X – areas determined to be outside the 100-year flood plain.

3.0 NOTICE OF INTENT

Prior to commencement of construction activities, the Owner/Operator shall submit a Notice of Intent (NOI) to the NYSDEC for authorization. The NYSDEC authorization schedule is as follows:

For construction activities that are not subject to the requirements of a regulated, traditional land use control MS4:

- Five (5) business days from the date the NYSDEC receives a complete NOI for construction activities with a SWPPP that has been prepared in conformance with the technical standards, or
- Sixty (60) business days from the date the NYSDEC receives a complete NOI for construction activities with a SWPPP that has not been prepared in conformance with the technical standards.

For construction activities that are subject to the requirements of a regulated, traditional land use control MS4:

- Five (5) business days from the date the NYSDEC receives a complete NOI and signed "MS4 SWPPP Acceptance" form.

The project area is under the control of a regulated MS4, therefore the NOI shall be submitted directly to the NYSDEC along with the MS4 SWPPP Acceptance form. A blank NOI and SWPPP Acceptance Form has been included within Appendix A.

4.0 SOILS

The hydrologic soil characteristics of the watershed areas were obtained from Soil Survey Mapping of Dutchess County, New York, and available Geographical Information Systems (GIS) and are as follows:

Symbol	Description	Hydrologic Soil Group
DwB	Dutchess-Cardigan complex, undulating, rocky	B
NwC	Nassau-Cardigan complex, rolling, very rocky	D
Ud	Udorthents, smoothed	A

SOIL PROPERTIES

Symbol	Water Table	Restrictive Layer	Bedrock	Erosion Hazard (k)
DwB	>80”	>20-40” *	20-40” *	0.32
NwC	>80”	20-40” *	20-40” *	0.24
Ud	36-72”	>80”	>80”	0.17

*Cardigan component

Supporting information has been provided in Appendix B.

5.0 RAINFALL

5.1 Overview

The rainfall data utilized in the analysis of the watershed was obtained from http://precip.eas.cornell.edu as provided in the NYS Stormwater Design Manual dated January 2015. Supporting information has been provided in Appendix C. The storm events are as follows:

Storm Event	24-Hour Rainfall (in)
1 - year	2.61
10 - year	4.70
100 - year	8.34

5.2 Rainfall Event Sizing Criteria

The stream channel protection volume (Cpv) criteria, intended to protect stream banks from erosion, will be demonstrated by providing 12-24 hour extended detention or infiltration of the Type III 1-year, 24-hour storm event. The channel protection volume criterion is not required where the resulting diameter of the extended detention basin orifice is less than three (3) inches with a trash rack.

The overbank flood control (Qp) criteria, intended to prevent an increase in frequency and magnitude of out of bank flooding generated by new development, will be demonstrated by attenuating the Type III 10-year, 24-hour peak discharge rate to pre-development conditions. The overbank flood criteria can be waived if the project site discharges to a tidal water or fifth order stream.

The extreme flood control (Qf) criteria, intended to prevent the increased risk of flood damage from large storm events, maintain the boundaries of pre-development conditions, and protect the physical integrity of stormwater management practices, will be demonstrated by attenuating the Type III 100-year, 24-hour peak discharge rate to pre-development conditions. The extreme flood control criteria can be waived if the project site discharges to a tidal water or fifth order stream.

The pre-and post-development runoff rates were compared utilizing the Type III 1-year (channel protection), 10-year (overbank flood control), and 100-year (extreme flood control) year, 24-hour storm events.

The proposed drainage conveyance system will be designed utilizing the Type III, 25-year storm event.

6.0 STORMWATER ANALYSIS AND MANAGEMENT

6.1 Methodology

6.1.1 Hydrologic Analysis

The HydroCAD stormwater modeling system computer program by Applied Microcomputer Systems was used to analyze, design and document the complete drainage system. The program uses standard hydrograph generation and routing techniques based on the USDA-NRCS Technical Releases TR-20 and TR-55 to develop stormwater runoff rates and volumes.

The program determines the rate and volume of runoff based on inputs of the watershed area, and characteristics of the land including vegetative coverage, slope, soil type, and impervious area.

6.1.2 Stormwater Design Points

Design Points represent the location where the majority of runoff from an area exits the site. The same design points are identified in post-development conditions so that a comparison can be made between the pre-development and post-development conditions. Four design points for the main project area were selected, as follows:

Stormwater Design Points	
SDP	**Description**
1	Discharge from on-site area to the westerly property line (north of the Hammond Plaza)
2	Discharge from on-site area to westerly property line and Ferry Street (south and east of the Hammond Plaza)
3	Discharge from on-site developed area to City of Beacon’s municipal stormwater collection system at the southerly property line
4	Discharge from on-site and off-site area to the westerly property line to Beekman Street

6.2 Pre-Development Watershed Conditions

All existing watershed areas are modeled in HydroCAD as 'subcatchment' areas. The pre-development areas are as follows:

Subcatchment 1 is comprised of approximately 0.33 acres of on-site area. The on-site area is undeveloped wooded areas. The subcatchment area contains soils in hydrologic soil groups D. Runoff from the subcatchment travels overland via sheet flow and shallow concentrated flow to SDP 1.

Subcatchment 2 is comprised of approximately 0.55 acres of on-site and off-site area. The on-site area is undeveloped wooded area. Off-site area accounts for a small amount of wooded area and a small amount of impervious area comprised of Ferry Street's cul-de-sac. The subcatchment area contains soils in hydrologic soil D. Runoff from the subcatchment travels overland via sheet flow and shallow concentrated flow to SDP 2.

Subcatchment 3 is comprised of approximately 2.04 acres of on-site and off-site area. The on-site area is mostly undeveloped open grassy meadow and wooded area. The off-site portion of the subcatchment consists of impervious walkways and driveways and grassed areas with some woods. The entire subcatchment area contains soils in hydrologic soil group A, B and D. Runoff from the subcatchment travels overland via sheet flow and shallow concentrated flow where it is intercepted by an existing berm and drainage system that flows via pipe flow to SDP 3.

Subcatchment 4 is comprised of 1.01 acres of on-site and off-site area. The on-site area is comprised of undeveloped woods. Off-site area is a small amount of grassed area and impervious rooftop from the church building to the north of the site, and from the cemetery. The subcatchment contains soils in hydrologic soil groups A & D. Runoff from the subcatchment travels overland via sheet flow and shallow concentrated flow to SDP 4.

Detailed stormwater calculations and routing have been included in Appendix D.

The following table summarizes the pre-development watershed conditions:

Pre-Development Watershed Conditions					
Subcatchment	**Area (ac)**	**Cover**	**Average Curve #**	**Hydrologic Soil Group(s)**	**Time of Concentration**
1	0.33	All wooded area	77	D	10.0 minutes
2	0.55	Mostly woods and a small amount of impervious area	80	D	7.5 minutes
3	2.04	Mostly open meadow, gravel areas, woods and some grass	69	A, B & D	10.8 minutes
4	1.01	Mostly woods, with some grass	74	A & D	12.7 minutes

6.3 Post-Development Watershed Conditions

The proposed development will result in a disturbance of approximately 2.35 acres. The land cover will consist of mainly impervious areas, buildings, retaining walls and parking lots, with some grassy green spaces, a gravel walkway trail and stormwater management areas.

The post-developed subcatchment numbers listed below correspond to the pre-developed watershed areas with the same number. Sub watershed areas have been broken out of the main areas that drain directly to a stormwater management area. Two underground infiltration areas are, and one water quality unit is proposed to provide treatment of the site runoff from the site access, and attenuation of the design storms.

Subcatchment 10 is comprised of approximately 0.34 acres of on-site area. The area consists of meadow areas and undeveloped wooded areas with a small amount of impervious area (the retaining wall). The entire subcatchment area contains soils in hydrologic soil group D. Runoff from the subcatchment is directed towards the western property line to SDP1.

Subcatchment 20 is comprised of approximately 0.51 acres of on-site and off-site area. The on-site area is largely undeveloped wooded areas with parts of the retaining wall and landscaped grassed areas. The subcatchment area contains soils in hydrologic soil group D. Runoff from the subcatchment travels via sheet and shallow concentrated flow to SDP2 on the westerly property line.

Subcatchment 30 is comprised of approximately 1.98 acres of on-site area. The on-site area is the main project area, developed with the asphalt access drive, parking lots graded grass areas, residential buildings and retaining walls. The subcatchment area contains soils in hydrologic soil group A, B and D. Runoff from the subcatchment travels overland via sheet flow to the proposed stormwater conveyance system Underground Infiltration Area A that discharges to SDP3.

Subcatchment 31 is comprised of approximately 0.15 acres of on-site area. The area contains meadow areas and undeveloped wooded areas with a small amount of impervious area (the retaining wall). The subcatchment area contains soils in hydrologic soil group B and D. A minimum Tc of 6 minutes is used for this subcatchment.

Subcatchment 32 is comprised of approximately 0.11 acres of on-site area. The area contains meadow areas and undeveloped wooded areas with a small amount of impervious area (the retaining wall). The subcatchment area contains soils in hydrologic soil group D. A minimum Tc of 6 minutes is used for this subcatchment.

Subcatchment 40 is comprised of approximately 0.85 acres of on-site and off-site area. The on-site area is undeveloped wooded area, meadow, portions of the retaining wall, and a small amount of developed graded grass area and impervious rooftops from off-site areas. The subcatchment area contains soils in hydrologic soil group A & D. Runoff from the subcatchment travels overland via sheet flow and shallow concentrated flow to SDP4.

Detailed stormwater calculations and routing have been included in Appendix E.

The following table summarizes the post-development watershed conditions:

Post-Development Watershed Conditions					
Subcatchment	**Area (ac)**	**Cover**	**Average Curve #**	**Hydrologic Soil Group(s)**	**Time of Concentration**
10	0.34	Mostly meadow and wooded area with some impervious	78	D	10.5 minutes
20	0.51	Mostly wooded area with some impervious and grassed areas	80	D	6.0 minutes
30	1.98	Mostly impervious with some grassed areas and small amount of gravel path	79	A, B & D	8.8 minutes
31	0.15	Mostly grassed areas with some impervious area	79	B & D	6.0 minutes
32	0.11	Mostly grass area with some impervious	81	D	6.0 minutes
40	0.85	Mostly woods and meadow with some offsite impervious and grassed areas	77	A & D	10.6 minutes

6.4 Hydrologic Review

The stormwater runoff flows at each discharge point under pre-development and post-development conditions are summarized below.

Volumetric Flow Rate in cfs:

SDP	**1 - Year**		**10 - Year**		**100 - Year**	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
1	0.3	0.3	0.8	0.8	1.9	1.9
2	0.6	0.6	1.6	1.5	3.5	3.4
3	0.7	0.3	3.3	2.7	9.1	8.4
4	0.6	0.6	2.1	2.0	5.3	4.7

As shown above, post-development peak flow rates are less than pre-development rates for all the storm events modeled for all stormwater discharge points. Therefore, it can be stated that the post-developed storm water management controls (infiltration basin) mitigate the increased runoff from development of the site.

Supporting hydrologic analyses for pre-development and post-development conditions are included in Appendices D and E, respectively.

6.5 Stormwater Management System

The final stormwater management system will consist of conveyance systems which will include catch basins, yard drains, culverts, grass-lined swales/dikes and underground infiltration areas

where required. The remainder of the drainage area will remain undisturbed with natural vegetation remaining.

6.6 Hydraulic Calculations

Hydraulic sizing of the culverts and swales are based on the 25-year, Type III, 24-hour rainfall event. Sizing calculations will be provided within Appendix F in the final SWPPP.

6.7 Green Infrastructure for Stormwater Management

The SDM encourages the use of green infrastructure (GI) practices for stormwater management. Green infrastructure approach for stormwater management reduces a site's impact on an aquatic ecosystem through the use of site planning techniques, runoff reduction techniques, and certain standard stormwater management practices. The objective is to replicate the pre-development hydrology by maintaining pre-construction infiltration, peak runoff flow, discharge volume, and minimizing concentrated runoff by use of runoff control techniques. When implemented, green infrastructure can reduce volume, peak flow, and flow duration, promote infiltration and evapotranspiration, improve groundwater recharge, reduce downstream flooding, and protect downstream water and wetlands.

6.7.1 Green Infrastructure Practices

Green infrastructure consists of implementing several techniques during the site planning process which are:

- Preservation of Natural Resources – Preservation of undisturbed areas; preservation of buffers; reduction of clearing and grading; locating development in less sensitive areas; open space design; soil restoration.
- Reduction of Impervious Cover – Roadway reduction; sidewalk reduction; driveway reduction; cul-de-sac reduction; building footprint reduction; parking reduction.
- Runoff Reduction Techniques – Conservation of natural areas; sheet flow to riparian buffers or filter strips; vegetated open swale; tree planting/tree box; disconnection of roof runoff; stream daylighting for redevelopment projects; bioretention areas; rain gardens; green roofs; stormwater planters; rain tank/cistern; pervious pavement.

During the planning process, the above techniques are implemented to the greatest extent possible to reduce runoff developed by the site.

6.7.2 Five Step Process for Stormwater Site Planning and Selection Design

Stormwater management using GI is summarized in the five-step process described below.

Step 1: Site Planning

The site design will incorporate the preservation of natural resources including protection of wetland areas (where applicable), natural areas, avoidance of sensitive areas, minimizing grading and soil disturbance, minimizing impervious areas on internal access ways, driveways and parking areas. The site layout will avoid wetlands, waterways, buffers, areas of highly erodible soils and critical areas. The site design will also maintain natural drainage design points.

Step 2: Determine Water Quality Volume (WQv)

Calculate the water quality volume per Chapter 4 of the NYSDEC manual. This is described in detail under Section 6.8.

Step 3: Runoff Reduction by Applying Green Infrastructure Techniques

Green infrastructure practices will be implemented wherever possible to reduce runoff from the site. GI for this site will consist of reduction of access drive width, preservation of undisturbed buffers, providing infiltration practices and use of open channel vegetated conveyance systems.

Step 4: Apply Standard SMP's to Address Remaining WQv

Standard SMP's such as ponds, filtering practices or stormwater wetlands to meet additional water quality volume requirements. No additional standard SMP's will be required for this project.

Step 5: Apply Volume and Peak Rate Control Practices (if needed)

Cpv, Qp and Qf must also be met, either by standard practices, or other accepted techniques such as meeting criteria set forth in the NYS SWDM, where Cpv, Qp and Qf are required. Cpv, Qp and Qf are met by the installation of underground infiltration trenches which reduce the peak flows associated with each criterion.

6.8 Qualitative Practices

Small sized, frequently occurring storms account for the majority of runoff events that generate stormwater runoff. As a result, the runoff from these storms is recognized as a major contributor of pollutants. Therefore, treating these frequently occurring smaller rainfall events and a portion of the larger events offers an opportunity to minimize the water quality impacts associated with developed areas.

The water quality volume, denoted as $WQ_{v,}$ specifies a treatment volume required to be captured and treated by intercepting 90% of the average annual stormwater runoff volume. This criterion strives to achieve an 80% Total Suspended Solids (TSS) removal and 40% Total Phosphorous (TP) removal on an annual basis.

In numerical terms, it is calculated using the formula below which was obtained from Section 4.2 of the New York State Stormwater Management Design Manual, January 2015:

$$WQ_v = (P \times R_v \times A) / 12$$

Where:

WQ_v = Water Quality Volume (acre-feet)

P = 90% Rainfall Event Number

$R_v = 0.05+0.009 \times I$, where I is percent impervious (minimum $R_v = 0.2$)

A = Site area in acres (contributing area)

The following table has been developed summarizing the pre-treatment volume, water quality volume and treatment practices for the main project area.

Watershed	Total WQv (cf)	Required Pre-Treatment Volume (cf)	Pre-Treatment Practice	Treatment Practice	WQv Provided (cf)
30	5,529	5,529	Hydrodynamic	Infiltration	5,529

All water quality volumes are calculated using the total contributing area. Offsite contributing areas that do not require treatment are diverted as much as possible. Infiltration rates are greater than 5 inches per hour, thus requiring 100% pre-treatment at Underground Detention Area A. The above volumes are total for the entire watershed.

A major concern with runoff into waterbodies is phosphorus loading. Phosphorus, like nitrogen, is an essential nutrient for aquatic life in waterbodies. However, increased amounts of phosphorus entering surface waters promotes excessive algae growth, which decreases water clarity, causes variations in dissolved oxygen, disagreeable odors, habitat loss and fish kills. The protection of waterbodies from the harmful effects of phosphorus can be accomplished from reducing the runoff volume entering surface waters. Reduction of runoff volume reduces the concentrations of pollutants entering the surface water and thus decreases harmful effects. The removal of enhanced phosphorus can be accomplished using stormwater management practices. Whether in particulate or dissolved speciation, phosphorus can be removed using unit operations. Particulate phosphorus in particular can be removed using infiltration basins and through sedimentation of runoff before entering surface water. Primarily, reducing the WQv entering a surface water body will lower phosphorus pollutant loading. The infiltration basin has been sized to infiltrate the entire WQv and 1-year storm.

At the request of the City Engineer an analysis of the overall on-site WQv was prepared. The resulting WQv is 5,685 cubic feet. This represents 156 more cubic feet than subcatchment 30, which is where the majority of the projects site disturbance and impervious area is located. The only impervious area from on-site that is not being treated in our stormwater management practice is from the lower retaining wall (691 sqft). However, the stormwater management practice is treating 2,057 sqft of previously untreated impervious area from the sidewalk on Wolcott Avenue.

6.8.2 Pre-Treatment Practices

The following pre-treatment practices have been incorporated into the design of this project. Preventative and corrective maintenance measures to provide long-term effectiveness of stormwater attenuation practices if properly implemented will be included in Appendix L.

6.8.2.1 Overland Flow

A significant portion of the runoff will flow overland to receiving water bodies. Much of the site's existing natural vegetation is proposed to remain, and the post developed land cover will be restored to meadow. The meadow and remaining vegetated areas will capture sediment and floatables for those areas that are not directly conveyed to treatment practices.

6.8.2.2 Grass-Lined Swales

The design does not incorporate permanent grass-lined swale/dike to convey stormwater.

6.8.2.3 Stone Check Dams

No stone check dams will be incorporated in the stormwater design for this project. Stone check dams provide a pooling area where sediment can be captured and allowed to settle out of suspension. Stone check dams provide a good means of capturing floatables.

6.8.2.4 Hydrodynamic Devices

Hydrodynamic devices are designed to intercept and store pollutants such as sediment and floatables for later removal and safe disposal.

One hydrodynamic devices have been included in the design of this project conveying flow into Underground Infiltration Area A.

6.8.3 Treatment Practices

The following treatment practices have been incorporated into the design of this project. Preventative and corrective maintenance measures to provide long-term effectiveness of stormwater attenuation practices if properly implemented will be included in Appendix L.

6.8.3.1 Underground Infiltration Area

Stormwater infiltration practices capture and temporarily store the water quality volume before allowing it to infiltrate through the floor of each practice into the soil over a two-day period. In areas where the subsurface soils exhibit high infiltration rates, the channel protection volume may also be infiltrated. Infiltration facilities are not typically capable of infiltrating the overbank flood or extreme flood volumes. Adequate outflows are required for these larger storm events. Soil testing to obtain infiltration rates are required as part of the design of infiltration facilities. Varying degrees of pre-treatment of the water quality are required based on the field determined infiltration rate of the subsurface soils. 100% of the water quality volume is required where the infiltration rate exceeds 5 inches per hour, 50% for infiltration rates between 2 and 5 inches per hour, and 25% for infiltration rates less than 2 inches per hour. Pre-treatment is typically accomplished through installation of plunge pools and other filtering methods. Infiltration practices must be isolated and protected from stormwater run-off during construction. The contributory drainage area shall be completely constructed and stabilized before connection of the stormwater conveyance system to the infiltration practice. Infiltration basins are typically landscaped by providing a hardy, drought tolerant grass species that is capable of tolerating periodic inundation. The established grass requires mowing twice annually (or as needed). Underground infiltration areas typically consist of stone reservoirs with piping or chambers embedded within the stone. These areas are typically used where surface infiltration areas are limited due to site constraints. Proper maintenance of the contributing conveyance system and pre-treatment practice are important in maintaining infiltration rates.

There is one underground infiltration area proposed for this project. Underground Infiltration Area A consists of 5 rows of 13 chambers each, utilizing Cultec Recharger Model 330 XLHD. A hydrodynamic device has been provided for pre-treatment prior to discharge to the infiltration basin. Infiltration testing in the area has been performed, and the basin has been designed to infiltrate the entire WQv and CPv.

6.9 Runoff Reduction Volume (RRv)

RRv (measured in acre-feet) is reduction of the total WQv by application of GI techniques and SMP's to replicate the pre-development hydrology. The minimum required RRv is defined as the specified Reduction Factor (S), provided objective technical justification is documented.

RRv must be achieved by infiltration, groundwater recharge, reuse, recycle, evaporation/evapotranspiration of 100% of the post-developed WQv's to replicate pre-development hydrology by maintaining pre-construction infiltration, peak runoff flow, discharge volume, as well as minimizing concentrated flow by using runoff control techniques to provide treatment in a distributed manner before runoff reaches the collection system.

RRv is calculated based upon three methods:

1. Reduction of the practice contributing area in WQv computation.
2. Reduction of runoff volume by storage capacity of the practice.
3. Reduction using standard SMP's with runoff reduction capacity.

Projects that cannot meet 100% of the runoff reduction requirement must provide a justification that evaluates each of the GI planning and reduction techniques and identify the specific limitations of the site according to which application of this criterion is technically infeasible. Projects that do not achieve runoff reduction to pre-construction must, at a minimum, reduce a percentage of the runoff from impervious areas to be constructed on the site. The percent reduction is based on the Hydrologic Soil Group(s) (HSG) of the site and is defined as Specific Reduction Factor (S).

The following lists the specific reduction factors for the HSG's.

HSG A = 0.55

HSG B = 0.40

HSG C = 0.30

HSG D = 0.20

The specific reduction factor (S) is based on the HSG's present at the site. The values are defined based on a hydrology analysis of low, medium, and high imperviousness. The reduction is achieved when runoff from a percentage of the impervious area on a site is captured, routed through GI or an SMP, infiltrated to the ground, reused, reduced by evapotranspiration, and eventually removed from the stormwater discharge from the site.

The following equation is used to determine the minimum RRv:

RRv (in acre-feet of storage) = [(P)(Rv*)(Ai)]/12

Ai = (S)(Aic)

Ai = impervious cover targeted for runoff reduction

(Aic) = total area of new impervious cover

Rv * = 0.05+0.009(I) where I is 100% impervious

S = Hydrologic Soil Group (HSG) Specific Reduction Factor (S)

The goal of the SWPPP is to utilize as many runoff reduction methods as possible on a site. All GI practices will be quantified and compared to the overall WQv for the site. If the RRv is greater than or equal to the WQv, then standard SMP's can be implemented to control peak rate leaving the site if applicable.

The following table summarizes required 100% RRv, minimum RRv, RRv reduced by use of runoff reduction techniques, RRv provided by standard SMP's with RRv and provided RRv for the main project area.

Watershed	Required Total RRv (cf)	Required Minimum RRv (cf)	RRv reduced by use of runoff reduction techniques (cf)	RRv provided by standard SMP with RRv (cf)*	RRv (cf) Provided
1	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A
3	5,529	1,522	0	5,529	5,529
4	N/A	N/A	N/A	N/A	N/A

* Treatment practices can be oversized to provide additional runoff reduction (RRv); however, they can only be oversized to provide up to 100% of the RRv. No additional credit can be taken for RRv for practices that provide greater than 100% RRv. The infiltration basin has been sized to infiltrate the 1-year storm.

6.10 Soil Restoration

Soils within disturbed areas tend to over compact as a result of heavy construction traffic; thus, limiting their infiltrative capacity. Under the GP 0-15-002 permit, soil restoration is required in disturbed areas that will be vegetated in order to recover the original properties and porosity of the soil, especially in areas that receive high construction traffic, or areas that have soils that are poorly drained.

Many runoff reduction practices need Soil Restoration measures applied over and adjacent to the practice to achieve runoff reduction performance. Some key benefits of soil restoration are less runoff, better water quality; healthier, aesthetically pleasing landscapes; increased porosity on redevelopment sites where impervious cover is converted to converted to pervious; decreases runoff volume generated and lowers the demand on runoff control structures; enhances direct groundwater recharge; promotes successful long-term re-vegetation by restoring soil organic matter, permeability, drainage and water holding capacity for healthy root system development of trees, shrubs and deep-rooted ground covers, minimizing lawn chemical requirements, plant drowning during wet periods, and burnout during dry periods.

Soil restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.

6.10.1 Soil Restoration Methods

- Topsoil Application – Applying 6" of topsoil in soils with an HSG of A & B and have only been stripped, cut or filled. Soils with HSG of C or D that have only been stripped require aeration in addition to topsoil.
- Aeration - Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.
- Tilling – Tilling includes the use of a cat-mounted ripper, tractor mounted disc, or tiller in order to expose the compacted soil devoid of oxygen and air to recreate temporary air space which allows for infiltration.
- Full Soil Restoration - Consists of Deep Ripping and De-Compaction, Compost Enhancement, and/or Deep Subsoiling. Deep Ripping includes the use of a cat mounted ripper and is typically done at 12" to 24" depths. Compost Enhancement is done by using a deep subsoiler after topsoil has been applied. The goal is to alleviate the compaction that may have occurred during the placement of topsoil. This method mixes the topsoil and compost with subsoils.

Restoration techniques shall not be done until construction is complete, and traffic will not travel through green areas.

7.0 EROSION AND SEDIMENT CONTROL

7.1 Overview

The most sensitive stage of the development cycle is the period when vegetation is cleared, and a site is graded. The potential impacts to on-site and off-site receiving waters and adjoining properties are particularly high at this stage. Trees and topsoil are removed, soils are exposed to erosion, natural topography and drainage patterns are altered. Control of erosion and sediment during these periods is an essential function of this SWPPP and accompanying plans.

Effective and practical measures employed to minimize the erosion potential and prevent sediment from leaving the construction site and reaching streams or other water bodies have been recommended in accordance with:

- New York State Standards and Specifications for Erosion and Sediment Control, July 2016

In order to ensure the effectiveness of the measures recommended herein, routine inspections and documentation, along with procedures for monitoring the findings, maintenance, and corrective actions resulting from each inspection are outlined within this section of the SWPPP.

7.2 Temporary Erosion and Sediment Control Measures

The following temporary measures have been incorporated into the erosion and sediment control plans for the site construction activities. These measures are also detailed on the site plans.

7.2.1 Silt Fence

A silt fence is a temporary sediment barrier consisting of a filter fabric stretched across and attached to supporting posts, entrenched, and supported with woven wire fence. Silt fences are installed on the contours across a slope and used to trap sediment by intercepting and detaining sediment laden runoff from disturbed areas in order to promote sedimentation on the uphill side of the fence.

Silt fences are suitable for perimeter and interior control, placed below areas where runoff may occur in the form of sheet flow. It should not be placed in channels or areas where flow is concentrated. In addition to interior and perimeter control a silt fence can be applied in the following applications:

- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels banks.
- Around temporary spoil area and stockpiles.

7.2.2 Stabilized Construction Entrance

A stabilized construction entrance consists of a pad of aggregate overlaying a geotextile fabric located at a point where construction vehicles enter or exit a site to reduce or eliminate the tracking of sediment onto public right of ways, street, alleys or parking areas, thereby preventing the transportation of sediment into local stormwater collection systems. Efficiency is greatly increased when a washing area is included as part of a stabilized construction entrance.

Stabilized construction entrances shall be a minimum of fifty (50) feet long and twelve (12) feet wide, but not less the full width of points where vehicles enter and exit the site. Where there is only one access point to the site, the stabilized construction entrance shall be a minimum of twenty-four (24) feet wide. Stabilized construction entrances shall be a minimum of six (6) inches in depth consisting of one (1) to four (4) inch stone or reclaimed or recycled equivalent.

7.2.3 Check Dams

Check dams shall be placed in channels to reduce scour and erosion by reducing flow velocity and promoting sediment settlement. Check dams shall be spaced in the channel so that the crest of the downstream dam is at the elevation of the toe of the upstream dam. Check dams, consisting of a well-graded stone two (2) – nine (9) inches in size (NYSDOT – Light Stone) shall maintain a height of two (2) feet with side slopes of 2:1 extending beyond the bank of the channel by a minimum of one and a half (1.5) feet. Check dams shall be anchored in the channel by a cutoff trench of one and a half (1.5) feet in width by a half (0.5) foot in depth.

7.2.4 Inlet Protection

Inlet protection consists of a filtering measure placed around or upstream of a storm drain used to trap sediment by temporary ponding runoff before it enters the storm drain. Inlet protection is not considered to be a primary means of sediment control and should be used with an overall integrated sediment control program. There are four types of storm drain inlet protection consisting of: excavated drop inlet protection, fabric drop inlet protection, stone and block drop inlet protection and curb drop inlet protection.

Inlet protection shall be implemented for all inlets that could potentially be impacted by sediment laden runoff.

7.2.5 Temporary Channels

Temporary channels in the form of diversion swales or berms may be used to intercept and direct runoff under the following applications:

- Above disturbed areas in order to direct and prevent clean runoff from flowing over disturbed areas until the area is permanently stabilized.
- Below disturbed areas to convey sediment laden runoff to sediment traps.
- Across disturbed slopes to reduce slope lengths.

Where used to convey sediment laden runoff, temporary channels shall be equipped with check dams.

7.2.6 Sediment Traps & Sediment Basins

A sediment trap or basin is a containment area, where sediment laden runoff collected from disturbed areas is temporarily detained allowing sediment to settle out before the runoff is discharged. Sediment traps and basins are formed by excavating an area or constructing an earthen embankment where sediment control is needed.

There are several types of sediment traps. The outlet of a rip rap outlet sediment traps shall be through a partially excavated channel through the embankment lined with rip rap. Pipe outlet sediment traps are equipped with an outlet structure including a perforated riser. The pipe outlet typically is installed through the embankment.

Sediment traps and basins are designed to treat 3,600 cubic feet per acre of drainage area collected. Pipe outlet sediment traps are limited to drainage areas of less than five (5) acres, rip rap outlet sediment traps are limited to fifteen (15) acres of drainage area, and sediment basins can accommodate upwards of one-hundred (100) acres.

Sediment shall be removed, and the trap or basin shall be restored to the original dimensions when the sediment has accumulated to ½ of the design depth. The required and provided storage/cleanout elevations have been provided on the plan set. Calculations for sizing the facilities will be provided in the final SWPPP if necessary.

7.2.7 Water Bars

Water bars are temporary earth barriers constructed across construction roads used to intercept and divert roadway runoff toward temporary sediment traps or channels, prevent runoff from concentrating, and minimize the potential of gullies from forming. Spacing of water bars is dependent upon the road slope and shall be installed in accordance with the schedule depicted on the Erosion and Sediment Control detail sheet, if necessary.

7.2.8 Straw Bale Barriers

Straw bale barriers are used to intercept and contain sediment from disturbed areas of limited size in order to prevent sediment from exiting the site. Bales should be placed in a single row lengthwise along the contour, with ends abutting one another. Straw bales shall be bound and installed so that the bindings are oriented around the sides. Straw bales shall be entrenched a

minimum of four (4) inches, backfilled, and anchored using either two stakes or rebar driven through the straw bales to a depth of one and a half (1.5) to two (2) feet below grade.

Straw bales shall be used where no other measure is feasible. They shall not be used where there is a concentration of flow within a channel or other area.

The useful life of a straw bale barrier is three (3) months.

7.2.9 Temporary Soil Stockpiles

Stockpiling of soil is a method of preserving soil and topsoil for regrading and vegetating disturbed areas. Stockpiles shall be located away from environmentally sensitive areas (i.e. wetlands and associated buffers, streams, water bodies) and shall be protected with a peripheral silt fence. Slopes of stockpiles shall not exceed 2V:1H. Temporary stabilization measures shall be completed within seven (7) days of stockpile formation.

7.2.10 Dust Control

Dust controls reduce the surface and air transport of dust, thereby preventing pollutants from mixing into stormwater. Dust control measures for the construction activities associated within this project consist of windbreaks, minimization of soil disturbance (preserving buffer areas of vegetation where practical), mulching, temporary and permanent vegetation cover, barriers (i.e. geotextile on driving surfaces) and water spraying.

Construction activities shall be scheduled to minimize the amount of area disturbed at any one time.

7.2.11 Temporary Soil Stabilization Practices

Stabilization practices reduce the potential for soil detachment by shielding the soil surface from the impact of rainfall and reducing overland flow velocity.

The Contractor shall initiate stabilization measures as soon as possible in portions of the site where construction activities have temporarily or permanently ceased. In areas where soil disturbance activity has temporarily or permanently ceased and is located in one of the watersheds [NYCDEP] the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased.

This requirement does not apply where the initiation of stabilization measures by the 7th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions.

Temporary stabilization practices may include:

7.2.11.1 Mulching

Mulching is a temporary soil stabilization practice. Mulching prevents erosion by protecting soil from raindrop impact and by reducing the velocity of overland flow. Mulching also retains moisture within the soil surface and prevents germination.
Where mulching consists of wood chips or shavings, it shall be applied at a rate of 500-900 lbs per 1000 s.f. Where mulching consists of straw, it shall be applied at a rate of 90-100 lbs. per 1000 s.f.

All temporary grass areas shall receive a standard application of mulch consisting of straw, unless the area is hydro-seeded.

7.2.11.2 Temporary Seeding

Temporary seeding provides additional benefits over other stabilization practices by creating a vegetation system holding soil particles in place with root systems and maintaining the soils capacity to absorb runoff. Temporary vegetation shall be placed in accordance with project plans.

Irrigation shall be used when the soil is dry or when summer plantings are done.

7.2.11.3 Temporary Erosion Control Blanket

A temporary erosion control blanket is a degradable erosion control blanket used to hold seed and soil in place until vegetation is established in disturbed areas. Temporary erosion control blankets insulate and conserve seed moisture thus reducing evaporation and increasing germination rates and protects seeds from birds. Temporary erosion control blankets may consist of straw blankets, excelsior blankets (curled wood excelsior), coconut fiber blankets, or wood fiber blankets (reprocessed wood fibers which do not possess or contain any growth or germination inhibiting factors).

7.3 Permanent Erosion and Sediment Control Measures

The following permanent measures have been incorporated into the erosion and sediment control plans for the site construction activities.

7.3.1 Outlet Protection

Outlet protection is used to reduce stormwater velocity and dissipate the energy of flow exiting a culvert before discharging into receiving channels. Rip-rap treatment extends between the point where flows exit the culvert and where the velocity and/or energy from runoff is dissipated to a degree where there is minimal erosion downstream of the discharge point.

A geotextile fabric shall be placed beneath the rip-rap to prevent soil movement into and through the rip-rap.

7.3.2 Permanent Soil Stabilization Practices

Stabilization practices reduce the potential for soil detachment by shielding the soil surface from the impact of rainfall and reducing overland flow velocity.

In areas where soil disturbance activity has temporarily or permanently ceased and is located in one of the watersheds [NYCDEP] the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased.

Permanent stabilization practices may include:

7.3.2.1 Sod

Where exposed soils have the potential to generate off-site sediment loading, sod can provide a immediate form of stabilization and extra protection to a disturbed area. Where applied, sod shall be blue grass or a bluegrass/red fescue mixture or a perennial ryegrass and machine cut

with a uniform soil thickness of ¾ inch, plus or minus ¼ inch. Sod shall be used at the discretion of the Owner, unless specifically required by the plans.

7.3.2.2 Permanent Vegetation

Permanent vegetation shall be used to provide a protective cover for exposed areas that have received final grading. Permanent stabilization shall be applied where topsoil has been placed or returned and incorporated into the soil surface. When used, this process shall be followed with the application of straw mulch to protect soil from erosion and seed from drying out.
Irrigation shall be used when the soil is dry or when summer plantings are done.
Permanent vegetation shall be placed in accordance with project plans.

7.3.2.3 Hydroseeding

Hydroseeding is the hydraulic application of seed and fertilizer onto prepared seed beds. When used, this process shall be followed with the application of straw mulch to protect soil from erosion and seed from drying out.
Irrigation shall be used when the soil is dry or when summer plantings are done.
Hydroseeding shall be used at the discretion of the Contractor, unless specifically required by the plans.

7.3.2.4 Permanent Erosion Control Blankets

Permanent erosion control blankets are comprised of synthetic materials that form a high strength mat that helps prevent soil erosion in channels and on steep slopes. Stems and roots become intertwined within the matrix, thus reinforcing the vegetation and anchoring the mat. Permanent erosion control blankets insulate and conserve seed moisture thus reducing evaporation and increasing germination rates and protect seeds from birds. When used within channels, permanent erosion control blankets can aid in the establishment of vegetation and increase the maximum permissible velocity of the given channel by reinforcing the soil and vegetation to resist the forces of erosion during runoff events.
Permanent erosion control blankets shall be used on slopes steeper than 3:1.

7.4 Erosion and Sediment Control Sequencing Schedule

Implementation schedules for the installation of erosion and sediment control measures prior to and during the course of construction will depend greatly on the actual construction schedule and the varying field conditions that may warrant temporary construction stops and/or work commencing in other locations. The plans include an anticipated construction sequence schedule, of which temporary and permanent erosion and sediment control practices will be required and inspected.

7.5 Maintenance Schedules

Maintenance of the erosion and sediment controls incorporated into this project shall be performed on a regular basis to assure continued effectiveness. This includes repairs and replacement to all erosion and sediment control practices, including cleanout of all sediment retaining measures. Those measures found to be ineffective during routine inspections shall be repaired or replaced and cleaned out (where applicable) before the next anticipated storm event or within 24-hours of being notified, whichever comes first. A more detailed description of the

maintenance procedures for the site-specific erosion and sediment control practices has been provided on the plan set.

7.6 Construction Staging Areas

Construction staging areas are areas designated within construction sites where most equipment and materials are stored. The locations of the construction staging areas for this project will be shown on the final plan set.

7.7 Site Assessments, Inspections and Reporting

Regular inspections of the construction site shall be performed by a qualified professional who is familiar with all aspects of the SWPPP and the implemented control practices. Inspections are intended to identify areas where the pollutant control measures at the site are ineffective and have the potential to allow pollutants to enter water bodies or adjoining properties.

7.7.1 Prior to Construction

Prior to the commencement of construction, a qualified professional shall conduct an inspection of the site and certify in an inspection report that the appropriate erosion and sediment control measures have been installed as indicated by the project plan set and SWPPP. This certification shall be forwarded to the Owner's Representative and Contractor for filing in the construction log book.

A copy of the "Pre-Construction Site Assessment Checklist" has been provided in Appendix G.

7.7.2 During Construction

Following the commencement of construction, a qualified professional shall perform inspections of site construction activities in accordance with the SPDES General Permit. Inspections shall occur every seven (7) calendar days. Refer to Section 1.2 of this SWPPP for additional inspection requirements associated with disturbance of greater than five (5) acres at any time.

For project areas where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the qualified inspector shall conduct a site inspection at least once every thirty (30) calendar days. The owner or operator shall notify the Regional Office stormwater contact person in writing prior to reducing the frequency of inspections.

For project areas where soil disturbance activities have been shut down with partial project completion, the qualified inspector can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The owner or operator shall notify the Regional Office stormwater contact person in writing prior to the shutdown.

The inspections shall include observation of installed and maintained erosion and sediment control measures for consistency with project specifications and documentation of items to be corrected and recommendations for mitigating concerns. The following information, at minimum, shall be recorded during each inspection:

- Date and time of inspection;

- Name and title of person(s) performing inspection;

- A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

- A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

- A description of the condition of all-natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface waterbody;

- Identification of all erosion and sediment control practices that need repair or maintenance;

- Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

- Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection;

- Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

- 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 (where applicable);

- Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of the sediment storage volume;

- Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

- Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The qualified inspector shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection

- A brief description of any erosion and sediment control practice repairs, maintenance or installations made as a result of previous inspection; and

- All deficiencies that are identified with the implementation of the SWPPP.

Summary reports shall be forwarded to the Owner's Representative and Contractor. Reports shall be incorporated into the construction log book. Within one business day of the completion of an inspection, the qualified inspector shall notify the owner or operator and appropriate contractor or subcontractor of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

A copy of the "Construction" inspection report has been provided in Appendix M.

7.7.3 Quarterly Report

The Owner shall prepare a written summary of its status with respect to compliance with the SPDES General Permit at a minimum frequency of every three months during which coverage under the permit exists. The summary should address the status of achieving each component of the SWPPP.

7.7.4 End of Term

Termination of coverage under SPDES General Permit is accomplished by filing a Notice of Termination with the NYSDEC. Prior to the filing of the Notice of Termination (NOT), the Owner shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment control structures have been removed and that all permanent erosion control and stormwater facilities have been installed and are operational in conformance with the SWPPP by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The owner or operator shall then submit the completed NOT form to the NYSDEC. 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 geotextile) have been employed on all unpaved areas and area not covered by permanent structures.

A NOT is provided in Appendix N.

7.8 Construction Log Book

The construction log book shall be maintained on-site from the date of initiation of construction activities to the date of final stabilization and shall be made available to the permitting authority upon request. The construction log book shall contain a record of all inspections; preparer's, qualified professional's; owner's/operator's; contractor's, and sub-contractor's (if applicable) certifications; and weekly and quarterly reports.

8.0 GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES

The following good housekeeping and material management practices shall be followed to reduce the risk of spills or exposure of materials to stormwater runoff.

8.1 Waste Materials

All waste material, including but not limited to trash and construction debris, generated during construction shall be collected and stored in a proper receptacle in accordance with Federal, State, County and Local regulations. No waste material shall be buried on-site. All collected waste material shall be hauled to an approved waste disposal facility.

8.2 Chemical

Chemicals used on-site shall be kept in small quantities and stored in closed water tight containers undercover in a neat orderly manner and kept out of direct contact with stormwater. Chemical products shall not be mixed with one another unless recommended by manufacturer.

All on-site personnel shall have access to material safety data sheets (MSDS) and National Institute for Occupational Safety and Health (NIOSH) Guide to Chemical Hazards (latest edition) for all chemicals stored and used on-site.

Manufacturer's and/or Federal, State, County and Local guidelines for proper use and disposal shall be followed. Any spills or contamination of runoff with chemicals shall be contained, collected, cleaned up immediately and disposed of in accordance with Federal, State, County and Local regulations.

8.3 Fuels and Oil

All on-site vehicles, tools, and construction equipment shall be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. On-site vehicle and equipment refueling shall be conducted at a location away from access to surface waters and runoff. Any on-site storage tanks shall have a means of secondary containment. Oil products shall be kept in their original containers with original manufacturer's label. In the event of a spill, it shall be contained, cleaned up immediately and the material, including any contaminated soil, shall be disposed of in accordance with Federal, State, County and Local regulations.

Fuel and oil spills in excess of reportable quantities shall be reported to the NYSDEC as soon as the discharge is discovered.

8.4 Fertilizers

Fertilizers used on-site shall be stored in closed water tight containers undercover in a neat orderly manner and kept out of direct contact with stormwater. Manufacturer's and/or Federal, State, County and Local guidelines for proper use and disposal shall be followed. Any spills or contamination of runoff with fertilizers shall be contained, collected, cleaned up immediately, and disposed of in accordance with Federal, State, County and Local regulations.

8.5 Paint

Paints used on-site shall be stored in closed water tight containers undercover in a neat orderly manner and kept out of direct contact with stormwater. Manufacturer's and/or Federal, State, County and Local guidelines for proper use and disposal shall be followed. Any spills or contamination of runoff with paint shall be contained, collected, cleaned up immediately, and disposed of in accordance with Federal, State, County and Local regulations.

8.6 Sanitary Waste Facilities

Should portable units be located on-site, they shall be placed on upland areas away from direct contact with surface waters. They shall be serviced and cleaned on a weekly basis by a licensed portable toilet and septic disposal service. Any spills occurring during service shall be cleaned up immediately and disposed of in accordance with Federal, State, County, and Local regulations.

8.7 Container Disposal

All of a product shall be used up before disposal of the container. Empty containers that may contain chemical residue shall be disposed of in accordance with Federal, State, County and Local regulations.

8.8 Concrete and Asphalt Trucks

Concrete and asphalt trucks shall not be allowed to wash out or discharge surplus material on-site.

8.9 Site Supervisor

It shall be the responsibility of the Contractor's Site Supervisor to inspect daily and ensure the proper use, storage and disposal of all on-site materials.

9.0 SWPPP AMENDMENT

The SWPPP shall be updated by a licensed professional engineer whenever any of the following apply:

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.
2) The SWPPP proves to be ineffective in:

- Eliminating or significantly minimizing pollutants from sources identified in the SWPPP required by the SPDES Permit; or
- Achieving the general objective of controlling pollutants in stormwater discharges from permitted construction activity.

3) Identify any new contractor or subcontractor that will implement any measure of the SWPPP.
4) NYSDEC notifies the Permittee that the SWPPP does not meet one or more of the minimum requirements of the SPDES Permit. Within seven (7) days of such notification or as provided for by the NYSDEC, the Permittee shall make amendments to the SWPPP and submit to the NYSDEC a written certification that the requested changes have been made.

10.0 CONTRACTOR CERTIFICATIONS

All contractors and subcontractors that have any responsibility to install, inspect or maintain erosion or sediment control measures shall sign a copy of the certification statement included in Appendix I before undertaking any construction activity at the site identified in the SWPPP.

11.0 OWNER/OPERATOR CERTIFICATION

The Owner/Operator must review and sign the owner/operator certification statement included in Appendix K.

12.0 CONCLUSIONS

This SWPPP demonstrates that the proposed project generally meets the requirements of SPDES GP-0-15-002, as follows:

- An erosion and sediment control plan in accordance with the latest revision to the New York State Standards and Specifications for Erosion and Sediment Control, July 2016, has been developed for the project and is included in the site plan set.
- Hydraulic calculations for all storm events modeled will demonstrate that the resulting stormwater runoff from the development, exiting the site will not adversely impact offsite properties, stormwater conveyance systems or receiving water bodies. Temporary and permanent stormwater systems and facilities are designed in accordance with the latest revision to the New York State Stormwater Management Design Manual, January 2015.
- The project has been designed to capture and treat 90% of the average annual stormwater runoff from the development through approved water quality measures in all available areas.
- The underground infiltration practice will capture 100% of the required runoff reduction volume (RRv) and infiltrate the entire 1-year storm.

APPENDIX A

NOTICE OF INTENT AND MS4 ACCEPTANCE

0644089821

NOTICE OF INTENT

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

NYR _____ (for DEC use only)

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

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

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
RIVER RIDGE VIEW, LLC

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

Owner/Operator Contact Person First Name
GARY

Owner/Operator Mailing Address
445 MAIN STREET

City
Beacon

State
NY

Zip
12508-

Phone (Owner/Operator)
845-418-

Fax (Owner/Operator)

Email (Owner/Operator)
garyjoseph625@gmail.com

FED TX ID
-
(not required for individuals)

Project Site Information

Project/Site Name
RIVER RIDGE

Street Address (NOT P.O. BOX)
WOLCOTT AVENUE

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

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Beacon

State: NY
Zip: 12508 -
County: Dutchess
DEC Region: 3

Name of Nearest Cross Street
Tompkins Terrace

Distance to Nearest Cross Street (Feet)
0

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

Tax Map Numbers
Section-Block-Parcel
5954-26

5954-26
5954-34

Tax Map Numbers
649885

637879
630770

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

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

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

X Coordinates (Easting): 585088

Y Coordinates (Northing): 4595455

2. What is the nature of this construction project?

● **New Construction**

○ **Redevelopment with increase in impervious area**

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

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

Pre-Development Existing Land Use

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

Post-Development Future Land Use

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

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

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

Total Site Area	Total Area To Be Disturbed	Existing Impervious Area To Be Disturbed	Future Impervious Area Within Disturbed Area
2.9	1.9	.	.

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

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

A	B	C	D
30 %	10 %	%	60 %

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

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

Start Date	End Date
04/01/2018	04/01/2019

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

Name

Hudson River

9a. Type of waterbody identified in Question 9?

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

9b. How was the wetland identified?

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

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

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

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

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

.

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

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

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

City of Beacon

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

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

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

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

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

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

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

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

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

SWPPP Preparer: Hudson Land Design

Contact Name (Last, Space, First): Bodendorf Michael

Mailing Address: 174 Main Street

City: Beacon

State: NY Zip: 12508-

Phone: 845-440-6926 Fax: 845-440-6637

Email: mbodendorf@hudsonlanddesign.com

SWPPP Preparer Certification

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

First Name Michael **MI** A

Last Name Bodendorf

Signature

Date / /

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

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

Temporary Structural

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

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

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

Permanent Structural

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

Other

Post-construction Stormwater Management Practice (SMP) Requirements

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

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

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

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

- ● All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

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

Total WQv Required

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

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

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

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

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

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

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

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

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

Name _____

Manufacturer _____

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

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

Total RRv provided

___.___ **acre-feet**

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

● **Yes** ○ **No**

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

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

Minimum RRv Required

___.___ **acre-feet**

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

● **Yes** ○ **No**

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

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

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

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

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

WQv Provided

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

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

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

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

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

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

CPv Required

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

CPv Provided

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

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

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

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

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

Total Overbank Flood Control Criteria (Qp)

Pre-Development

[ ][ ][ ].[ ][ ][ ] **CFS**

Post-development

[ ][ ][ ].[ ][ ][ ] **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

[ ][ ][ ].[ ][ ][ ] **CFS**

Post-development

[ ][ ][ ].[ ][ ][ ] **CFS**

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

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

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

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

RIVER RIDGE VIEW, LLC

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

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

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

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

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

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

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

Owner/Operator Certification

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

Print First Name: GARY

MI:

Print Last Name: JOSEPH

Owner/Operator Signature:

Date: / /

APPENDIX B

SOILS DATA

Hydrologic Soil Group—Dutchess County, New York
(FERRY STREET)

Map Scale: 1:1,320 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Lines

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Points

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Dutchess County, New York
Survey Area Data: Version 13, Sep 23, 2016

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

Date(s) aerial images were photographed: Mar 26, 2011—Apr 16, 2012

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Dutchess County, New York (NY027)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DwB	Dutchess-Cardigan complex, undulating, rocky	B	0.1	2.2%
NwC	Nassau-Cardigan complex, rolling, very rocky	D	3.6	80.1%
Ud	Udorthents, smoothed	A	0.8	17.7%
Totals for Area of Interest			**4.4**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

K Factor, Whole Soil—Dutchess County, New York
(FERRY STREET K-FACTOR_SOIL RATINGS)

Map Scale: 1:1,990 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Lines

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Points

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Dutchess County, New York
Survey Area Data: Version 13, Sep 23, 2016

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

Date(s) aerial images were photographed: Mar 26, 2011—Apr 16, 2012

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

K Factor, Whole Soil

K Factor, Whole Soil— Summary by Map Unit — Dutchess County, New York (NY027)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
DwB	Dutchess-Cardigan complex, undulating, rocky	.32	1.1	12.4%
NwC	Nassau-Cardigan complex, rolling, very rocky	.24	6.0	64.2%
Ud	Udorthents, smoothed	.17	2.2	23.5%
Totals for Area of Interest			**9.3**	**100.0%**

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

INFILTRATION TEST DATA

Project: River Ridge City of Beacon Date: 9/12/2017

By: Daniel G. Koehler, P.E.

Test Hole #	Test Hole Bottom Elevation	Soil Type	Soaked	TEST RUNS					
				*	1	2	3	4	5
IT 1	110	Brown Silty-Clay Loam	Yes	Finish	9:45	9:47	9:49		
				Start	9:44	9:46	9:48		
				Depth (in)	24	24	24		
IT 2	108	Brown Silty-Clay with Mottling	Yes	Finish	11:10	11:15	11:20		
				Start	11:07	11:00	11:12		
				Depth (in)	24	24	24		
IT 3	108.5	Brown Silty-Clay Loam	Yes	Finish	11:18	11:37	11:54		
				Start	11:09	11:20	11:38		
				Depth (in)	24	24	24		
IT 4	107.5	Brown Silty-Clay Loam	Yes	Finish	9:58	10:05	10:10		
				Start	09:54	10:00	10:05		
				Depth (in)	24	24	24		
IT 5	108	Brown Silty-Clay Loam	Yes	Finish	11:17	11:19	11:21		
				Start	11:16	11:18	11:20		
				Depth (in)	24	24	24		
IT 6	85	Brown Silt Loam	Yes	Finish	2:44	3:45			
				Start	1:44	2:45			
				Depth (in)	5/8”	1/8”			
IT 7	85	Brown Silt Loam	Yes	Finish	2:45	3:49	4:50		
				Start	1:45	2:49	3:50		
				Depth (in)	1 7/8”	1 1/2”	1 1/2”		

I, Daniel G. Koehler, P.E., the undersigned, certify that these infiltration tests were done by myself or under my direction according to the standard procedure as outlined in the NYS Stormwater Management Design Manual. The data and results presented are true and correct.

Dated: 9/12/2017 Signature: _____

License No. (P.E.) _____

Hudson Land Design
174 Main Street
Beacon, NY 12508
Tel: (845) 440-6926
Fax: (845) 440-6637

Project:	Stormwater Management River Ridge Infiltration Tests City of Beacon, NY	**Date:** **HLD No:**	September 11, 2017 2017-014

Test Pit Log

Test Pit Designation:	A1	Test Date:	September 11, 2017
Existing Grade Elevation (ft):	125		
Total Depth of Excavation:	15'		
Depth to Ground Water:	No GroundWater Encountered		
Depth to Mottling:	No Mottling Observed		
Depth to Bedrock:	No Bedrock Encountered		

Depth (ft)	Elev. (ft)
0	125
1	124
2	123
3	122
4	121
5	120
6	119
7	118
8	117
9	116
10	115
11	114
12	113
13	112
14	111
15	110
16	109
17	108
18	107
19	106
20	105
21	104
22	103
23	102
24	101
25	100
26	99
27	98
28	97
29	96
30	95

Non-Native Fill - Silty Loam with boulders, concrete and bricks

Brown Silty-Clay Loam with Cobbles

Limi of Excavation - No Refusal

Additional Notes:

Hudson Land Design
174 Main Street
Beacon, NY 12508
Tel: (845) 440-6926
Fax: (845) 440-6637

Project:	Stormwater Management River Ridge Infiltration Tests City of Beacon, NY	**Date:** **HLD No:**	September 11, 2017 2017-014

Test Pit Log

Test Pit Designation:	A2	Test Date:	September 11, 2017
Existing Grade Elevation (ft):	123.5		
Total Depth of Excavation:	16.5'		
Depth to Ground Water:	No GroundWater Encountered		
Depth to Mottling:	15.0'		
Depth to Bedrock:	No Bedrock Encountered		

Depth (ft)	Elev. (ft)
0	123.5
1	122.5
2	121.5
3	120.5
4	119.5
5	118.5
6	117.5
7	116.5
8	115.5
9	114.5
10	113.5
11	112.5
12	111.5
13	110.5
14	109.5
15	108.5
16	107.5
17	106.5
18	105.5
19	104.5
20	103.5
21	102.5
22	101.5
23	100.5
24	99.5
25	98.5
26	97.5
27	96.5
28	95.5
29	94.5
30	93.5

Non-Native Fill - Silty Loam with boulders, concrete and bricks

Brown Silty-Clay Loam with Cobbles

Limit of Excavation - No Refusal

Additional Notes:

This test wil not be used in the design of the underground system. This test falls outside of system footprint.

Hudson Land Design
174 Main Street
Beacon, NY 12508
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Fax: (845) 440-6637

Project:	Stormwater Management River Ridge Infiltration Tests City of Beacon, NY	**Date:** **HLD No:**	September 11, 2017 2017-014

Test Pit Log

Test Pit Designation:	A3	Test Date:	September 11, 2017
Existing Grade Elevation (ft):	122.5		
Total Depth of Excavation:	15'		
Depth to Ground Water:	No GroundWater Encountered		
Depth to Mottling:	No mottling observed		
Depth to Bedrock:	No Bedrock Encountered		

Depth (ft)	Elev. (ft)
0	122.5
1	121.5
2	120.5
3	119.5
4	118.5
5	117.5
6	116.5
7	115.5
8	114.5
9	113.5
10	112.5
11	111.5
12	110.5
13	109.5
14	108.5
15	107.5
16	106.5
17	105.5
18	104.5
19	103.5
20	102.5
21	101.5
22	100.5
23	99.5
24	98.5
25	97.5
26	96.5
27	95.5
28	94.5
29	93.5
30	92.5

Non-Native Fill - Silty Loam with boulders, concrete and bricks

Brown Silty-Clay Loam with Cobbles

Limit of Excavation - No Refusal

Additional Notes:

Hudson Land Design
174 Main Street
Beacon, NY 12508
Tel: (845) 440-6926
Fax: (845) 440-6637

Project:	Stormwater Management River Ridge Infiltration Tests City of Beacon, NY	**Date:** **HLD No:**	September 11, 2017 2017-014

Test Pit Log

Test Pit Designation:	A4	Test Date:	September 11, 2017
Existing Grade Elevation (ft):	124		
Total Depth of Excavation:	17.5		
Depth to Ground Water:	No GroundWater Encountered		
Depth to Mottling:	No mottling observed		
Depth to Bedrock:	No Bedrock Encountered		

Depth (ft)	Elev. (ft)
0	124
1	123
2	122
3	121
4	120
5	119
6	118
7	117
8	116
9	115
10	114
11	113
12	112
13	111
14	110
15	109
16	108
17	107
18	106
19	105
20	104
21	103
22	102
23	101
24	100
25	99
26	98
27	97
28	96
29	95
30	94

Non-Native Fill - Silty Loam with boulders, concrete and bricks

Brown Silty-Clay Loam with Cobbles

Limit of Excavation - No refusal

Additional Notes:

Hudson Land Design
174 Main Street
Beacon, NY 12508
Tel: (845) 440-6926
Fax: (845) 440-6637

Project:	Stormwater Management River Ridge Infiltration Tests City of Beacon, NY	**Date:** **HLD No:**	September 11, 2017 2017-014

Test Pit Log

Test Pit Designation:	A5	Test Date:	September 11, 2017
Existing Grade Elevation (ft):	124		
Total Depth of Excavation:	15'		
Depth to Ground Water:	No GroundWater Encountered		
Depth to Mottling:	No mottling observed		
Depth to Bedrock:	No Bedrock Encountered		

Depth (ft)	Elev. (ft)
0	124
1	123
2	122
3	121
4	120
5	119
6	118
7	117
8	116
9	115
10	114
11	113
12	112
13	111
14	110
15	109
16	108
17	107
18	106
19	105
20	104
21	103
22	102
23	101
24	100
25	99
26	98
27	97
28	96
29	95
30	94

Non-Native Fill - Silty Loam with boulders, concrete and bricks

Brown Silty-Clay Loam with Cobbles

Limit of Excavation - No refusal

Additional Notes:

Hudson Land Design
174 Main Street
Beacon, NY 12508
Tel: (845) 440-6926
Fax: (845) 440-6637

Project:	Stormwater Management River Ridge Infiltration Tests City of Beacon, NY	**Date:** **HLD No:**	September 11, 2017 2017-014

Test Pit Log

Test Pit Designation:	B1	Test Date:	September 11, 2017
Existing Grade Elevation (ft):	90		
Total Depth of Excavation:	6		
Depth to Ground Water:	No GroundWater Encountered		
Depth to Mottling:	No mottling observed		
Depth to Bedrock:	6.0'		

Depth (ft)	Elev. (ft)
0	90
1	89
2	88
3	87
4	86
5	85
6	84
7	83
8	82
9	81
10	80
11	79
12	78
13	77
14	76
15	75
16	74
17	73
18	72
19	71
20	70
21	69
22	68
23	67
24	66
25	65
26	64
27	63
28	62
29	61
30	60

Top Soil

Brown Silty Loam with Gravel

Limit of Excavation - Refusal - Bedrock

Additional Notes:

Hudson Land Design
174 Main Street
Beacon, NY 12508
Tel: (845) 440-6926
Fax: (845) 440-6637

Project:	Stormwater Management River Ridge Infiltration Tests City of Beacon, NY	**Date:** **HLD No:**	September 11, 2017 2017-014

Test Pit Log

Test Pit Designation:	B2	Test Date:	September 11, 2017
Existing Grade Elevation (ft):	91		
Total Depth of Excavation:	4		
Depth to Ground Water:	No GroundWater Encountered		
Depth to Mottling:	No mottling observed		
Depth to Bedrock:	4.0'		

Depth (ft)	Elev. (ft)
0	91
1	90
2	89
3	88
4	87
5	86
6	85
7	84
8	83
9	82
10	81
11	80
12	79
13	78
14	77
15	76
16	75
17	74
18	73
19	72
20	71
21	70
22	69
23	68
24	67
25	66
26	65
27	64
28	63
29	62
30	61

Top Soil

Brown Silty Loam with Gravel

Limit of Excavation- Refual - Bedrock

Additional Notes:

APPENDIX C

RAINFALL DATA, NYSDEC ERM, FLOOD MAP AND WETLAND MAP

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New York
Location	
Longitude	73.982 degrees West
Latitude	41.505 degrees North
Elevation	0 feet
Date/Time	Tue, 09 May 2017 12:02:08 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.33	0.50	0.62	0.82	1.02	1.26	**1yr**	0.88	1.19	1.45	1.77	2.15	2.61	2.96	**1yr**	2.31	2.85	3.29	3.95	4.59	**1yr**
2yr	0.39	0.60	0.74	0.98	1.23	1.53	**2yr**	1.06	1.43	1.75	2.14	2.61	3.16	3.57	**2yr**	2.80	3.43	3.93	4.63	5.28	**2yr**
5yr	0.46	0.71	0.89	1.19	1.52	1.91	**5yr**	1.31	1.76	2.20	2.70	3.28	3.96	4.52	**5yr**	3.51	4.34	4.99	5.77	6.53	**5yr**
10yr	0.51	0.80	1.02	1.38	1.79	2.27	**10yr**	1.55	2.07	2.62	3.21	3.90	4.70	5.40	**10yr**	4.16	5.20	5.98	6.81	7.67	**10yr**
25yr	0.60	0.95	1.21	1.67	2.23	2.85	**25yr**	1.92	2.56	3.30	4.06	4.93	5.90	6.85	**25yr**	5.22	6.59	7.61	8.48	9.49	**25yr**
50yr	0.68	1.09	1.39	1.95	2.63	3.39	**50yr**	2.27	3.00	3.93	4.84	5.86	7.02	8.20	**50yr**	6.21	7.89	9.14	10.03	11.16	**50yr**
100yr	0.77	1.24	1.60	2.27	3.10	4.03	**100yr**	2.68	3.53	4.68	5.77	6.99	8.34	9.83	**100yr**	7.38	9.45	10.98	11.85	13.14	**100yr**
200yr	0.87	1.43	1.85	2.65	3.67	4.79	**200yr**	3.17	4.15	5.58	6.89	8.33	9.93	11.78	**200yr**	8.79	11.33	13.19	14.02	15.47	**200yr**
500yr	1.05	1.73	2.26	3.28	4.59	6.03	**500yr**	3.96	5.15	7.04	8.70	10.51	12.51	14.98	**500yr**	11.07	14.40	16.84	17.51	19.22	**500yr**

Lower Confidence Limits

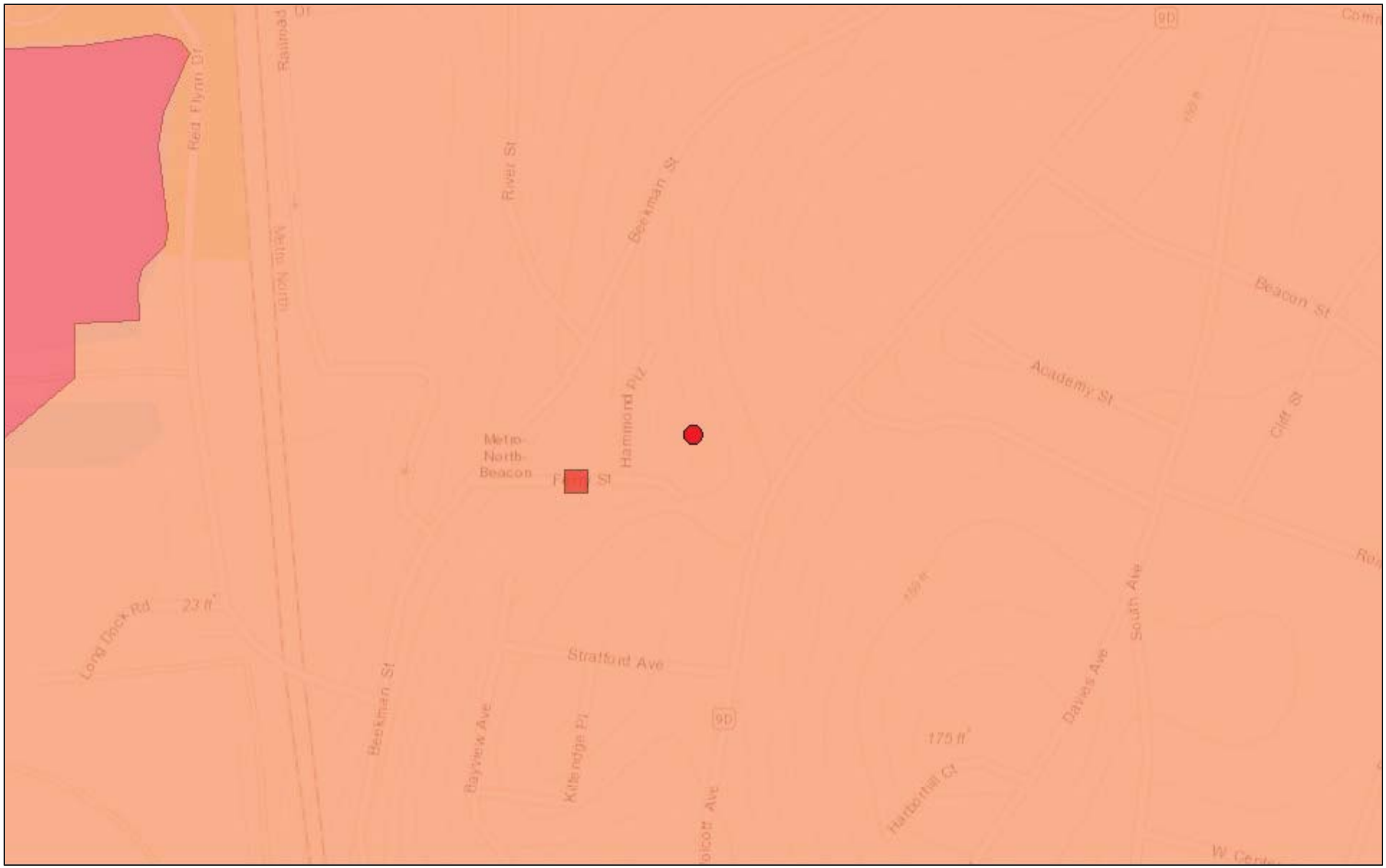
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.54	0.72	0.89	1.09	**1yr**	0.76	1.06	1.24	1.59	2.01	2.08	2.36	**1yr**	1.84	2.27	2.54	3.33	4.08	**1yr**
2yr	0.37	0.58	0.71	0.96	1.19	1.42	**2yr**	1.03	1.39	1.61	2.05	2.58	3.07	3.45	**2yr**	2.71	3.32	3.77	4.47	5.13	**2yr**
5yr	0.42	0.65	0.81	1.11	1.41	1.65	**5yr**	1.22	1.62	1.88	2.42	3.01	3.65	4.16	**5yr**	3.23	4.00	4.56	5.28	6.06	**5yr**
10yr	0.47	0.72	0.89	1.25	1.61	1.85	**10yr**	1.39	1.81	2.11	2.72	3.38	4.14	4.80	**10yr**	3.66	4.62	5.25	5.98	6.87	**10yr**
25yr	0.54	0.82	1.02	1.46	1.92	2.13	**25yr**	1.66	2.09	2.45	3.06	3.94	4.85	5.80	**25yr**	4.30	5.57	6.30	7.03	8.14	**25yr**
50yr	0.60	0.92	1.14	1.64	2.21	2.38	**50yr**	1.91	2.32	2.76	3.42	4.43	5.50	6.70	**50yr**	4.87	6.44	7.25	7.96	9.27	**50yr**
100yr	0.68	1.03	1.29	1.86	2.55	2.66	**100yr**	2.20	2.61	3.12	3.81	5.01	6.19	7.75	**100yr**	5.48	7.46	8.33	9.00	10.56	**100yr**
200yr	0.77	1.16	1.47	2.12	2.96	2.98	**200yr**	2.56	2.91	3.52	4.28	5.66	6.92	9.00	**200yr**	6.12	8.65	9.59	10.17	12.06	**200yr**
500yr	0.92	1.36	1.75	2.55	3.62	3.47	**500yr**	3.13	3.39	4.15	4.99	6.68	8.03	10.97	**500yr**	7.11	10.55	11.57	11.94	14.39	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.36	0.56	0.68	0.91	1.12	1.36	**1yr**	0.97	1.33	1.52	1.96	2.42	2.82	3.22	**1yr**	2.49	3.09	3.58	4.24	4.96	**1yr**
2yr	0.40	0.62	0.77	1.04	1.28	1.54	**2yr**	1.10	1.50	1.74	2.25	2.80	3.33	3.70	**2yr**	2.95	3.56	4.11	4.82	5.47	**2yr**
5yr	0.49	0.76	0.94	1.29	1.65	1.96	**5yr**	1.42	1.91	2.25	2.88	3.66	4.26	4.88	**5yr**	3.77	4.70	5.41	6.29	7.01	**5yr**
10yr	0.58	0.89	1.11	1.55	2.00	2.37	**10yr**	1.73	2.32	2.74	3.53	4.48	5.21	6.02	**10yr**	4.61	5.78	6.71	7.69	8.49	**10yr**
25yr	0.72	1.10	1.37	1.96	2.57	3.05	**25yr**	2.22	2.99	3.57	4.73	5.87	6.81	7.93	**25yr**	6.03	7.63	8.93	10.06	10.93	**25yr**
50yr	0.85	1.30	1.62	2.32	3.13	3.72	**50yr**	2.70	3.63	4.36	5.83	7.19	8.35	9.78	**50yr**	7.39	9.40	11.10	12.33	13.24	**50yr**
100yr	1.01	1.53	1.91	2.76	3.79	4.52	**100yr**	3.27	4.42	5.32	7.19	8.81	10.24	12.05	**100yr**	9.06	11.59	13.81	15.13	16.05	**100yr**
200yr	1.19	1.80	2.27	3.29	4.59	5.49	**200yr**	3.96	5.37	6.49	8.86	10.79	12.58	14.87	**200yr**	11.13	14.29	17.18	18.57	19.45	**200yr**
500yr	1.50	2.23	2.87	4.17	5.92	7.11	**500yr**	5.11	6.95	8.45	11.70	14.12	16.55	19.60	**500yr**	14.64	18.84	22.96	24.39	25.07	**500yr**

Powered by ACIS Northeast Regional Climate Center

River Ridge



January 30, 2018

1:4,514

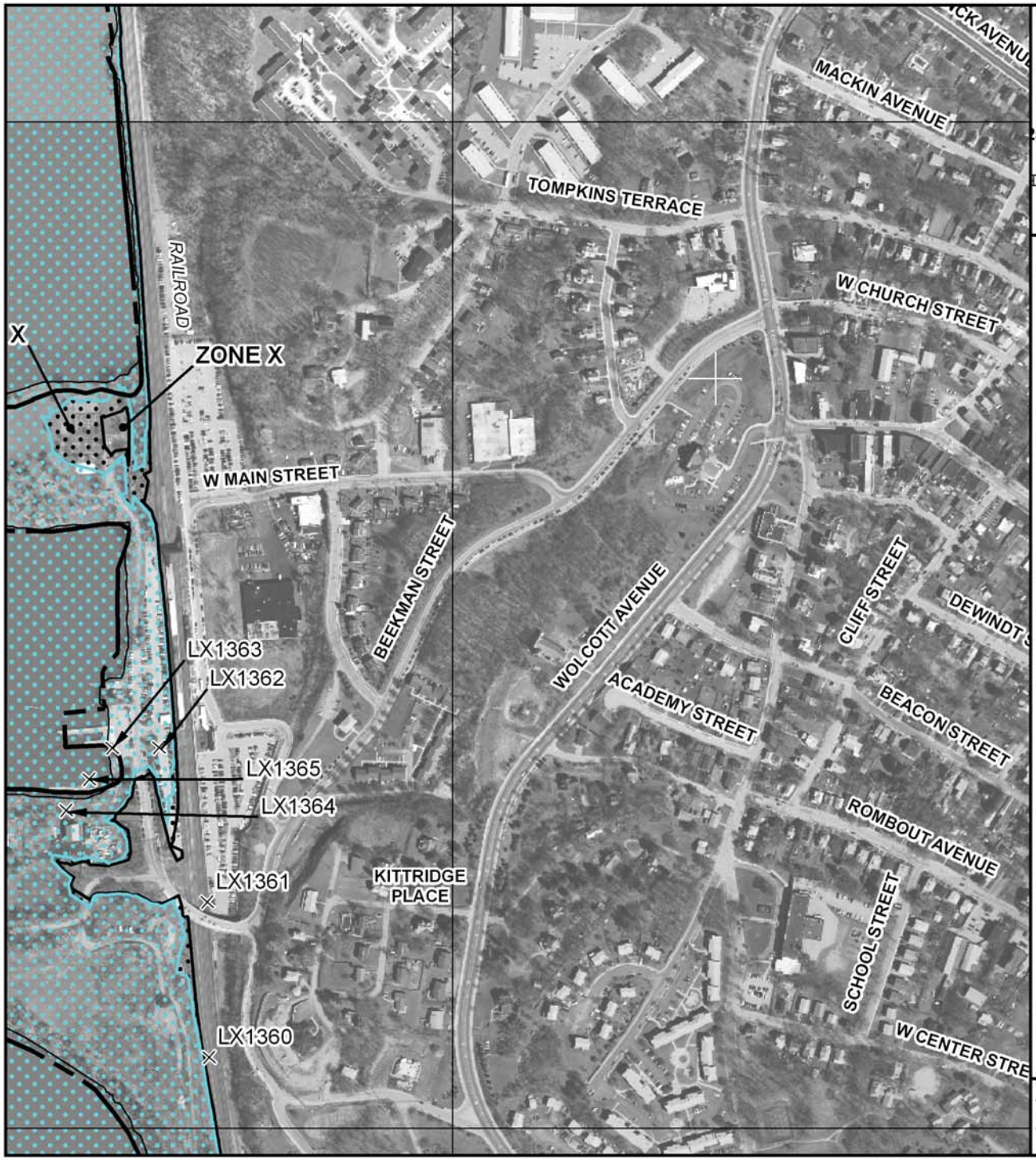
0 0.0375 0.075 0.15 mi

0 0.05 0.1 0.2 km

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey,

Author: Hudson Land Design

Not a legal document



MAP SCALE 1" = 500'

250 0 500 1000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0463E

FIRM

FLOOD INSURANCE RATE MAP

for DUTCHESS COUNTY, NEW YORK
(ALL JURISDICTIONS)

CONTAINS:

COMMUNITY	NUMBER
BEACON, CITY OF	360217
FISHKILL, TOWN OF	361337

PANEL 463 OF 602
MAP SUFFIX: E
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

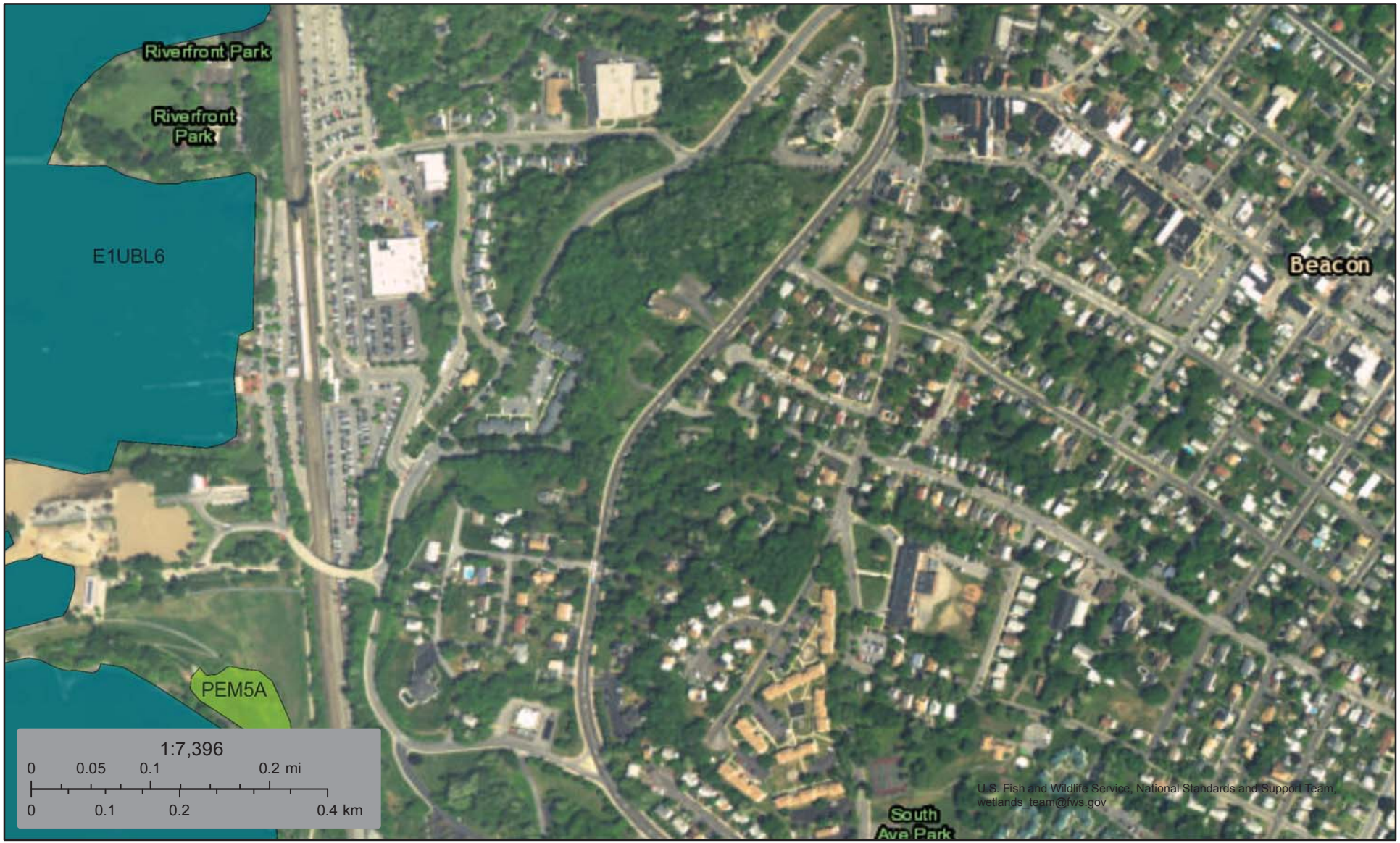
MAP NUMBER
36027C0463E

EFFECTIVE DATE
MAY 2, 2012

Federal Emergency Management Agency

U.S. Fish and Wildlife Service
National Wetlands Inventory

FERRY STREET WETLAND INVENTORY



May 9, 2017

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

APPENDIX D

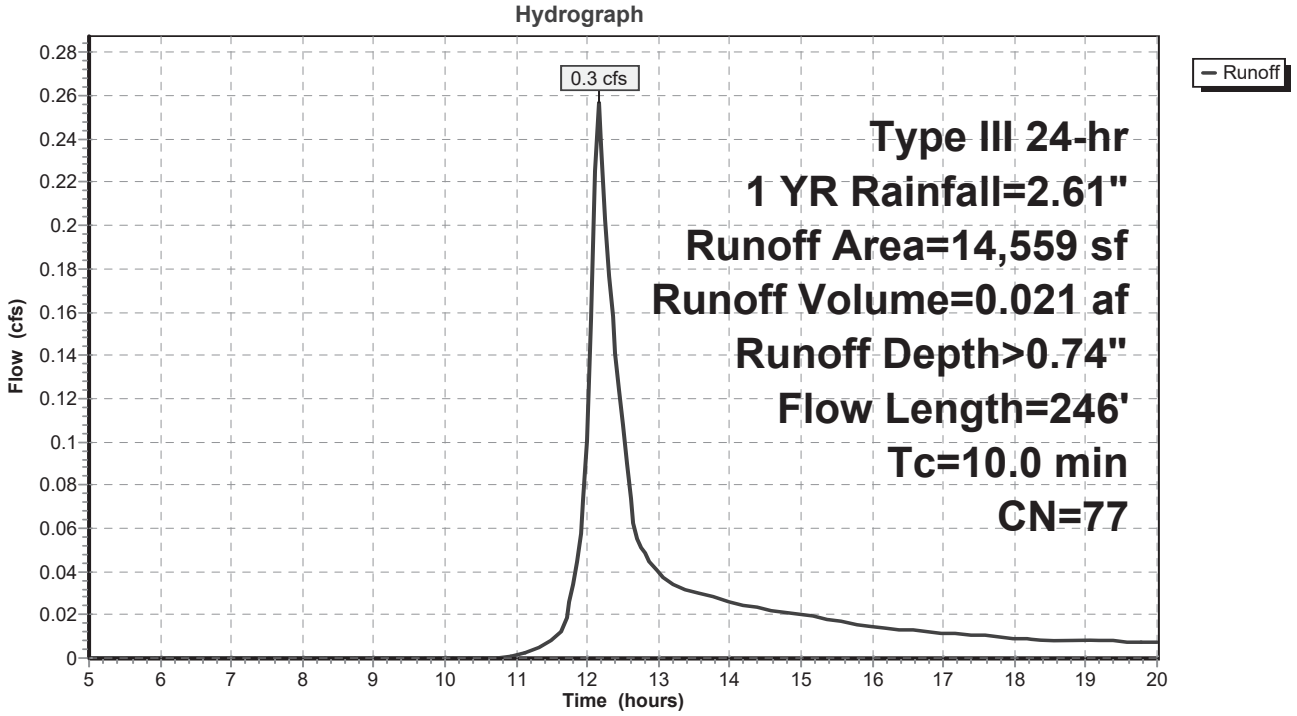
PRE-DEVELOPMENT HYDROCAD MODEL

DA 1 DA 2 DA 3 DA 4

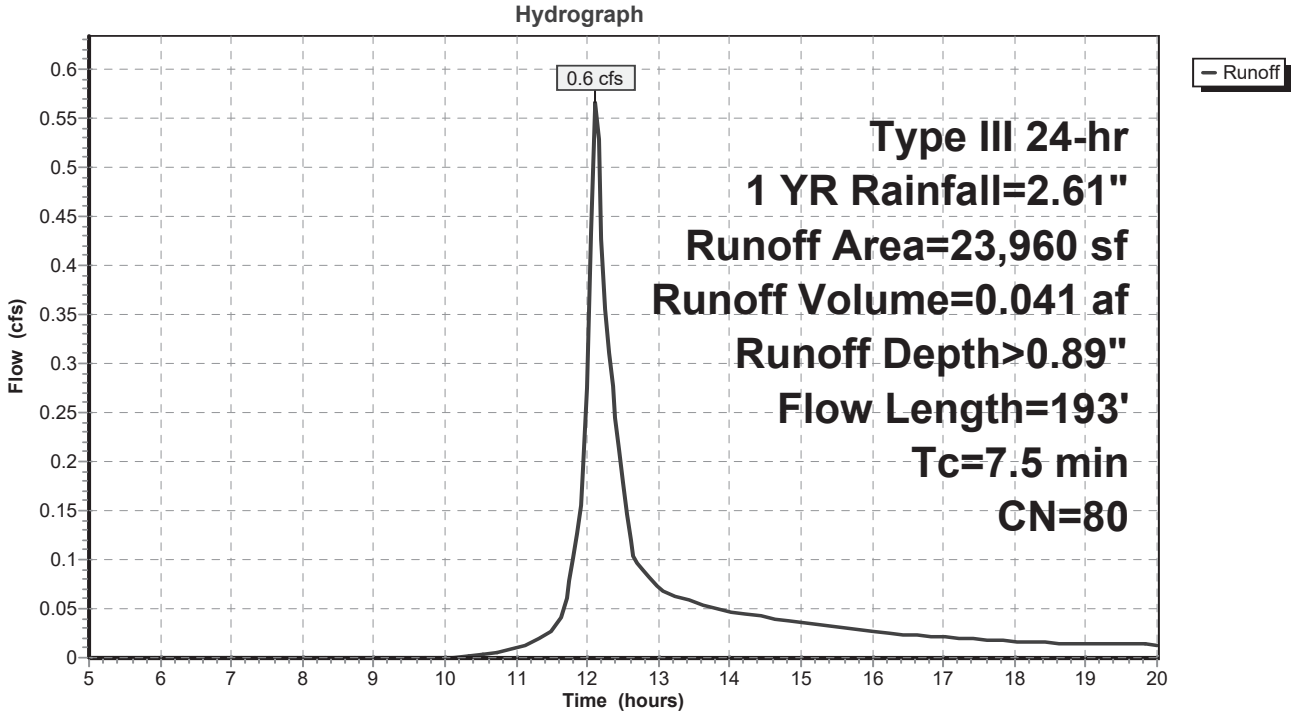
Subcat Reach Pond Link

Routing Diagram for FERRY ST PRE
Prepared by Hudson Land Design, P.C. , Printed 2/27/2018

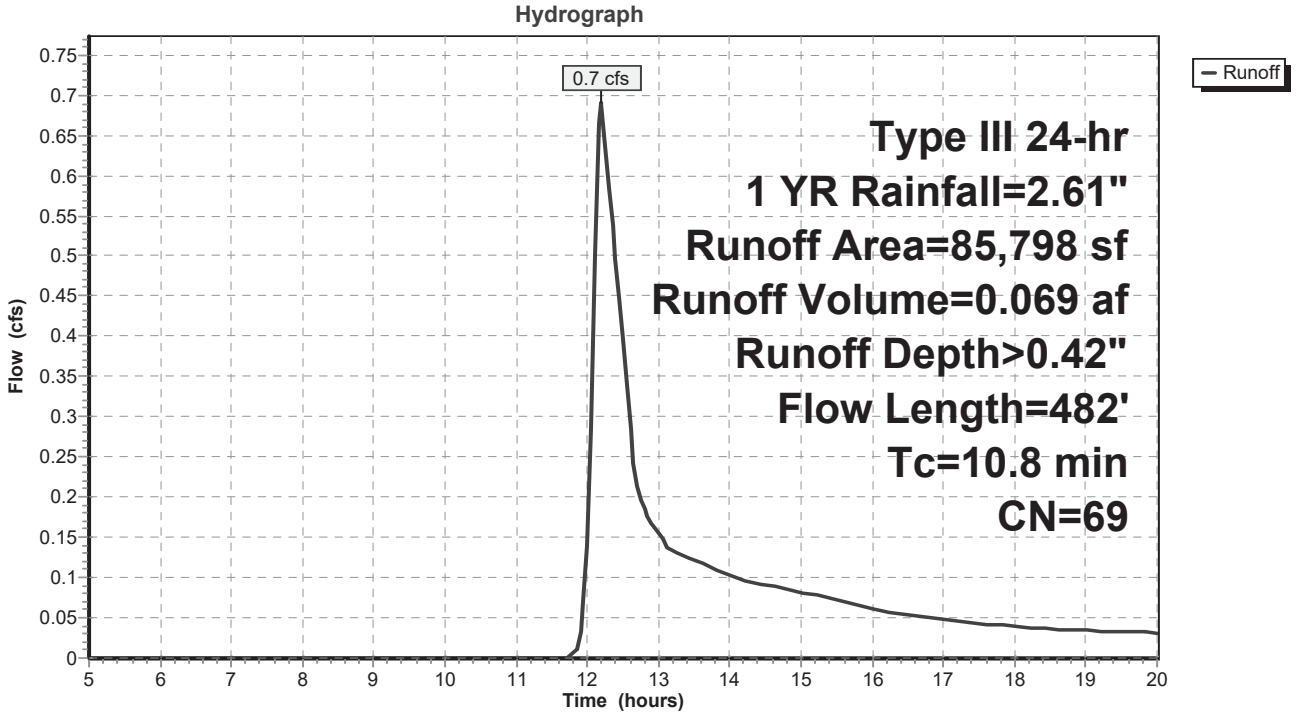
Subcatchment 1: DA 1



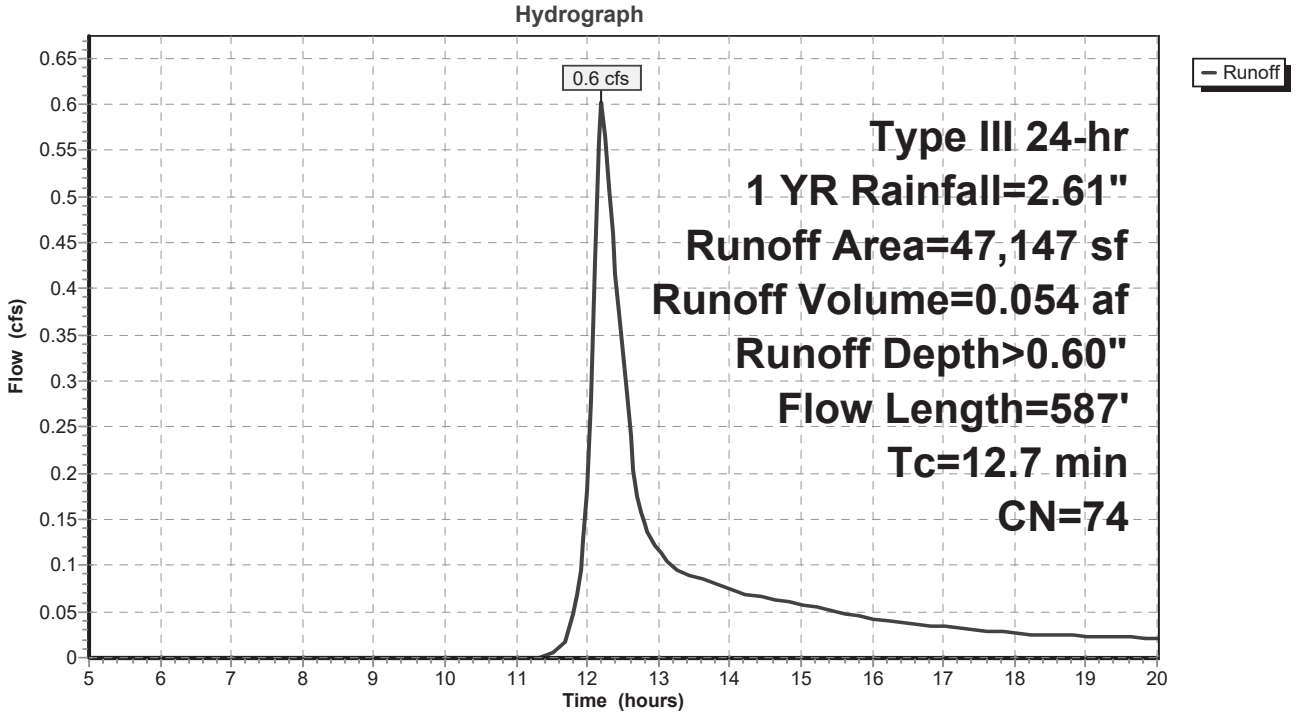
Subcatchment 2: DA 2



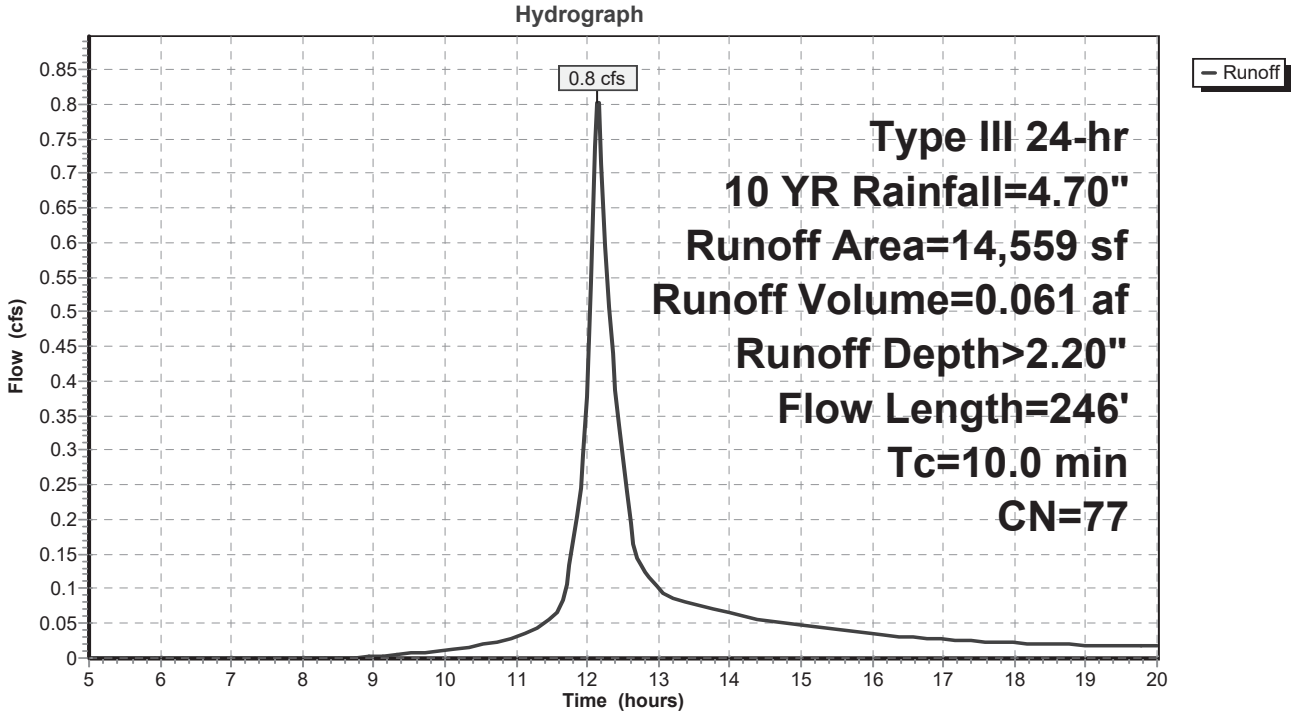
Subcatchment 3: DA 3



Subcatchment 4: DA 4



Subcatchment 1: DA 1



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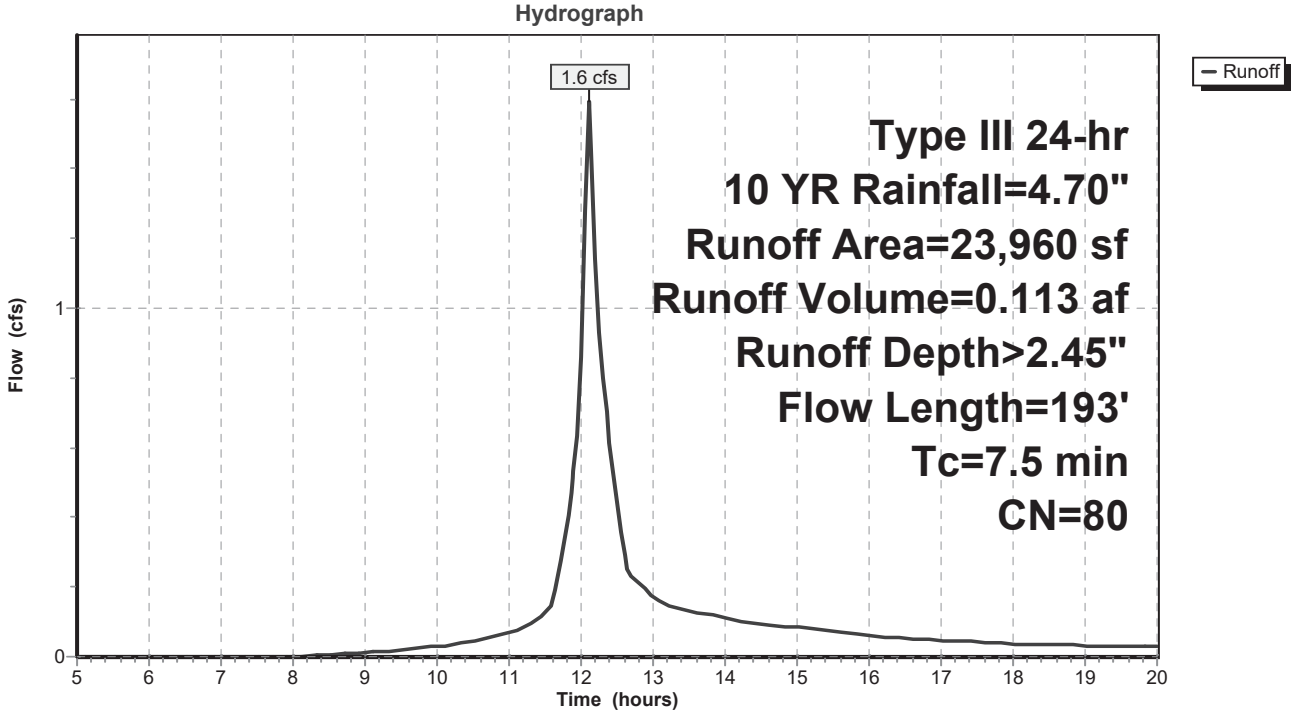
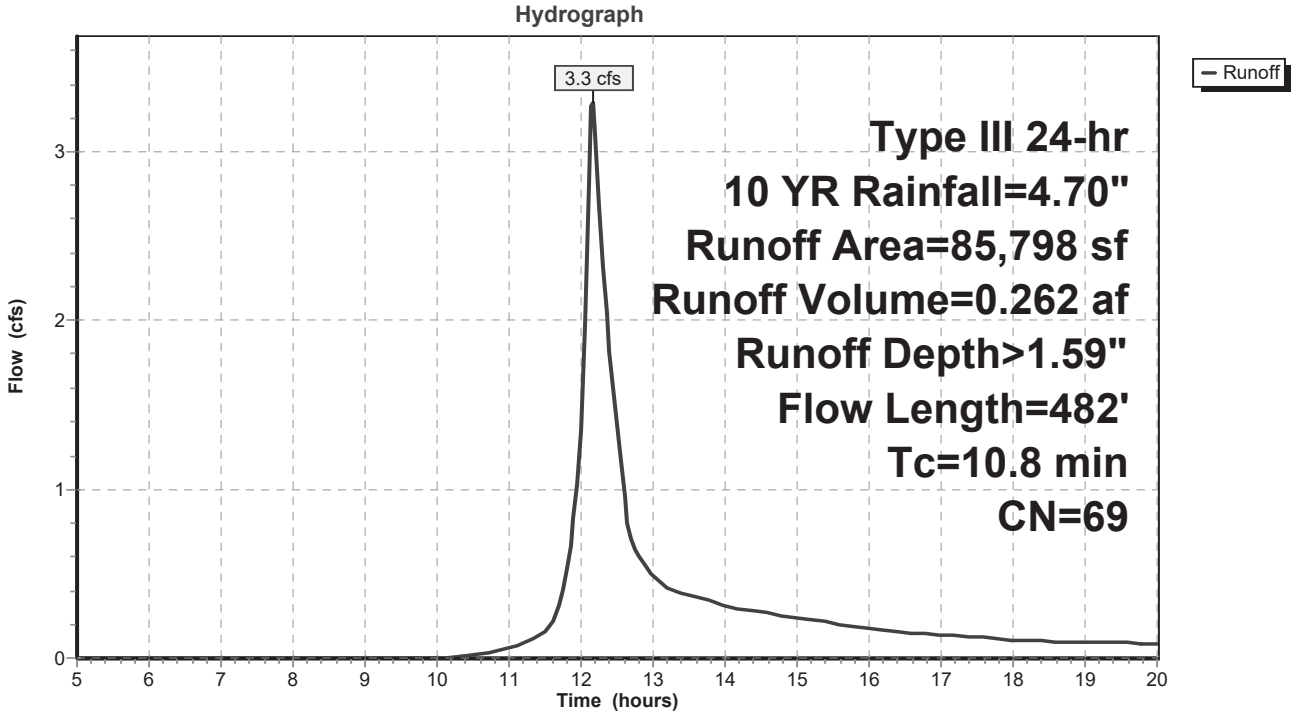
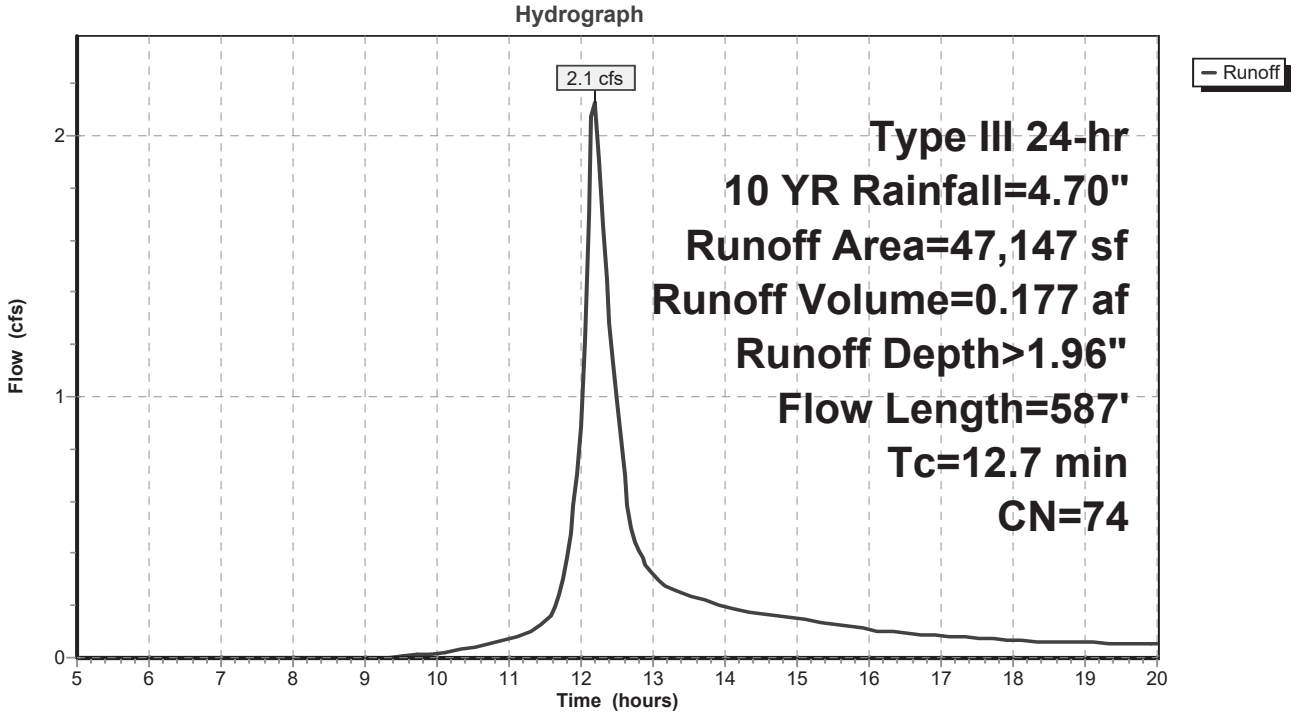


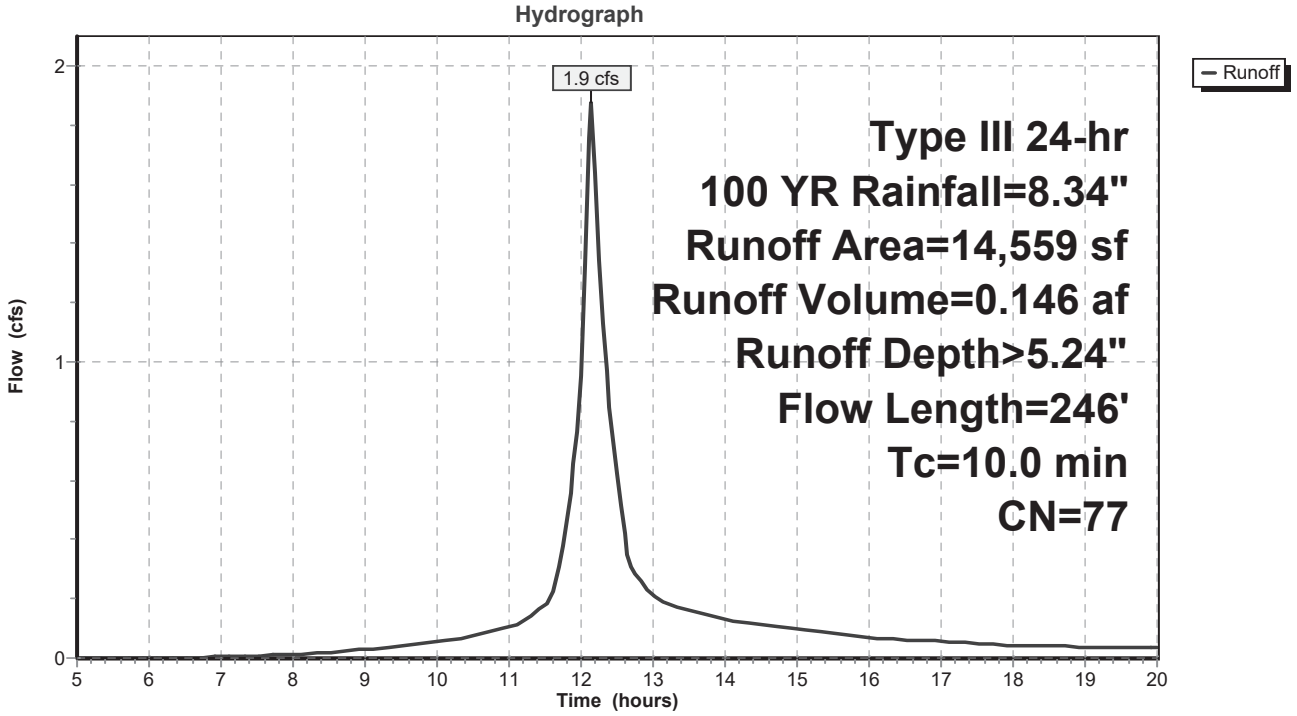
Subcatchment 3: DA 3



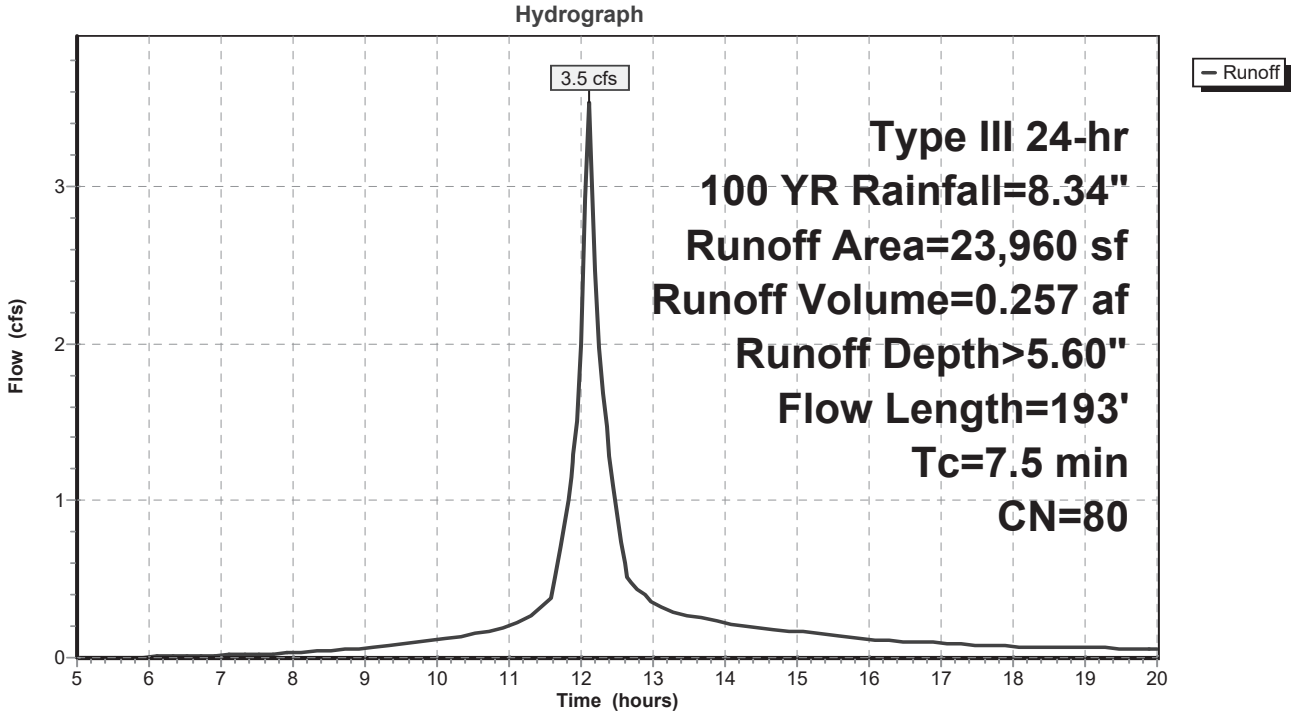
Subcatchment 4: DA 4



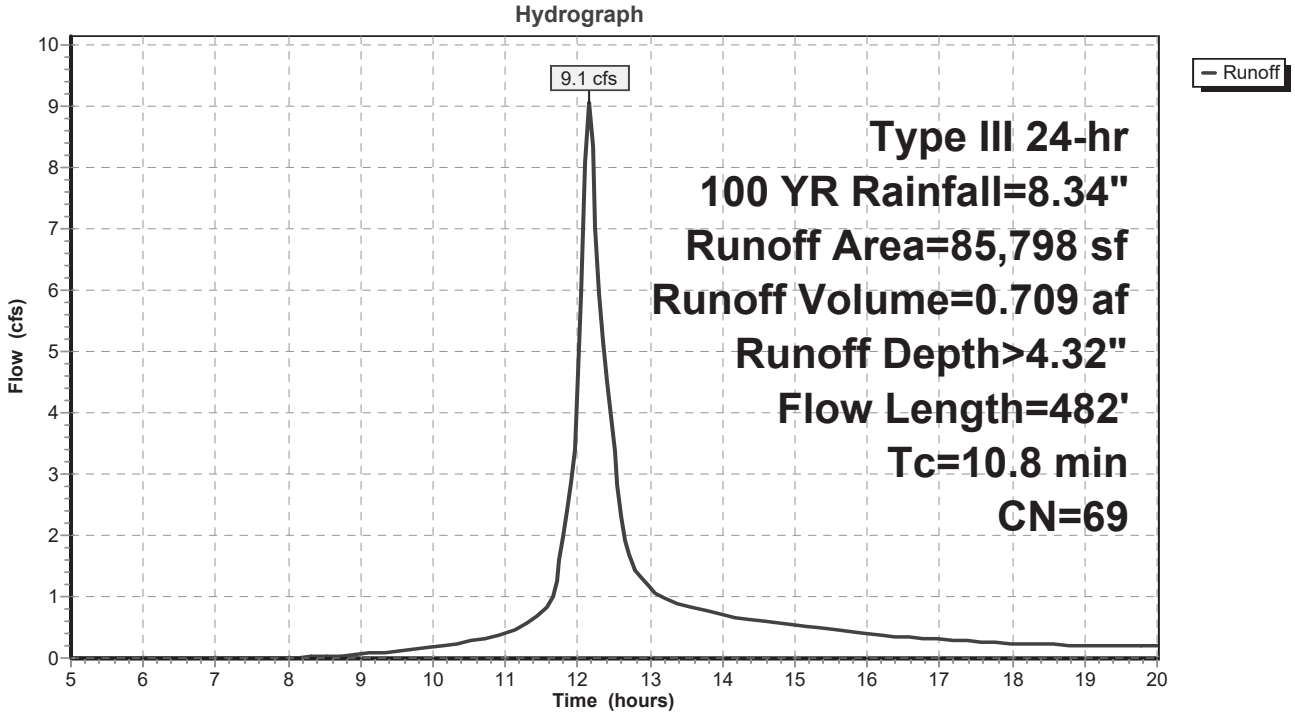
Subcatchment 1: DA 1



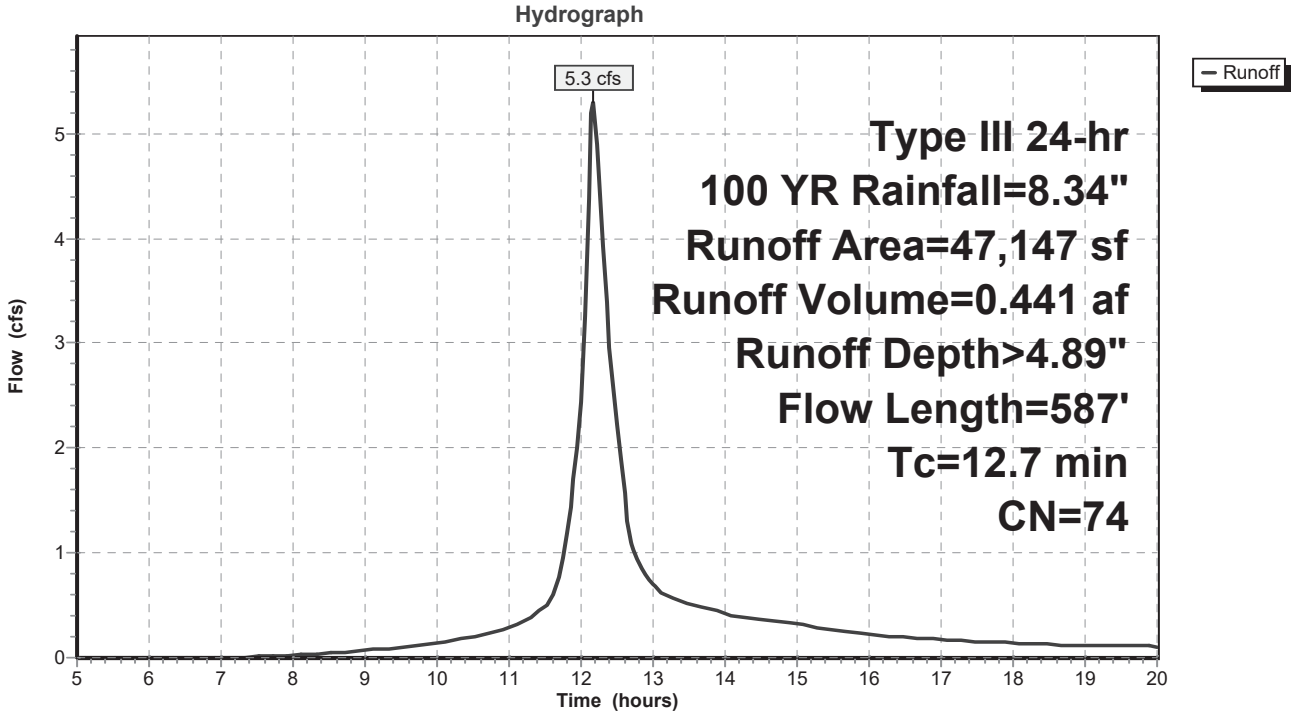
Subcatchment 2: DA 2



Subcatchment 3: DA 3

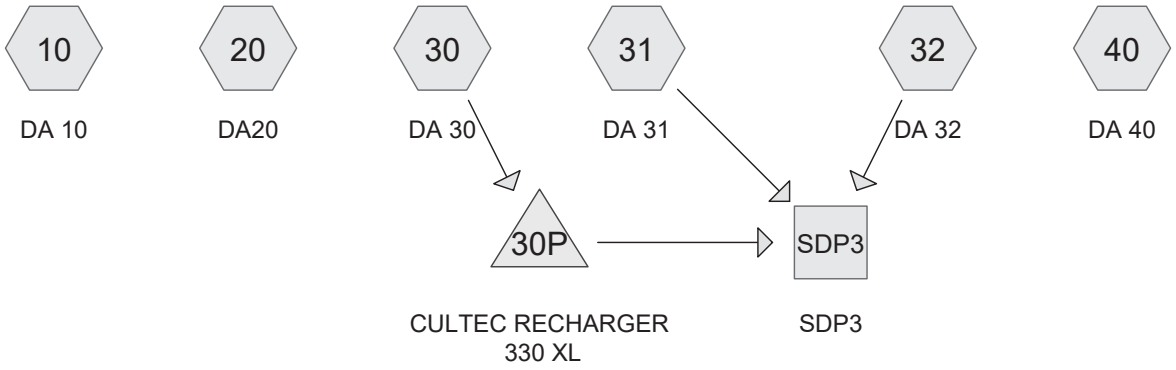


Subcatchment 4: DA 4



APPENDIX E

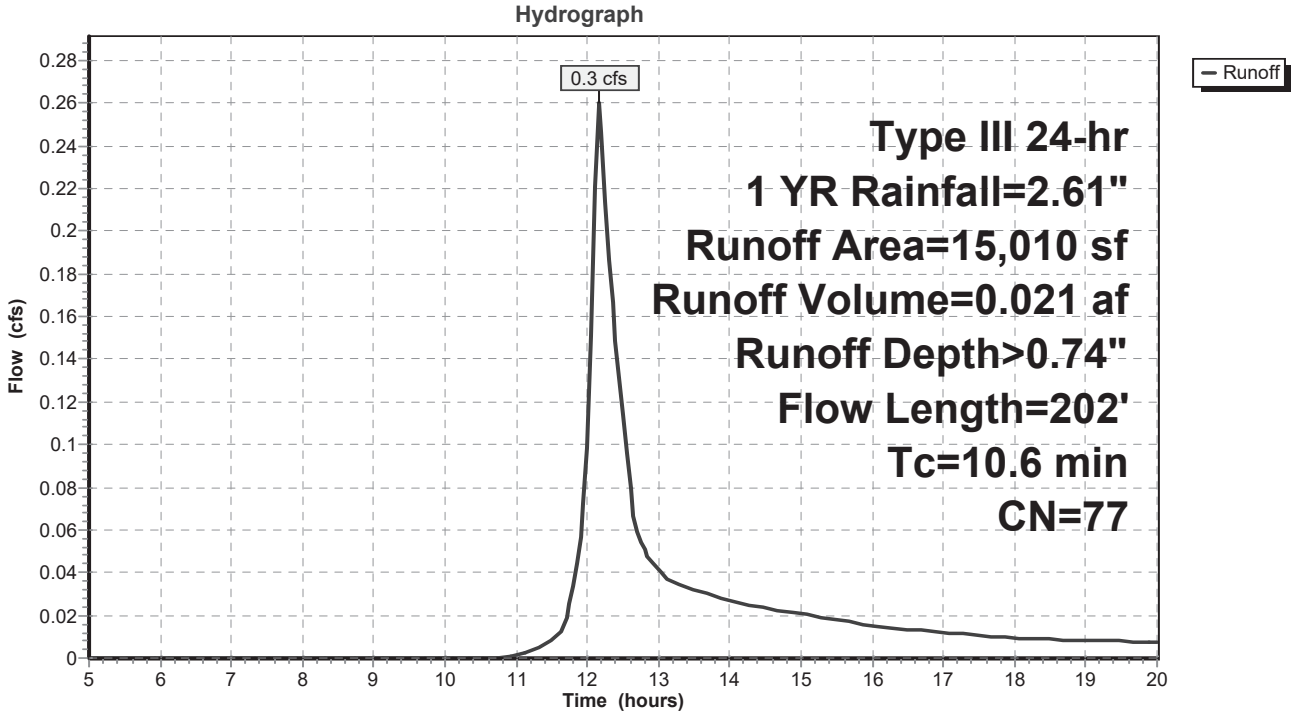
POST-DEVELOPMENT HYDROCAD MODEL



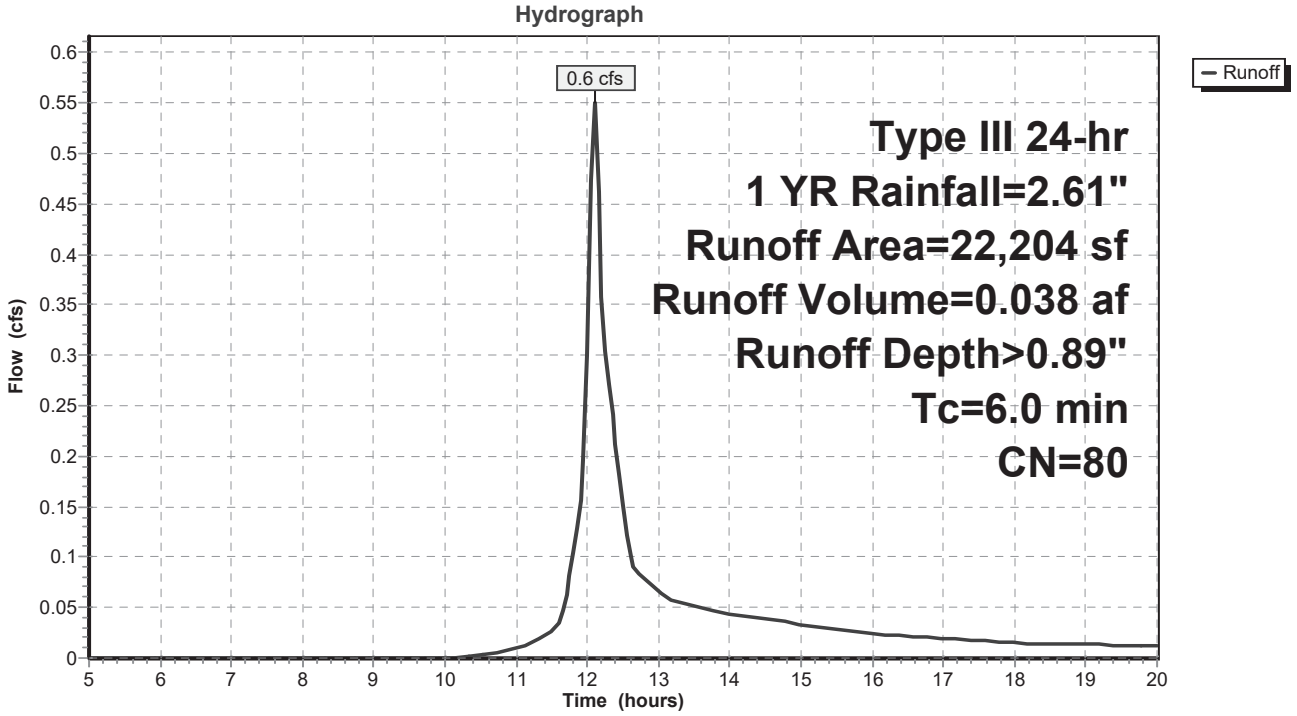
Subcat Reach Pond Link

Routing Diagram for FERRY ST POST 2018-0130
Prepared by Hudson Land Design, P.C. , Printed 2/27/2018

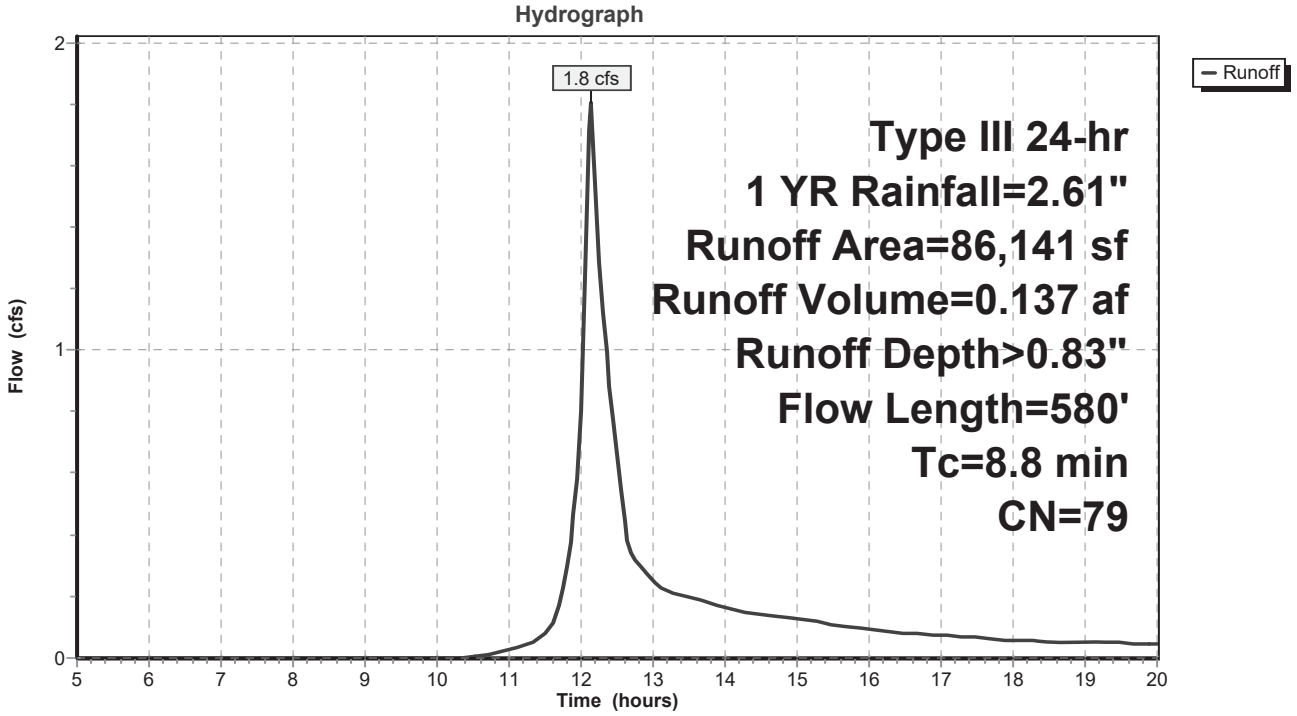
Subcatchment 10: DA 10



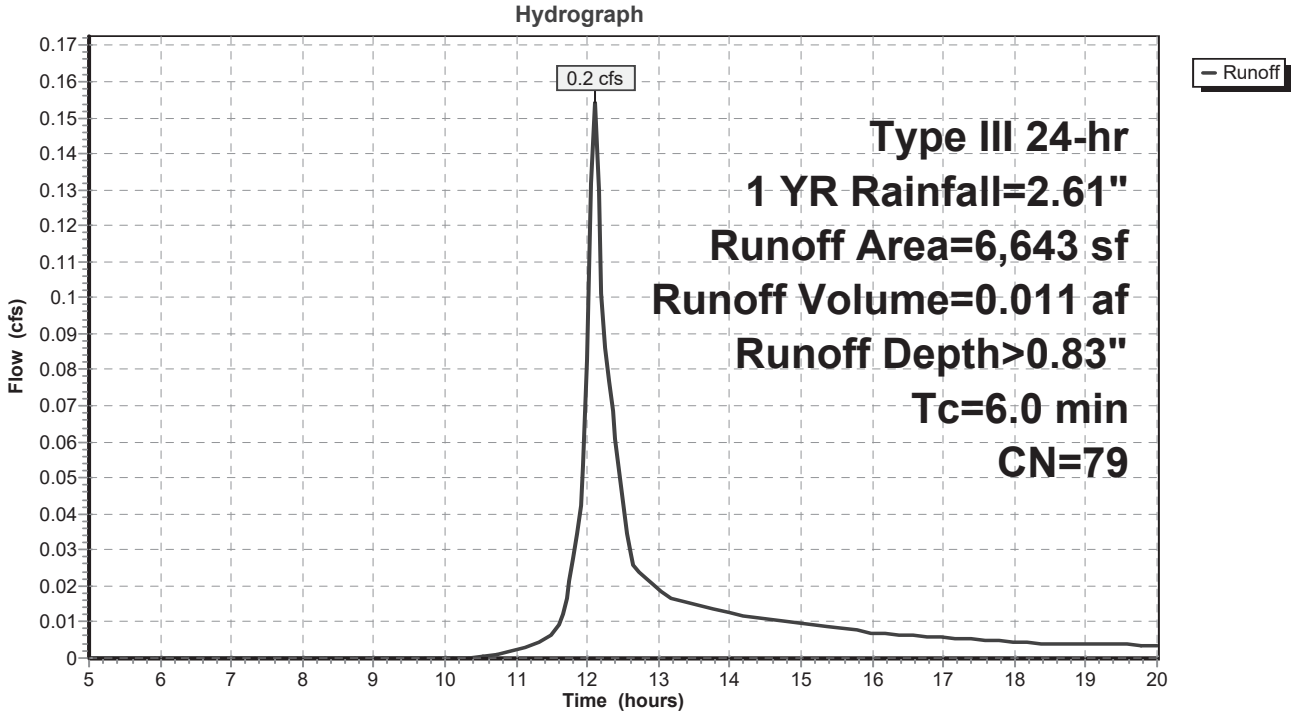
Subcatchment 20: DA20



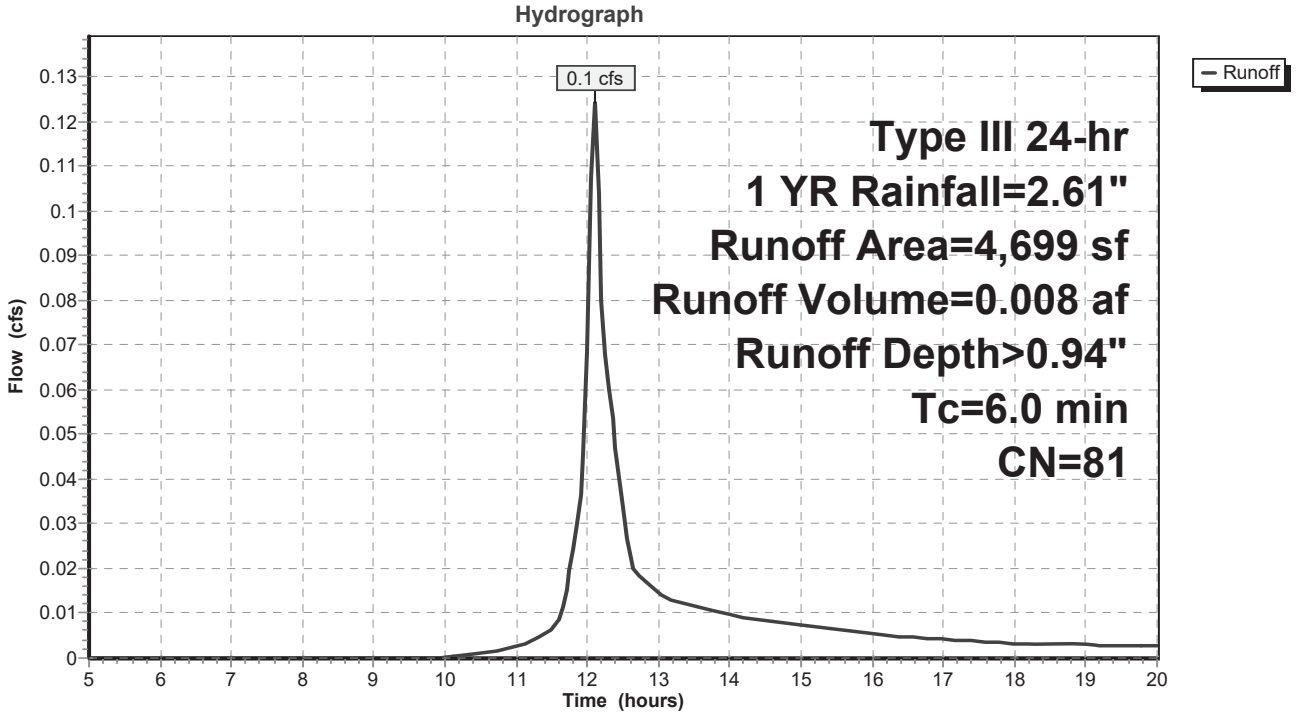
Subcatchment 30: DA 30



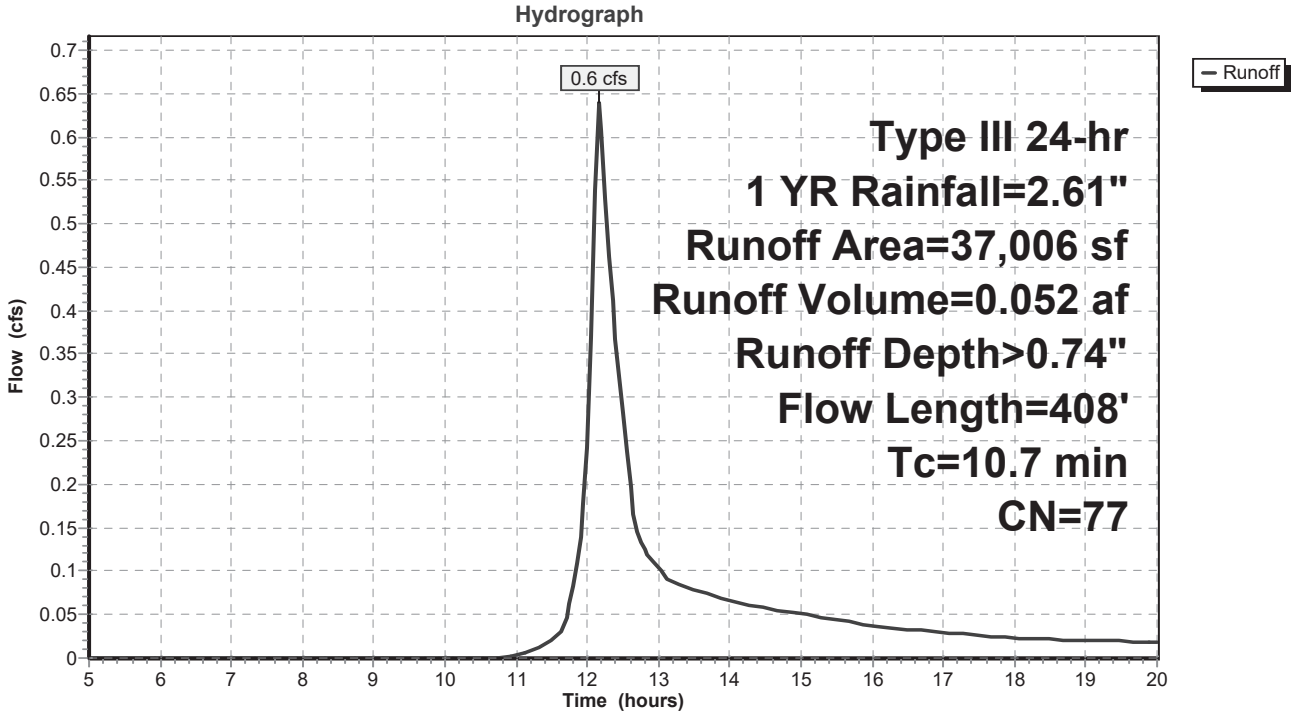
Subcatchment 31: DA 31



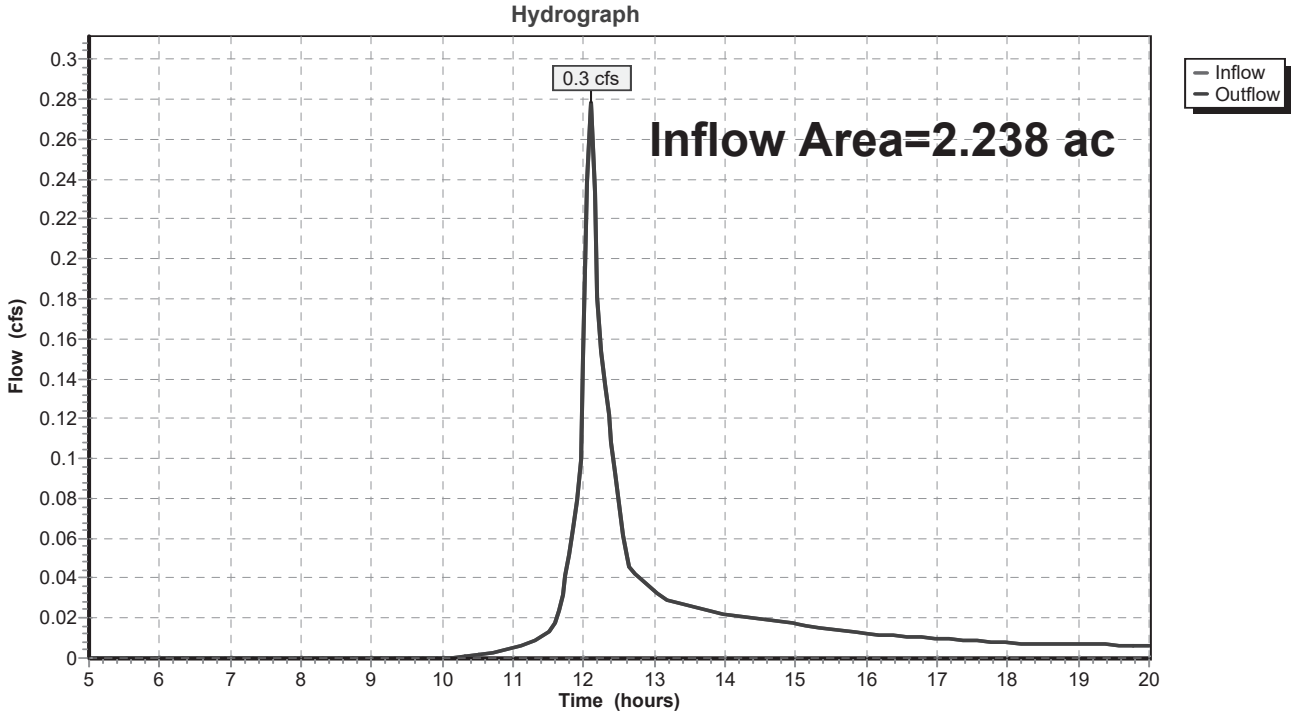
Subcatchment 32: DA 32



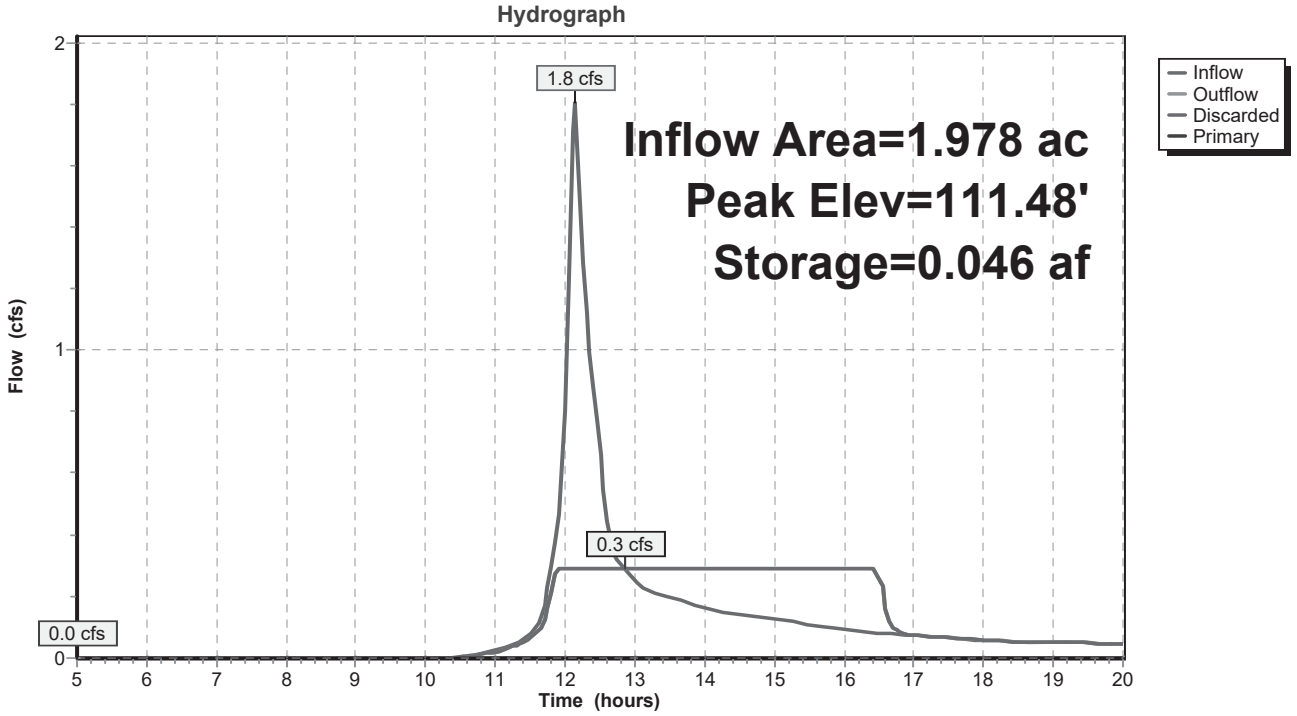
Subcatchment 40: DA 40



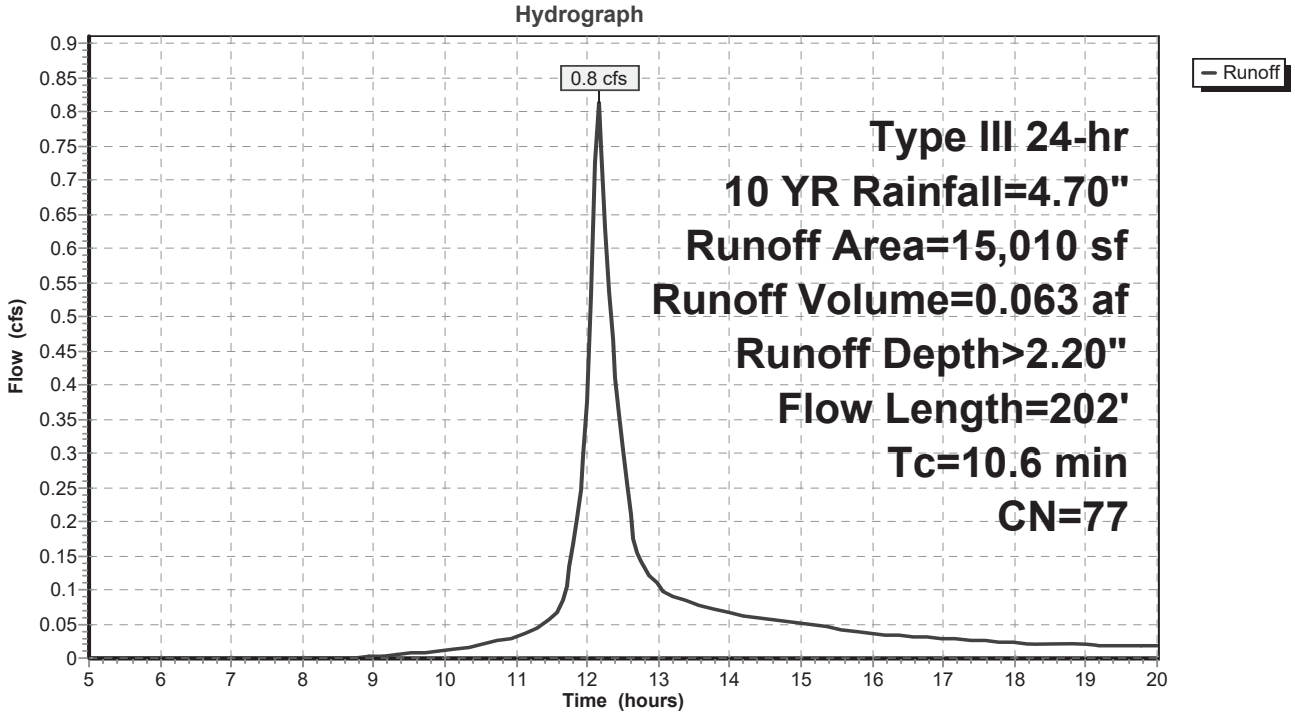
Reach SDP3: SDP3



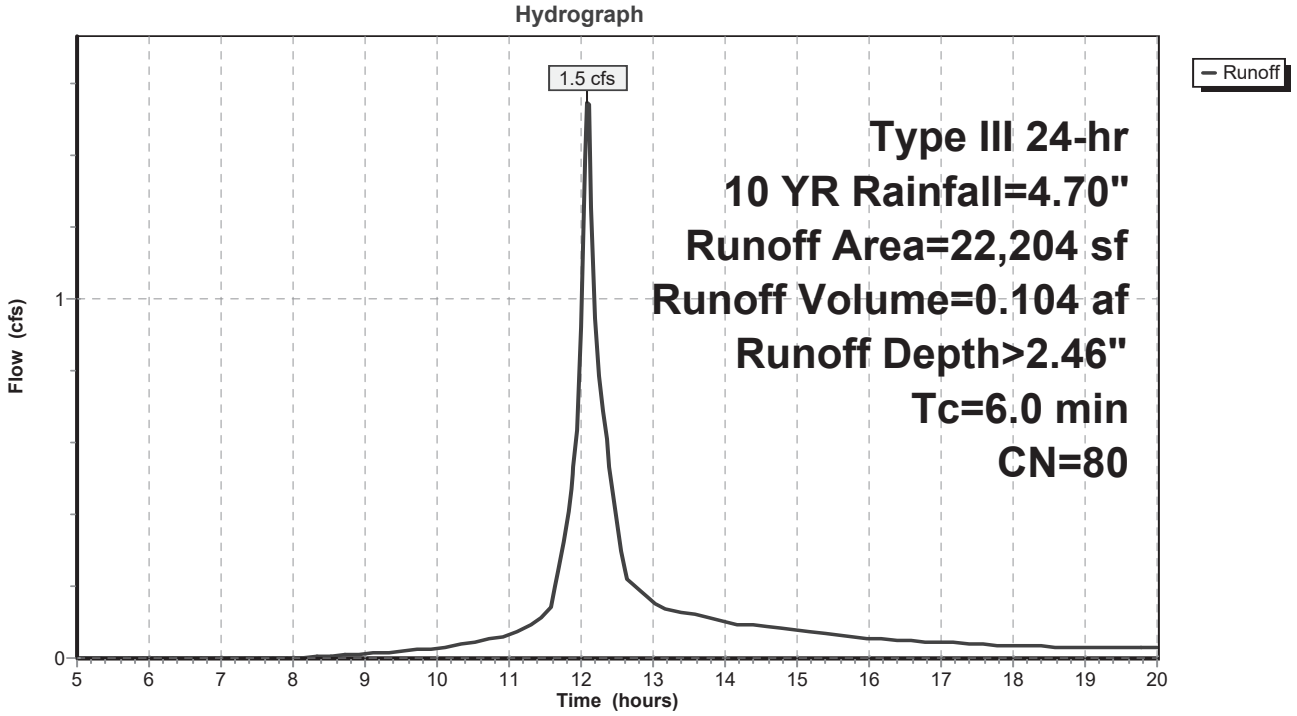
Pond 30P: CULTEC RECHARGER 330 XL



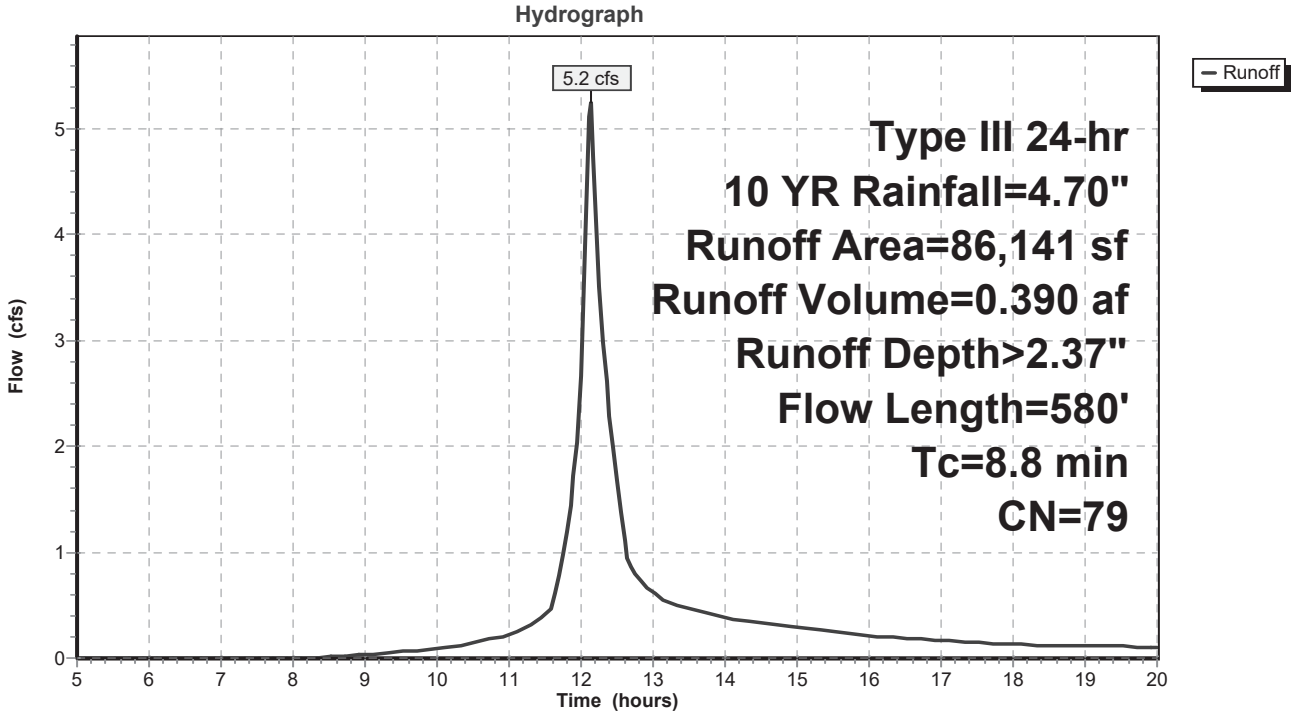
Subcatchment 10: DA 10



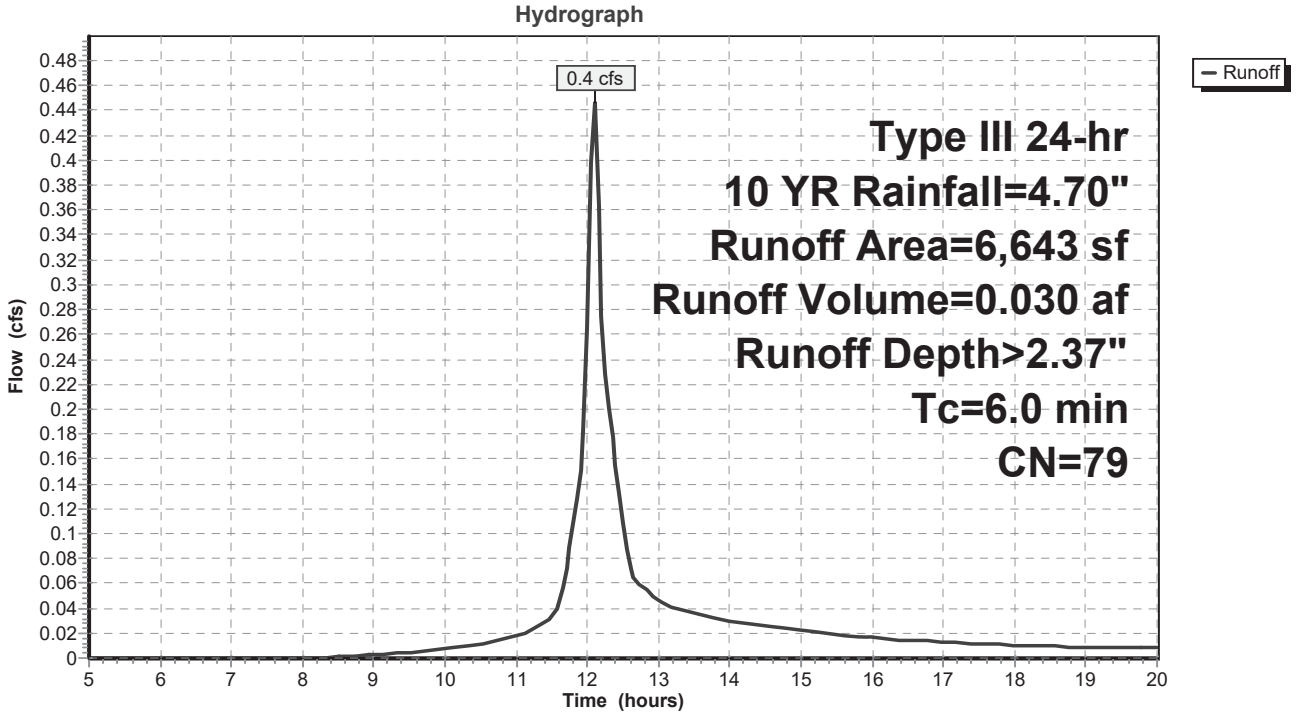
Subcatchment 20: DA20



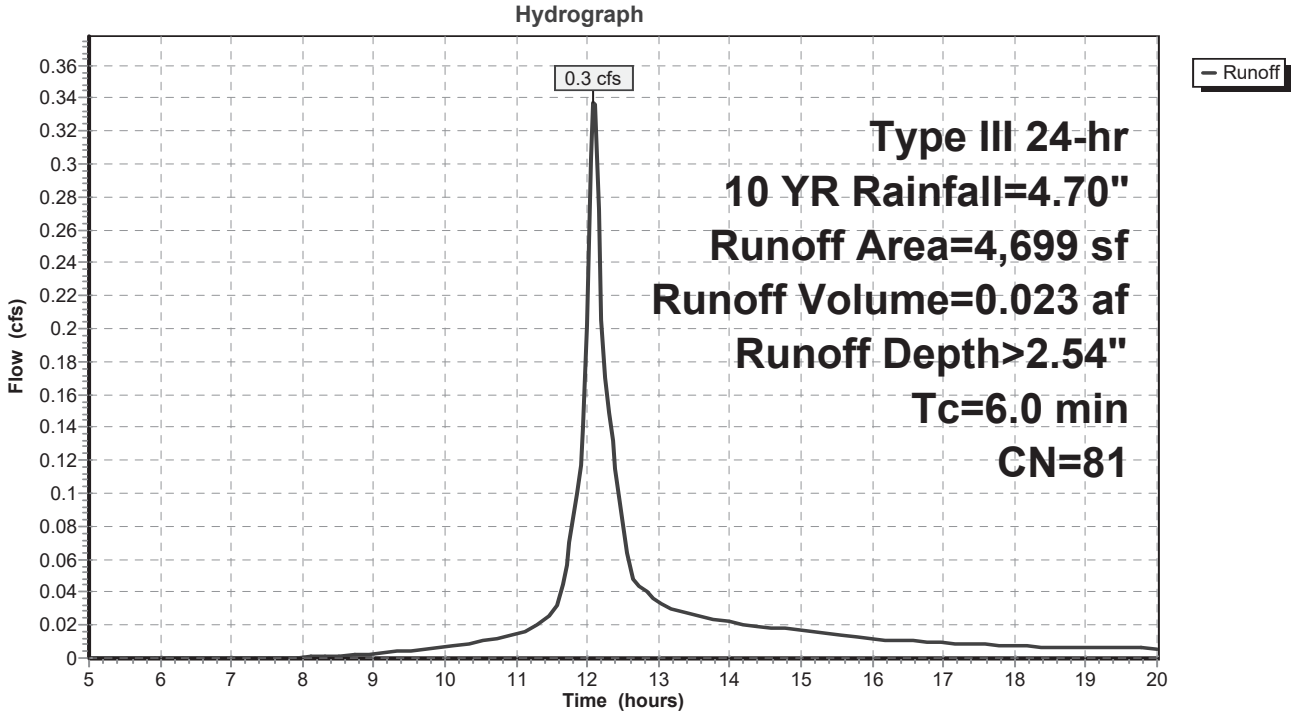
Subcatchment 30: DA 30



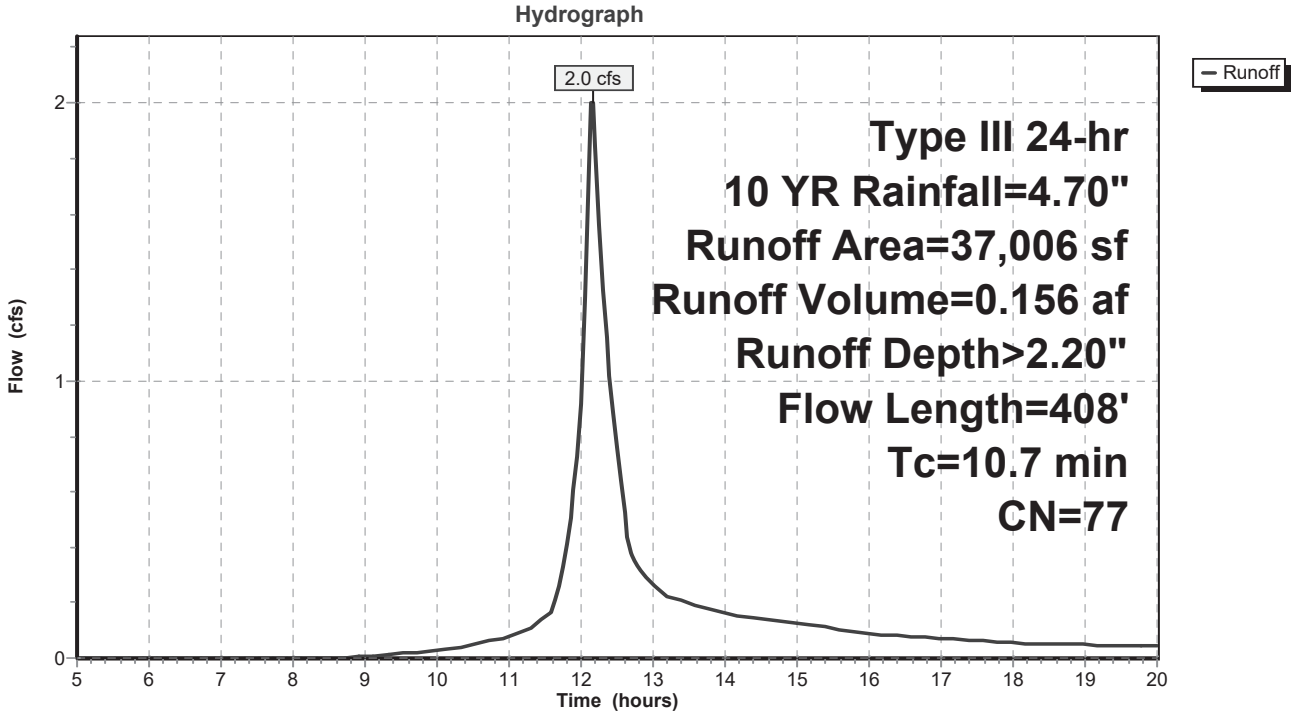
Subcatchment 31: DA 31



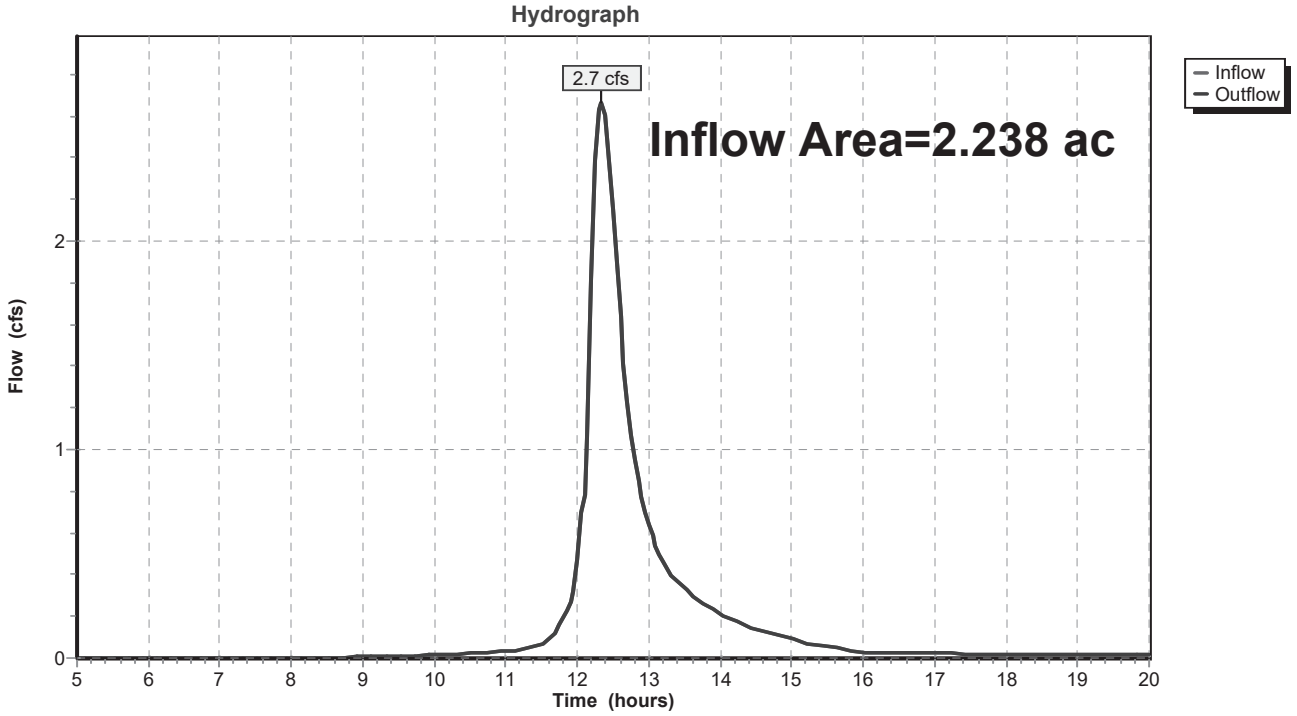
Subcatchment 32: DA 32



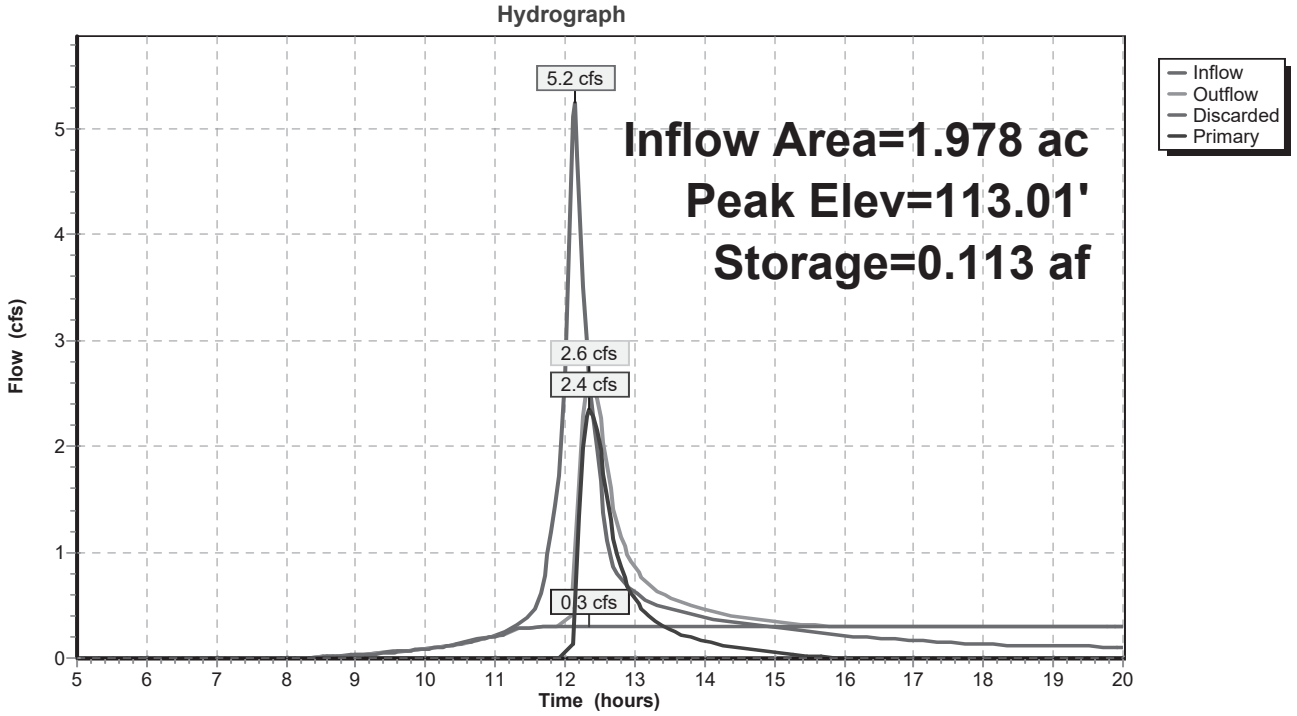
Subcatchment 40: DA 40



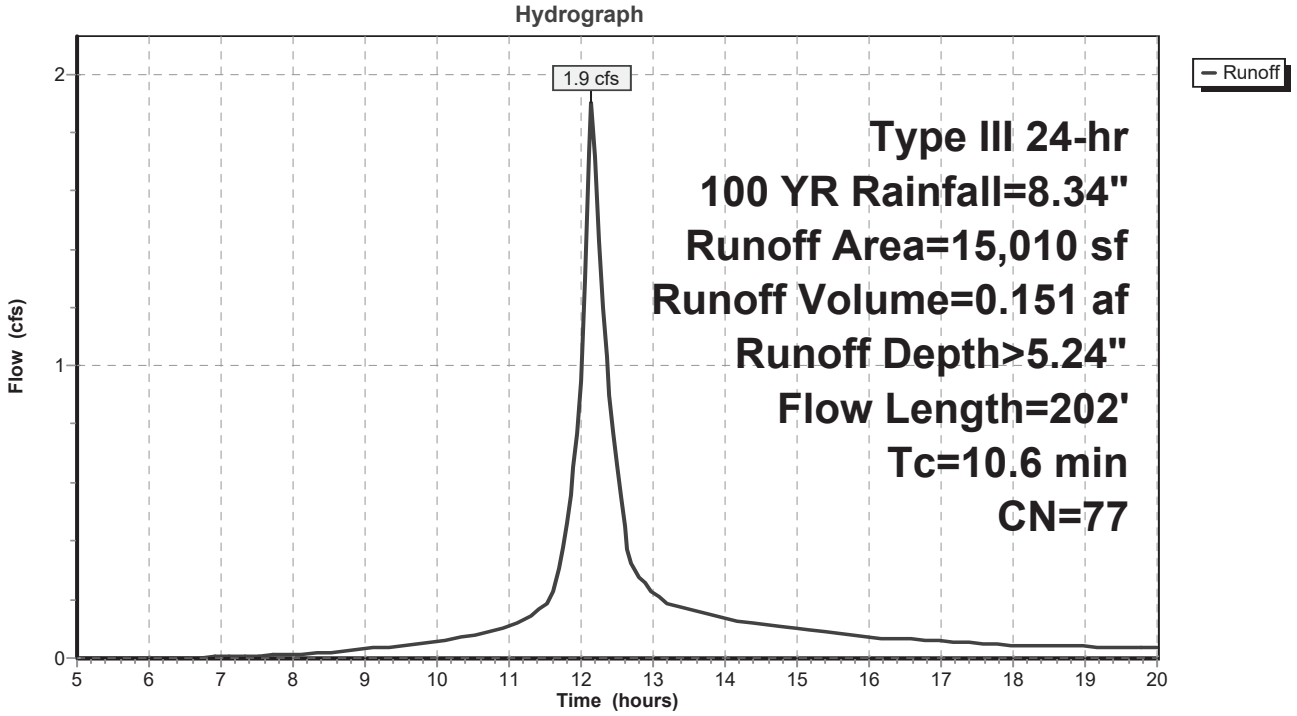
Reach SDP3: SDP3



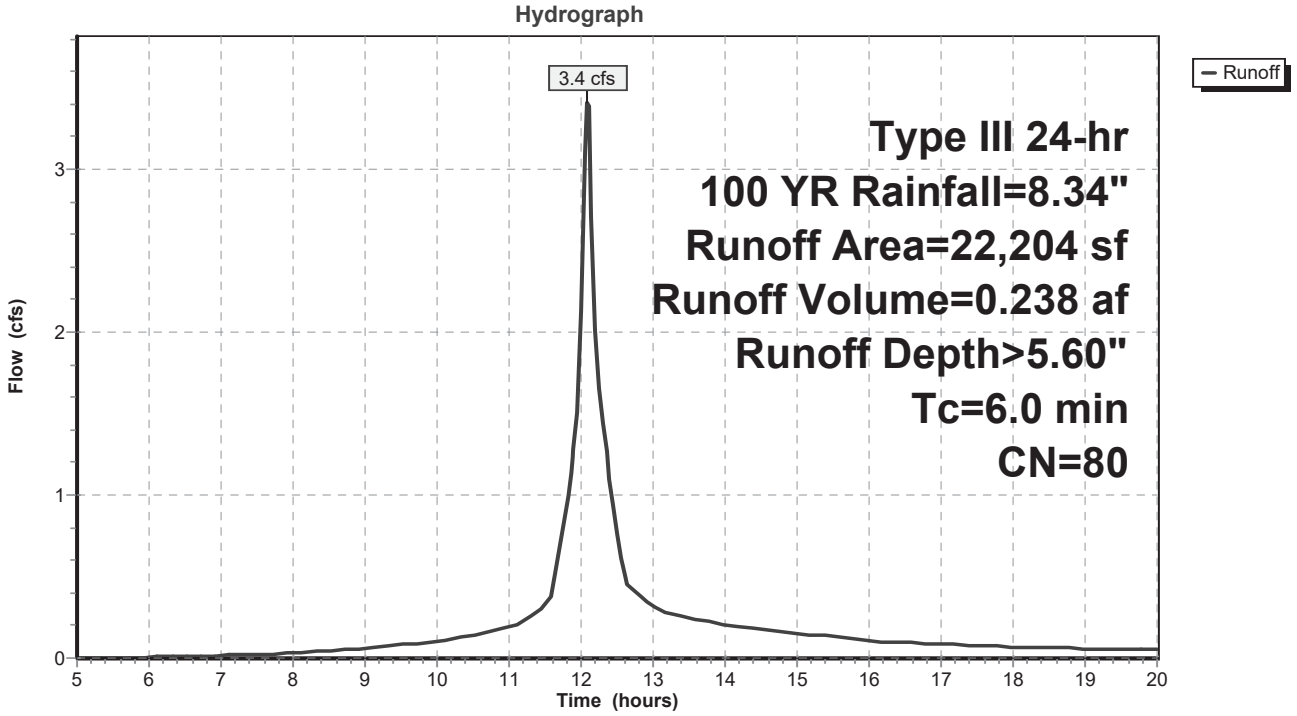
Pond 30P: CULTEC RECHARGER 330 XL



Subcatchment 10: DA 10



Subcatchment 20: DA20



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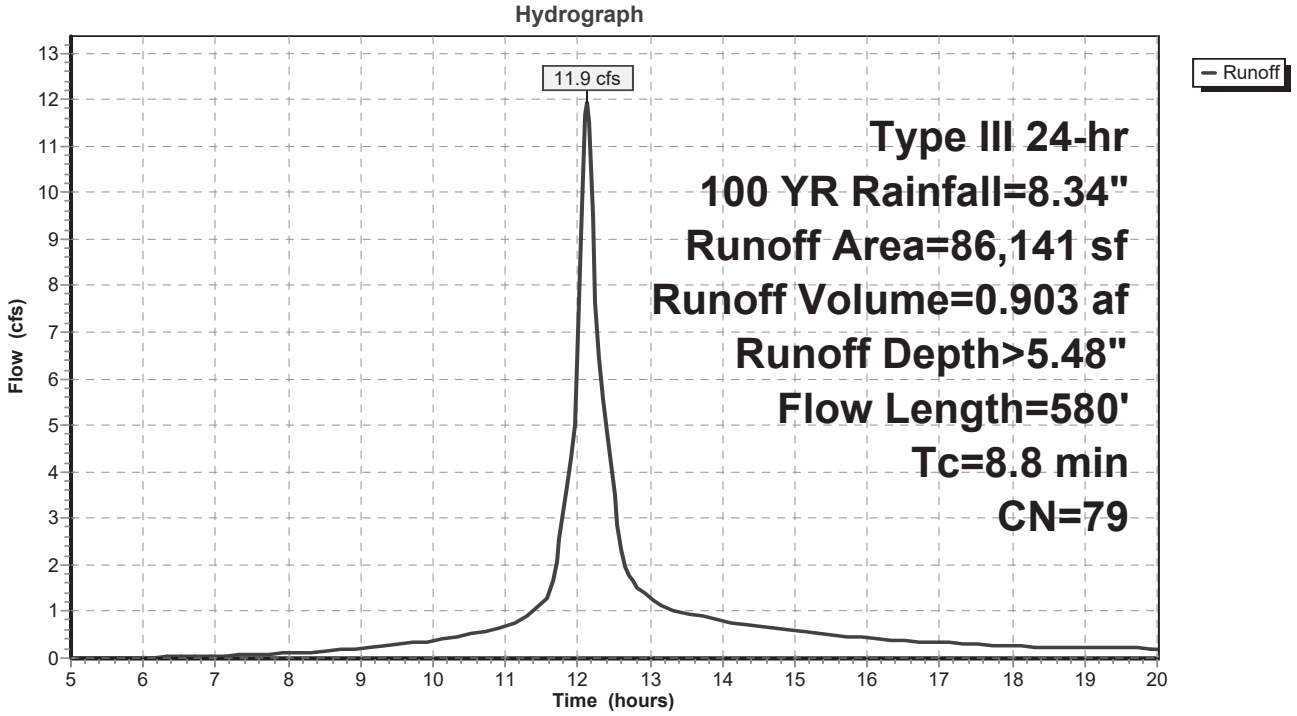

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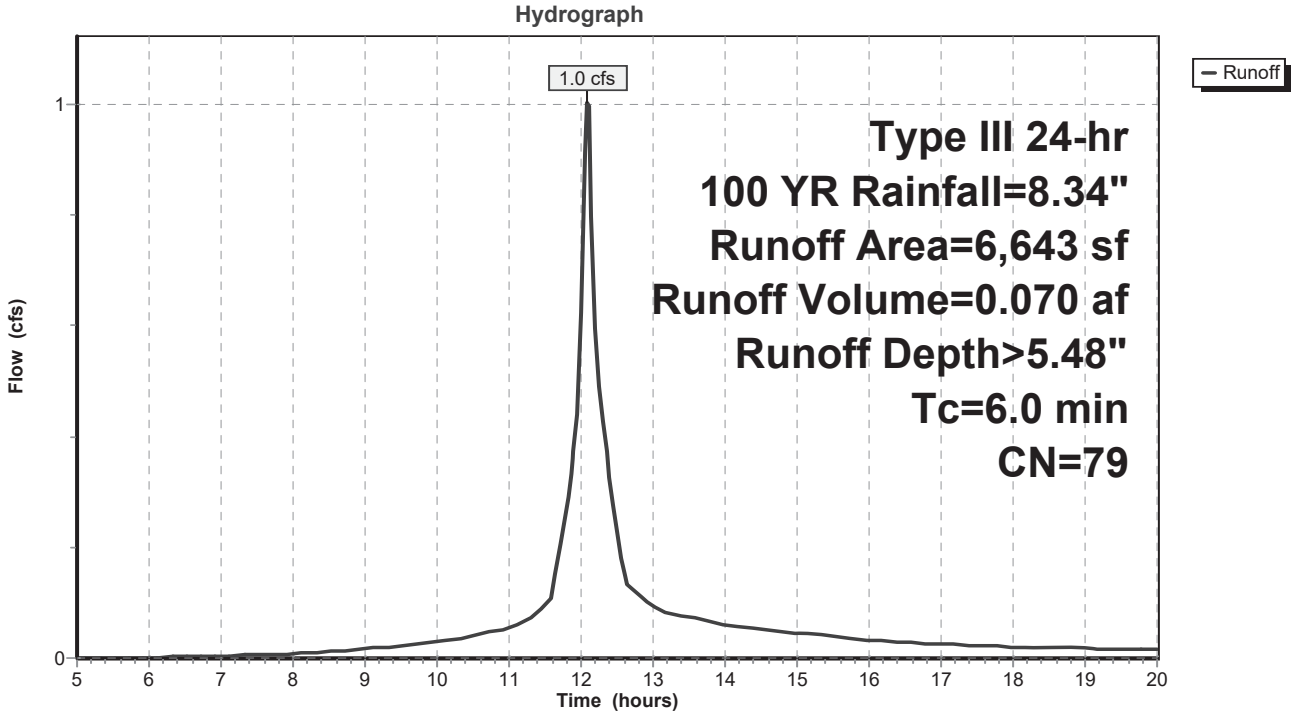

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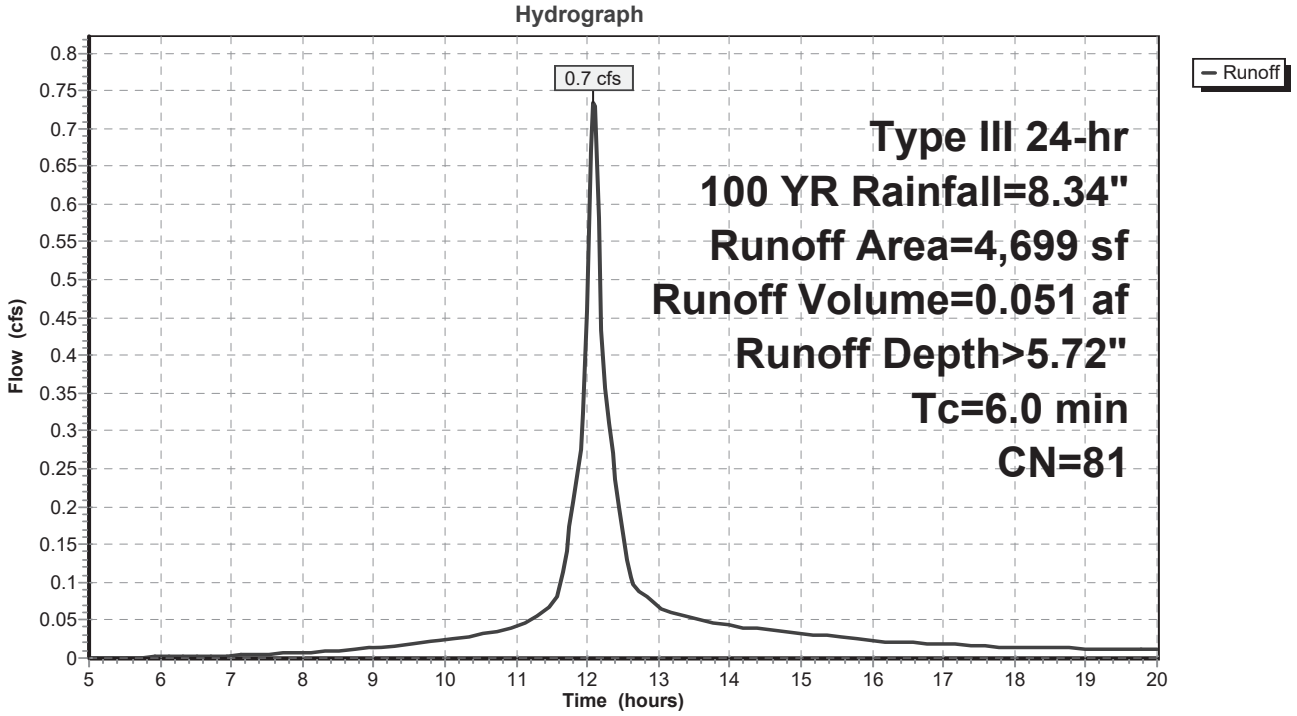
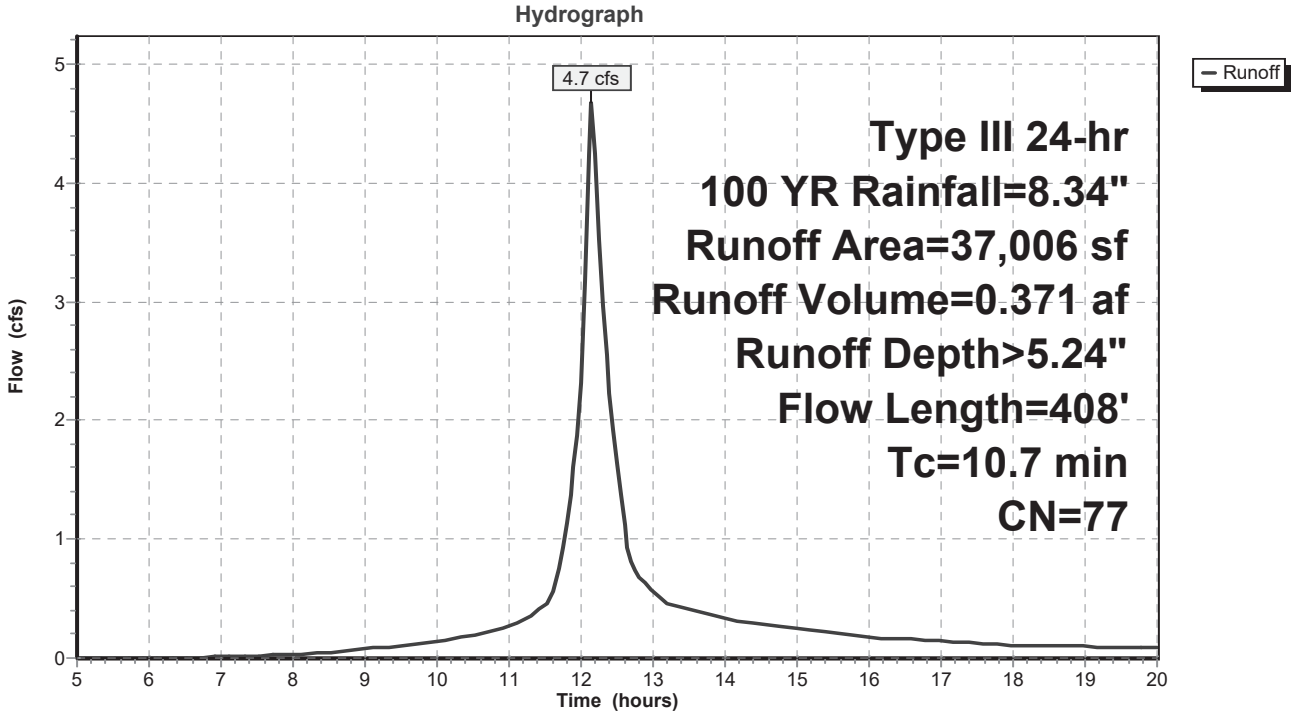
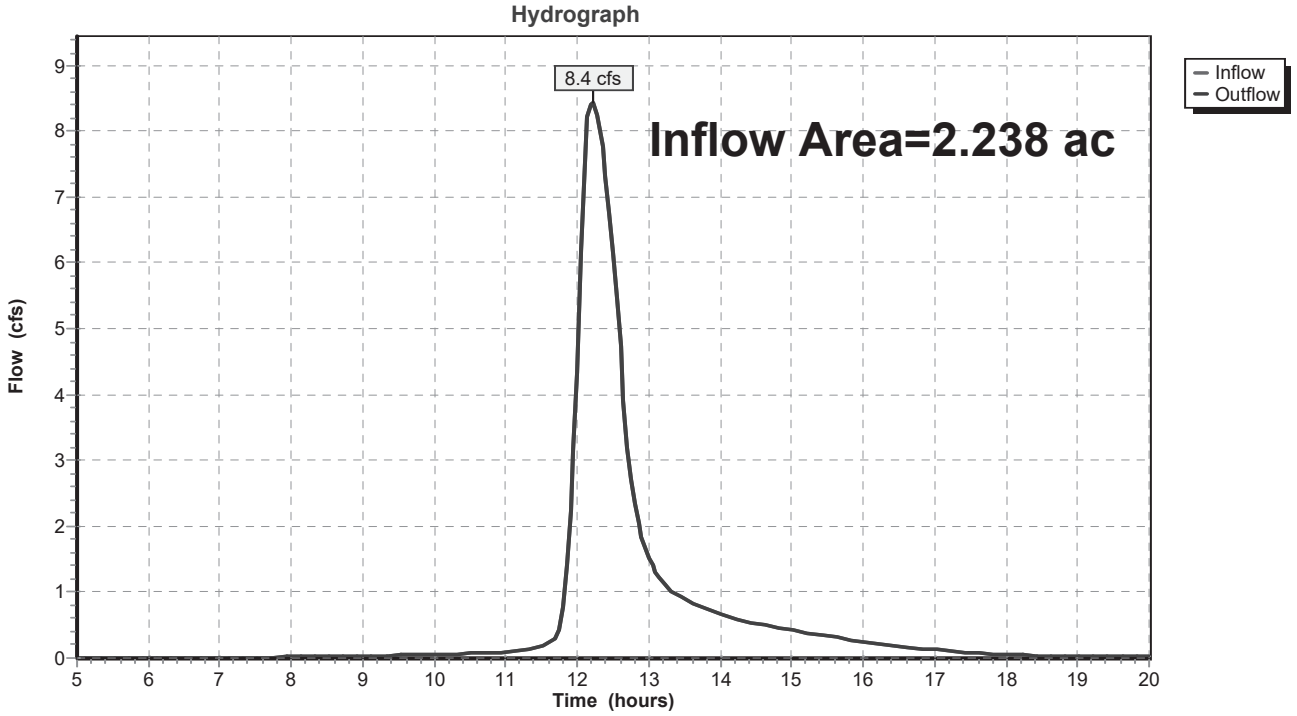


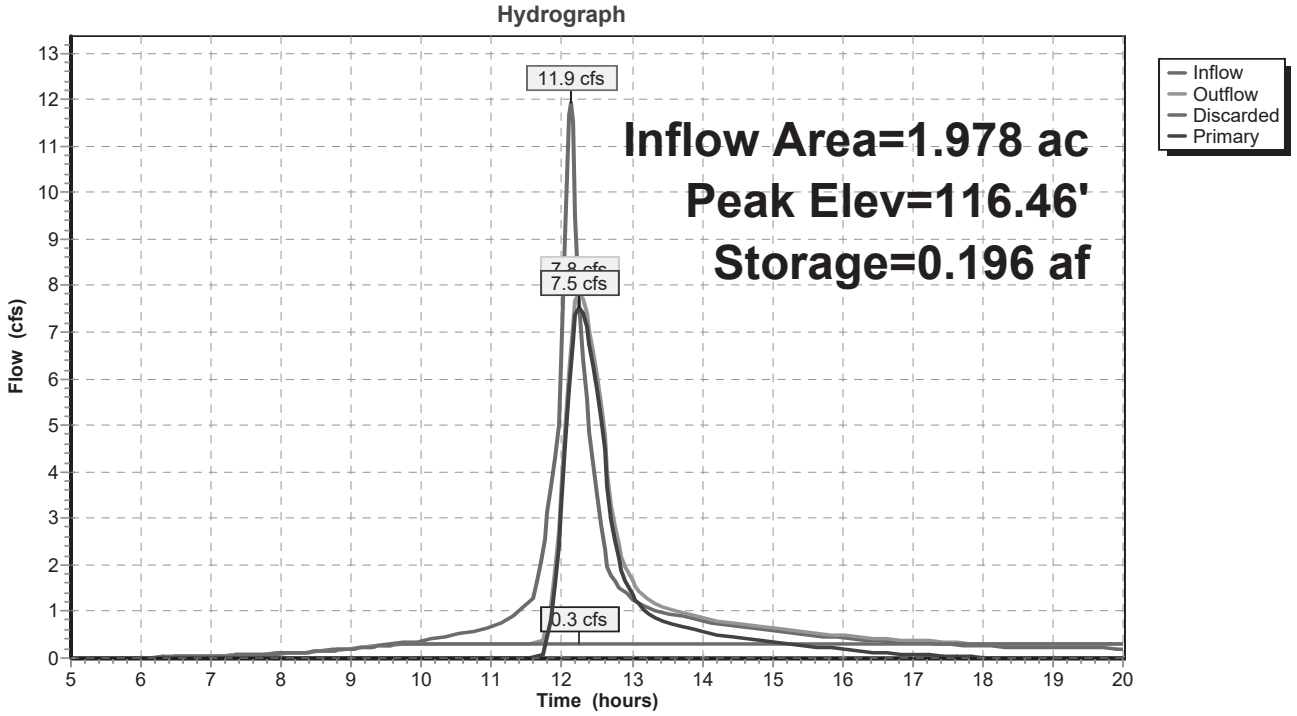
Subcatchment 40: DA 40



Reach SDP3: SDP3



Pond 30P: CULTEC RECHARGER 330 XL



APPENDIX F

STORMWATER MANAGEMENT PRACTICE DESIGN

174 Main Street
Beacon NY 12508

WATER MANAGEMENT PRACTICE:
ment 30

mine Required Water Quality Volume & Stormwater Management Practice

lity volume to be treated will be calculated using the 1-year storm from Chapter 10 of the New York State Storm Water Design Manual (January 2015), hereinafter referred to as NYSSDM.

3,560 x [P x Rv x A] / 12

Water quality volume (cf)
Rainfall Event
+ 0.009 x I , where I is % impervious area*
shed (ac)
um Rv of 0.2 will be applied to regulated sites.

Watershed	P (in)	Impervious Area (ac)	Impervious (Coverage %)	Rv	Total Area (ac)	WQv (cf)	Pre-Treatment Practice	Treatment Practice
Subcatchment 30	1.40	1.099	55.6	0.55	1.977	5,529	Overland	Infiltration

reatment will be handeled via hydrodynamic device

rface soil conditions Verified with soil tests - see appendix

iltration Rate (f_c): 5.00 inches per hour

mine Required Pre-Treatment Volume

Pre-Treatment Volume

iltration Rate: 5.00 inches per hour
Minimum Pretreatment Volume: 100%

Watershed	Required WQv (cf)	Required Pre-Treatment Volume (cf)	Pre-Treatment Practice	Treatment Practice
Subcatchment 30	5,529	5,529	Overland	Infiltration

ment volumes per § 6.3.3 of the NYSSDM (January 2015).

mine Runoff Reduction Volume (RR_V)

ide 100% RR_V by implementing Green Infrastructure techniques and Stormwater Management Practices

560 x [P x Rv x A] / 12

noff Reduction Volume (cf)
Rainfall Event Number (in), per Figure 4.1
+ 0.009 x I , where I is % impervious area — R_V: 0.55
shed (ac)
100% RR_V: 5,529 cf
n Rv of of 0.2 not applicable to RR_V calculations (use actual calculated Rv).

ts that cannot meet 100% RR_V: Implement Specific Reduction Factor (S), which provides an absoulte minimum acceptable RR_V.

Area with Hydrologic Soil Group A:	0.481 acres	Corresponding S: 0.55
Area with Hydrologic Soil Group B:	0.004 acres	Corresponding S: 0.40
Area with Hydrologic Soil Group C:	0.000 acres	Corresponding S: 0.30
Area with Hydrologic Soil Group D:	1.463 acres	Corresponding S: 0.20
Total Area:	1.948 acres	
Area Does Not Match…Re-Calculate		Calculated S: 0.29

RR_V (acre-feet) = [(P)(Rv*)(Ai)]/12 — Calculated Ai: 0.315
Calculated Rv*: 0.95
Calculated Minimum RR_V: 1522 cf

Rainfall Event Number (in), per Figure 4.1
5 + 0.009 x I , where I is % impervious area (100%)

174 Main Street
Beacon NY 12508

WATER MANAGEMENT PRACTICE:
ment 30

water Management Practice Design

e-Treatment Practice
rebay with overflow weir

Contour	Area (sf)	Volume (cf)	Cumulative Volume (cf)
168	24	0	0
170	523	547	547
172	1,457	1,980	2,527

2,527 cf < 5,529 cf (Required Pre-Treatment Volume)
insufficient

evation of forebay set at 172
1.3 of the New York State Stormwater Management Design Manual (January 2015), forebay storage volume counts toward the total WQv requirement.

iltration Basin To Meet Design Criteria of § 6.3

the approximate minimum bottom area of the infiltration basin using the following equation:

e area of the basin (sqft)
of the basin (ft)
gn volume (WQv) in cubic feet (cf)

	4.0 ft	
v =	5529 cf	
	1382 sqft	
sin elevation:	170	(Per Section 6.3.1, the bottom of the infiltration basin shall be a minimum of three feet above the seasonally high water table or bedrock layer)
	5529 cf	
se rate over maximum 48 hours:	115.19 cubic feet per hour	
iltration Rate:	0.42 feet per hour	
Required Basin Area:	276 square feet	
om Area Provided:	1,329 sqft	
d bottom area sufficient?	yes - acceptable	
elevation per HydroCAD model:	171.16	(Area used for calculation deducts 6 lots that rain gardens handle WQv)

Stream Channel Protection Volume (Cpv)

Storm Runoff Volume	0.380 acre-feet	From HydroCAD model
	16553 cf	
hrs extended detention of CPv:	0.19 cfs	(avg. release rate)
ate using minimum 3" orifice:	0.46 cfs	
ate met?	no - use minimum 3-inch orifice (per NYSDEC Manual)	

droCAD model for Overbank Flood Control (Qp) and Extreme Flood Control (Qf) computations

Project:	River Ridge Townhouses			
Description:	Stormwater Management Design			
By/Date:	DGK	7/24/2017	Reviewed/Date:	AG

HUDSON LAND DESIGN
174 Main Street
Beacon NY 12508

STORMWATER MANAGEMENT PRACTICE:
Sitewide Analysis

1) Determine Required Water Quality Volume & Stormwater Management Practice

Water quality volume to be treated will be calculated using the 1-year storm from Chapter 10 of the New York State Storm Water Design Manual (January 2015), hereinafter referred to as NYSSDM.

$WQv = 43{,}560 \times [P \times Rv \times A] / 12$

Where:
WQv = Water quality volume (cf)
P = 1-Year Rainfall Event
Rv = 0.05 + 0.009 x I , where I is % impervious area*
A = Watershed (ac)
* A minimum Rv of 0.2 will be applied to regulated sites.

Watershed	P (in)	Impervious Area (ac)	Impervious (Coverage %)	Rv	Total Area (ac)	WQv (cf)	Pre-Treatment Practice	Treatment Practice
Sitewide Analysis	1.40	1.079	36.5	0.38	2.953	5,685		

Note: Pretreatment will be handeled via hydrodynamic device

2) Subsurface soil conditions Verified with soil tests - see appendix

Design Infiltration Rate (f_c): 5.00 inches per hour

CULTEC, Inc.
878 Federal Road
P.O. Box 280
Brookfield, CT 06804 USA

Phone: 203.775.4416
Fax: 203.775.1462
Email: custservice@cultec.com
Website: www.cultec.com

MODEL # 330XLHD, RECHARGER® 330XLHD

The Recharger® 330XLHD is a 30.5" (775 mm) tall, high capacity chamber. Typically when using this model, fewer chambers are required resulting in less labor and a smaller installation area. The Recharger® 330XLHD has the side portal internal manifold feature. HVLV™ FC-24 Feed Connectors are

+ more

Specifications | Technical References

Specifications

Length	8.50 ft 2.59 m
Width	52 in 1321 mm
Height	30.50 in 775 mm
Installed Length	7.00 ft 2.13 m
Length Adjustment per Run	1.50 ft 0.46 m

Chamber Storage	7.459 ft³/ft 52.21 ft³/unit 391 gal 0.69 m³/m 1.48 m³/unit 1478.44 L
Min. Installed Storage	11.32 ft³/ft 79.26 ft³/unit 593 gal 1.05 m³/m 2.24 m³/unit 2244.25 L
Min. Area Required per Unit	33.83 ft² 3.14 m²
Min. Center-to-Center Spacing (Design Unit Width)	4.83 ft 1.47 m
Max. Allowable Cover	3.66 m 12 ft
Max. Inlet Opening in End Wall	24 in 600 mm
Max. Allowable O.D. in Side Portal	11.75 in 298 mm
Compatible Feed Connector	HVLV FC-24 Feed Connector

Technical References

Downloads	CAD - Recharger 330XLHD Stormwater Design Aide CAD - Recharger 330XLHD Stormwater Details PDF - Contactor & Recharger Stormwater Installation Instructions - CULG012 PDF - Recharger 330XLHD Stormwater Details PDF - Recharger 330XLHD Submittal Package - Stormwater XLS - CULTEC Recharger 330XLHD Incremental Storage Calculator

Daniel G. Koehler, P.E.

From: Alicia Messina <amessina@cultec.com>
Sent: Monday, February 12, 2018 3:21 PM
To: Daniel G. Koehler, P.E.
Cc: Tony Messina
Subject: Cultec Maintenance

Good afternoon Daniel,

Thank you again for reaching out to us and for specifying Cultec for this project – we greatly appreciate it! As discussed, the inspection port locations on each chamber are there solely for inspection purposes only; not as a means of accessing the system for maintenance. For maintenance, Cultec highly recommends that suspended solids be caught upstream of the system; whether it be with a proprietary maintenance device or simply a sumped inlet structure.

If you have any questions, or would like to discuss this in further depth, please don't hesitate to reach out to me directly.

Thank you!
Alicia

THE FOUNDER OF PLASTIC CHAMBER TECHNOLOGY
ALICIA MESSINA Technical Sales Manager, CULTEC, Inc.
amessina@cultec.com **Direct:** 475-289-7115 **Office:** 203-775-4416 ext. 115 www.cultec.com

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CONTECH ENGINEERED SOLUTIONS

Sizing Estimate

Prepared by Josh Stackhouse on February 16, 2018

Stormwater Treatment System Design Summary
River Ridge Townhouses

Beacon, NY

Information provided by Daniel Koehler, PE (Hudson Land Design)

Site information:

Structure ID	WQF- 90% Average Runoff Flow (cfs)	Peak Flow (100-Yr) (cfs)
WQI1	0.30	11.75

Assumptions:

- NYSDEC has adopted the NJCAT/NJDEP verified flow rates for the CDS system. NYSDEC has effectively created three categories of treatment, new development (standalone), redevelopment and pretreatment. Specific approval and sizing criteria are applied to each category. Per the specifying engineer, this project falls under **Redevelopment.**

CDS System Sizing:

The CDS Stormwater Treatment System is a high-performance hydrodynamic separator. Using patented continuous deflective separation technology, the CDS system screens, separates and traps debris, sediment, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, preventing re-suspension and release of previously trapped pollutants.

Contech typically selects the CDS model that based on the NJCAT/NJDEP verified flow rates meets or exceeds the Water Quality Flow generated by the Water Quality Volume. The NJCAT/NJDEP verification uses the TARP protocol and as such meets the requirement laid out by NYSDEC on page 9-8 of the New York State Stormwater Management Design Manual for redevelopment projects. No such specification exists for pretreatment projects, but in the best interest of the environment Contech holds to those flows for pretreatment projects as well. Based on the flows above, Contech recommends:

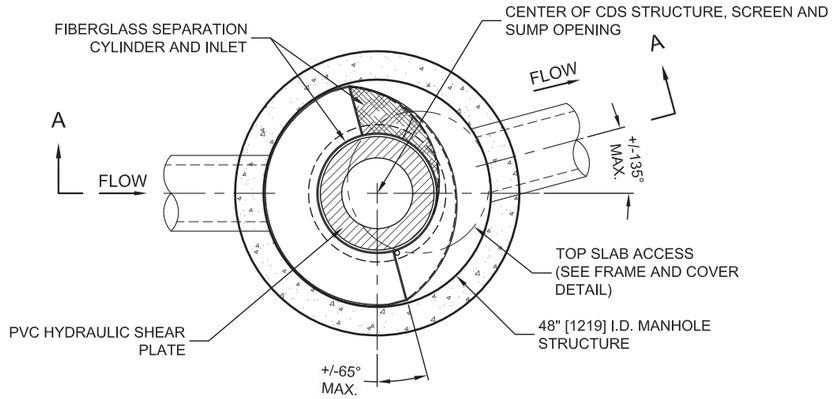
Structure ID	Treatment Device	NYSDEC Approved Treatment Flow (cfs)
WQI1	CDS2015-4 (CDS-4)	0.93

Maintenance:

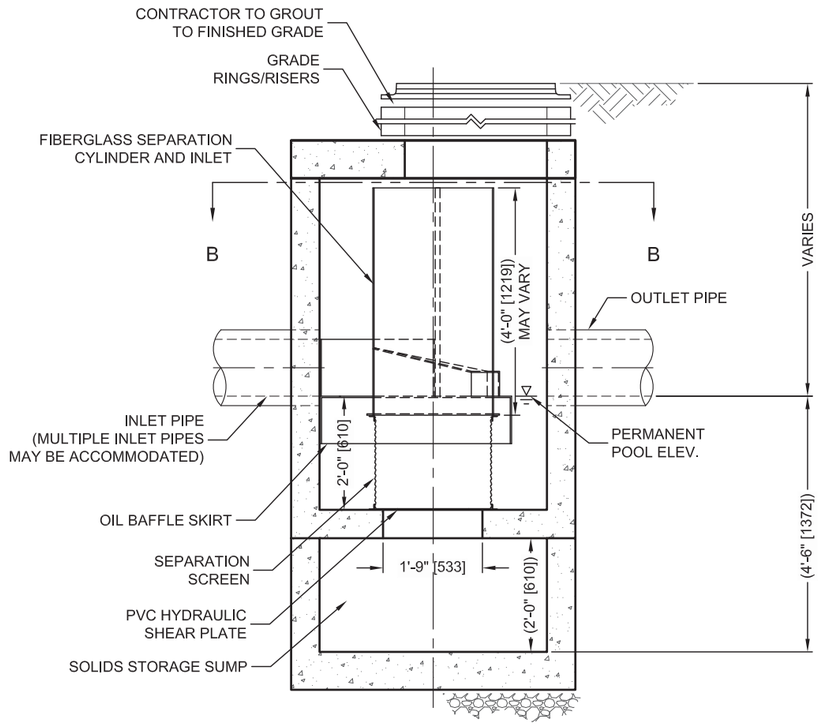
Like any stormwater best management practice, the CDS system requires regular inspection and maintenance to ensure optimal performance. Maintenance frequency will be driven by site conditions. Quarterly visual inspections are recommended, at which time the accumulation of pollutants can be determined. On average, the CDS system requires annual removal of accumulated pollutants.

Please contact us if you have any questions or need any additional information. Again, thank you for your interest in the CDS system. We look forward to receiving your feedback and working with you.

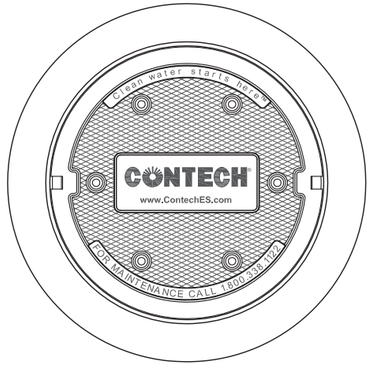
www.ContechES.com
71 U.S. Route One Suite F, Scarborough ME 04074
Toll-free: 877.907.8676 Fax: 207.885.9825



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

CDS-4-C (CDS2015-4) DESIGN NOTES

CDS-4-C (CDS2015-4) RATED TREATMENT CAPACITY IS 0.93 CFS. IF THE SITE CONDITIONS EXCEED MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET HS20 (AASHTO M 306) AND BE CAST WITH THE CONTECH LOGO.
6. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS-4-C (CDS2015-4) ONLINE CDS STANDARD DETAIL