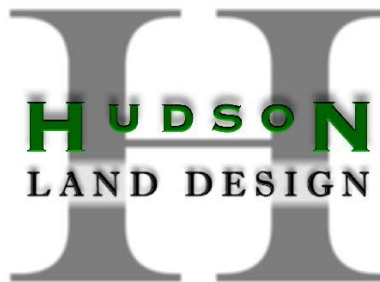


***Final Stormwater Pollution Prevention Plan:  
for  
511 Fishkill Avenue***

Prepared for:  
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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 vegetation, installation of utilities and associated grading for the construction of a parking lot area with new sidewalk to serve the project. The limits of soil disturbance have been calculated to be 1.20 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 511 Fishkill Avenue (NYS Route 52), 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 10.33 acres, while the development of the additional parking area is approximately 1.06 acres. The project study area, regarding storm water pollution prevention, consists of approximately 1.13 acres (total area contributing to the design point identified in the SWPPP), and consists of grassed area, a gravel drive and a small contributing area of impervious asphalt parking lot.

### **2.2 Project Scope and Description**

The construction project entails the construction of an additional parking area on the northern side of the existing industrial building due to a change in use.

The proposed project will disturb approximately 1.20 acres of on-site area. Development of a phasing plan is not necessary due to less than 5.0-acres of disturbance.

## **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 0464E 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 NOI and blank 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
BeB	Bernardston Silt Loam, 3% to 8% slopes	D

### **SOIL PROPERTIES**

Symbol	Water Table	Restrictive Layer	Bedrock	Erosion Hazard (k)
BeB	22"	>27"	>27"	0.32

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	4.69
25 - year	5.88
100 - year	8.29

### **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. One design point for the main project area was selected, as follows:

<b>Stormwater Design Points</b>	
<b>SDP</b>	<b>Description</b>
1	Discharge from on-site area to existing stormwater conveyance system at northeast corner of existing building.

### **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 0.94 acres of on-site area. The on-site area is undeveloped grassed area, gravel driveway and landscaped grassed area. The subcatchment area contains soil in hydrologic soil group D. Runoff from the subcatchment travels overland via sheet flow and shallow concentrated flow to SDP 1.

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

The following table summarizes the pre-development watershed conditions:

<b>Pre-Development Watershed Conditions</b>					
<b>Subcatchment</b>	<b>Area (ac)</b>	<b>Cover</b>	<b>Average Curve #</b>	<b>Hydrologic Soil Group(s)</b>	<b>Time of Concentration</b>
1	0.94	Grassed area, gravel driveway and some impervious parking area	81	D	6.0 minutes

### 6.3 Post-Development Watershed Conditions

The proposed development will result in a disturbance of approximately 1.20 acres. The land cover will consist of mainly impervious asphalt parking area, with some grassy landscaped areas and site grading.

The post-developed subcatchment numbers listed below correspond to the pre-developed watershed areas with the same number. One underground infiltration area and two water quality units are proposed for attenuation of the design storms and to provide treatment of the site runoff from the site access, respectively.

Subcatchment 10 is comprised of approximately 1.13 acres of on-site area. The area consists of impervious asphalt parking area, with some grassy landscaped areas and site grading. The entire subcatchment area contains soils in hydrologic soil group D. Runoff from the subcatchment is directed towards the western property line to SDP1.

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

The following table summarizes the post-development watershed conditions:

<b>Post-Development Watershed Conditions</b>					
<b>Subcatchment</b>	<b>Area (ac)</b>	<b>Cover</b>	<b>Average Curve #</b>	<b>Hydrologic Soil Group(s)</b>	<b>Time of Concentration</b>
10	1.13	Mostly impervious parking area and some grassed area	91	D	6.0 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:

<b>SDP</b>	<b>1 - Year</b>		<b>10 - Year</b>		<b>100 - Year</b>	
	<b>Pre</b>	<b>Post</b>	<b>Pre</b>	<b>Post</b>	<b>Pre</b>	<b>Post</b>
1	1.08	0.19	2.92	2.80	6.33	5.90

As shown above, post-development peak flow rates are less or equal to the pre-development

rates for all the storm events modeled for the stormwater discharge point. Therefore, it can be stated that the post-developed storm water management controls (underground 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. Operations and maintenance of the stormwater management system is included in Appendix O. The remainder of the drainage area will remain undisturbed with natural vegetation remaining.

## **6.6 Hydraulic Calculations**

Hydraulic sizing of the culverts and swales (not required) are based on the 25-year, Type III, 24-hour rainfall event. Sizing calculations will be provided within Appendix F in the final SWPPP (if required).

## **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 (WQ<sub>v</sub>)**

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 WQ<sub>v</sub>**

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)**

C<sub>pv</sub>, Q<sub>p</sub> and Q<sub>f</sub> must also be met, either by standard practices, or other accepted techniques such as meeting criteria set forth in the NYS SWDM, where C<sub>pv</sub>, Q<sub>p</sub> and Q<sub>f</sub> are required. C<sub>pv</sub>, Q<sub>p</sub> and Q<sub>f</sub> 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<sub>v</sub>, 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.

<b>Watershed</b>	<b>Total WQv (cf)</b>	<b>Required Pre-Treatment Volume (cf)</b>	<b>Pre-Treatment Practice</b>	<b>Treatment Practice</b>	<b>WQv Provided (cf)</b>
10	3,580	1,790	Hydrodynamic	Infiltration	3,580

Infiltration rates are 4 inches per hour, thus requiring 50% pre-treatment at Underground Detention Area A.

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 underground infiltration basin has been sized to infiltrate the entire WQv and provides extended detention of the 1-year storm.

## **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**

An underground infiltration chamber system has been incorporated into the design of this project. No overland flow is anticipated to receiving water bodies.

### **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.

Two 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 7 rows of 9 chambers each, utilizing Cultec Recharger Model 330 XLHD. Two hydrodynamic devices have been provided for pre-treatment prior to discharge to the infiltration basin. An outlet control structure is provided after the underground infiltration basin to provide extended detention. Infiltration testing in the area has been performed, and the basin has been designed to infiltrate the entire WQv and provides extended detention of the 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:

$$\text{RRv (in acre-feet of storage)} = [(P)(R_v^*)(A_i)]/12$$

$$A_i = (S)(A_{ic})$$

$A_i$  = impervious cover targeted for runoff reduction

$(A_{ic})$  = total area of new impervious cover

$R_v^* = 0.05 + 0.009(I)$  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.

<b>Watershed</b>	<b>Required Total RRv (cf)</b>	<b>Required Minimum RRv (cf)</b>	<b>RRv reduced by use of runoff reduction techniques (cf)</b>	<b>RRv provided by standard SMP with RRv (cf)*</b>	<b>RRv (cf) Provided</b>
10	3,580	695	N/A	3,580	3,580

\* 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 provide extended detention of 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 7<sup>th</sup> 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  $\frac{3}{4}$  inch, plus or minus  $\frac{1}{4}$  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:

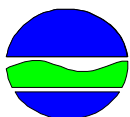
- An erosion and sediment control plan in accordance with the latest revision to the New York State Standards and Specifications for Erosion and Sediment Control, July 2016, has been developed for the project and is included in the site plan set.
- Hydraulic calculations for all storm events modeled 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 provides extended detention of the entire 1-year storm.



## **APPENDIX A**

### **NOTICE OF INTENT AND MS4 ACCEPTANCE**

## NOTICE OF INTENT



**New York State Department of Environmental Conservation**

## Division of Water

**625 Broadway, 4th Floor**

**Albany, New York 12233-3505**

NYR

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(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)

[illegible]

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

[illegible]

Owner/Operator Contact Person First Name

[illegible]

Owner/Operator Mailing Address

[illegible]

City

[illegible]

State

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Zip

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Phone (Owner/Operator)

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Fax (Owner/Operator)

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Email (Owner/Operator)

[illegible][illegible]

FED TAX ID

		-							
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(not required for individuals)

## Project Site Information

Project/Site Name

[illegible]

Street Address (NOT P.O. BOX)

[illegible]

Side of Street

☐ North    ☐ South    ☐ East    ☐ West

City/Town/Village (THAT ISSUES BUILDING PERMIT)

[illegible]

State

--	--

Zip

--	--	--	--	--

—

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County

[illegible]DEC Region

--	--

Name of Nearest Cross Street

[illegible]

Distance to Nearest Cross Street (Feet)

--	--	--	--	--

## Project In Relation to Cross Street

☐ North    ☐ South    ☐ East    ☐ West

## Tax Map Numbers

Section-Block-Parcel

[illegible]

## Tax Map Numbers

[illegible]

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](http://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)

--	--	--	--	--	--

Y Coordinates (Northing)

--	--	--	--	--	--	--

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

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**Post-Development  
Future Land Use**

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

Number of Lots

--	--	--

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**\*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**

					.	
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**Future Impervious  
Area Within  
Disturbed Area**

					.	
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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**  

--	--	--

 %

7. Is this a phased project? ☐ Yes ☐ No

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

**Start Date**

		/			/				
--	--	---	--	--	---	--	--	--	--

**End Date**

		/			/				
--	--	---	--	--	---	--	--	--	--

[illegible]

☐ 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

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

[illegible][illegible]

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

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?

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Page 4 of 14

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

- [illegible]

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

[illegible]

SWPPP Preparer

[illegible]

Contact Name (Last, Space, First)

[illegible]

Mailing Address

[illegible]

City

[illegible]

State Zip

								-				
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Phone

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Fax

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Email

[illegible][illegible]

## 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

[illegible]

MI

--	--

**Last Name**

[illegible]

Signature

--

Date \_\_\_\_\_

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

☐ 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

## Other

[illegible]

## 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



**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)

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

Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)																																													
<u>Alternative SMP</u>	<u>Total Contributing Impervious Area(acres)</u>																																												
<input type="radio"/> Hydrodynamic .....	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table> <span style="font-size: small; vertical-align: middle;">=</span> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table>																																												
<input type="radio"/> Wet Vault .....	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table> <span style="font-size: small; vertical-align: middle;">=</span> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table>																																												
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Provide the name and manufacturer of the Alternative SMPs (i.e.  
proprietary practice(s)) being used for WQv treatment.

Name	<table border="1" style="width: 100%; height: 20px;"></table>
Manufacturer	<table border="1" style="width: 100%; height: 20px;"></table>

**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.

[illegible]

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 acre-feet

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**acre-feet**

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Page 10 of 14

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

- 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

☐ Yes      ☐ No

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

[illegible]

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								
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☐ 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?  
(If No, skip question 43)

☐ Yes      ☐ No

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.

<b>Owner/Operator Certification</b>	
<p>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.</p>	
<b>Print First Name</b> <div style="border: 1px solid black; height: 30px; width: 100%; position: relative;"> <!-- Empty grid representation --> </div>	<b>MI</b> <div style="border: 1px solid black; height: 30px; width: 100%; position: relative;"> <!-- Empty grid representation --> </div>
<b>Print Last Name</b> <div style="border: 1px solid black; height: 30px; width: 100%; position: relative;"> <!-- Empty grid representation --> </div>	
<b>Owner/Operator Signature</b> <div style="border: 1px solid black; height: 60px; width: 100%;"></div>	
<div style="float: right; text-align: right;"> <b>Date</b>  <div style="display: inline-block; border: 1px solid black; width: 40px; height: 30px;"></div> /            <div style="display: inline-block; border: 1px solid black; width: 40px; height: 30px;"></div> /            <div style="display: inline-block; border: 1px solid black; width: 60px; height: 30px;"></div> </div>	

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Department of  
Environmental  
Conservation

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

## MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

**Construction Activities Seeking Authorization Under SPDES General Permit**

\*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

### I. Project Owner/Operator Information

1. Owner/Operator Name:

2. Contact Person:

3. Street Address:

4. City/State/Zip:

### II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/State/Zip:

### III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information

8. SWPPP Reviewed by:

9. Title/Position:

10. Date Final SWPPP Reviewed and Accepted:

### IV. Regulated MS4 Information

11. Name of MS4:

12. MS4 SPDES Permit Identification Number: NYR20A

13. Contact Person:

14. Street Address:

15. City/State/Zip:

16. Telephone Number:



## **MS4 SWPPP Acceptance Form - continued**

### **V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative**

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

### **VI. Additional Information**

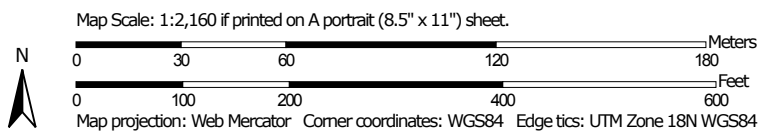
**APPENDIX B**

**SOILS DATA**

Hydrologic Soil Group—Dutchess County, New York  
(511 FISHKILL AVENUE)




Soil Map may not be valid at this scale.



## 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 15, Sep 2, 2018

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

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

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

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BeB	Bernardston silt loam, 3 to 8 percent slopes	C/D	3.6	37.1%
Ud	Udorthents, smoothed	A	0.9	9.3%
Ur	Urban land		5.2	53.6%
<b>Totals for Area of Interest</b>			<b>9.7</b>	<b>100.0%</b>

## 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

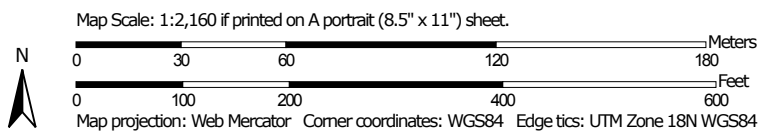
*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher




K Factor, Whole Soil—Dutchess County, New York  
(511 FISHKILL AVENUE)


















## 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
	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 15, Sep 2, 2018

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

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

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

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BeB	Bernardston silt loam, 3 to 8 percent slopes	.32	3.6	37.1%
Ud	Udorthents, smoothed	.17	0.9	9.3%
Ur	Urban land		5.2	53.6%
<b>Totals for Area of Interest</b>			<b>9.7</b>	<b>100.0%</b>

## 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)

**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	73.947 degrees West
Latitude	41.517 degrees North
Elevation	0 feet
Date/Time	Tue, 18 Dec 2018 13:29:09 -0500

## 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	0.81	1.02	1.26	1yr	0.88	1.19	1.44	1.77	2.15	2.61	2.96	1yr	2.31	2.84	3.29	3.96	4.59	1yr
2yr	0.39	0.59	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	4.64	5.28	2yr
5yr	0.45	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	3.50	4.34	5.00	5.78	6.53	5yr
10yr	0.51	0.80	1.02	1.38	1.79	2.27	10yr	1.55	2.06	2.62	3.21	3.90	4.69	5.40	10yr	4.15	5.19	6.00	6.83	7.67	10yr
25yr	0.60	0.95	1.21	1.67	2.23	2.85	25yr	1.92	2.55	3.30	4.06	4.91	5.88	6.85	25yr	5.20	6.58	7.64	8.52	9.50	25yr
50yr	0.68	1.09	1.40	1.95	2.63	3.39	50yr	2.27	3.00	3.93	4.83	5.84	6.98	8.20	50yr	6.18	7.88	9.18	10.07	11.17	50yr
100yr	0.77	1.25	1.61	2.28	3.11	4.03	100yr	2.69	3.52	4.68	5.77	6.96	8.29	9.82	100yr	7.34	9.44	11.03	11.92	13.14	100yr
200yr	0.88	1.43	1.86	2.66	3.68	4.80	200yr	3.18	4.14	5.59	6.88	8.29	9.85	11.76	200yr	8.72	11.31	13.26	14.11	15.47	200yr
500yr	1.06	1.74	2.27	3.29	4.61	6.05	500yr	3.98	5.14	7.05	8.68	10.45	12.38	14.95	500yr	10.96	14.37	16.94	17.64	19.21	500yr

## Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.08	1yr	0.75	1.06	1.24	1.60	2.00	2.07	2.35	1yr	1.83	2.26	2.48	3.13	4.16	1yr
2yr	0.37	0.58	0.71	0.96	1.18	1.41	2yr	1.02	1.38	1.60	2.05	2.58	3.07	3.44	2yr	2.72	3.31	3.78	4.47	5.13	2yr
5yr	0.42	0.65	0.81	1.11	1.41	1.65	5yr	1.22	1.61	1.87	2.41	3.00	3.64	4.16	5yr	3.22	4.00	4.55	5.26	6.06	5yr
10yr	0.47	0.72	0.89	1.25	1.62	1.85	10yr	1.39	1.81	2.11	2.70	3.37	4.12	4.80	10yr	3.64	4.62	5.23	5.93	6.86	10yr
25yr	0.54	0.83	1.03	1.47	1.93	2.13	25yr	1.67	2.08	2.45	3.04	3.92	4.81	5.82	25yr	4.26	5.60	6.27	6.93	8.10	25yr
50yr	0.61	0.92	1.15	1.65	2.22	2.37	50yr	1.92	2.32	2.76	3.39	4.41	5.45	6.75	50yr	4.82	6.49	7.19	7.78	9.20	50yr
100yr	0.69	1.04	1.30	1.88	2.57	2.66	100yr	2.22	2.61	3.12	3.78	4.98	6.11	7.83	100yr	5.41	7.53	8.25	8.70	10.43	100yr
200yr	0.78	1.17	1.48	2.15	3.00	2.98	200yr	2.59	2.91	3.53	4.24	5.62	6.79	9.11	200yr	6.01	8.76	9.46	9.72	11.86	200yr
500yr	0.93	1.38	1.78	2.59	3.68	3.48	500yr	3.18	3.40	4.17	4.93	6.63	7.83	11.14	500yr	6.93	10.71	11.34	11.19	14.05	500yr

## Upper Confidence Limits

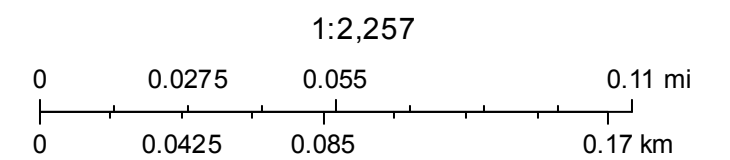
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.36	0.56	0.68	0.91	1.12	1.36	1yr	0.97	1.33	1.52	1.96	2.42	2.82	3.18	1yr	2.50	3.06	3.55	4.23	4.91	1yr
2yr	0.40	0.62	0.76	1.03	1.28	1.54	2yr	1.10	1.50	1.74	2.24	2.80	3.33	3.70	2yr	2.95	3.55	4.09	4.83	5.48	2yr
5yr	0.49	0.76	0.94	1.29	1.64	1.95	5yr	1.42	1.91	2.25	2.88	3.66	4.25	4.90	5yr	3.77	4.71	5.42	6.30	7.02	5yr
10yr	0.58	0.89	1.11	1.54	2.00	2.36	10yr	1.72	2.31	2.74	3.53	4.49	5.18	6.03	10yr	4.59	5.80	6.73	7.72	8.50	10yr
25yr	0.72	1.10	1.37	1.95	2.57	3.04	25yr	2.22	2.97	3.56	4.74	5.88	6.75	7.97	25yr	5.97	7.66	8.99	10.11	10.96	25yr
50yr	0.85	1.29	1.61	2.32	3.12	3.69	50yr	2.69	3.61	4.35	5.84	7.21	8.25	9.83	50yr	7.30	9.45	11.20	12.42	13.29	50yr
100yr	1.01	1.52	1.91	2.76	3.78	4.49	100yr	3.26	4.39	5.31	7.22	8.84	10.09	12.11	100yr	8.93	11.65	13.98	15.28	16.14	100yr
200yr	1.19	1.79	2.27	3.28	4.58	5.44	200yr	3.95	5.32	6.49	8.89	10.84	12.36	14.95	200yr	10.94	14.38	17.44	18.82	19.60	200yr
500yr	1.49	2.22	2.86	4.15	5.90	7.04	500yr	5.09	6.88	8.44	11.77	14.20	16.19	19.73	500yr	14.33	18.97	23.40	24.84	25.33	500yr



# 511 FISHKILL AVENUE



December 18, 2018

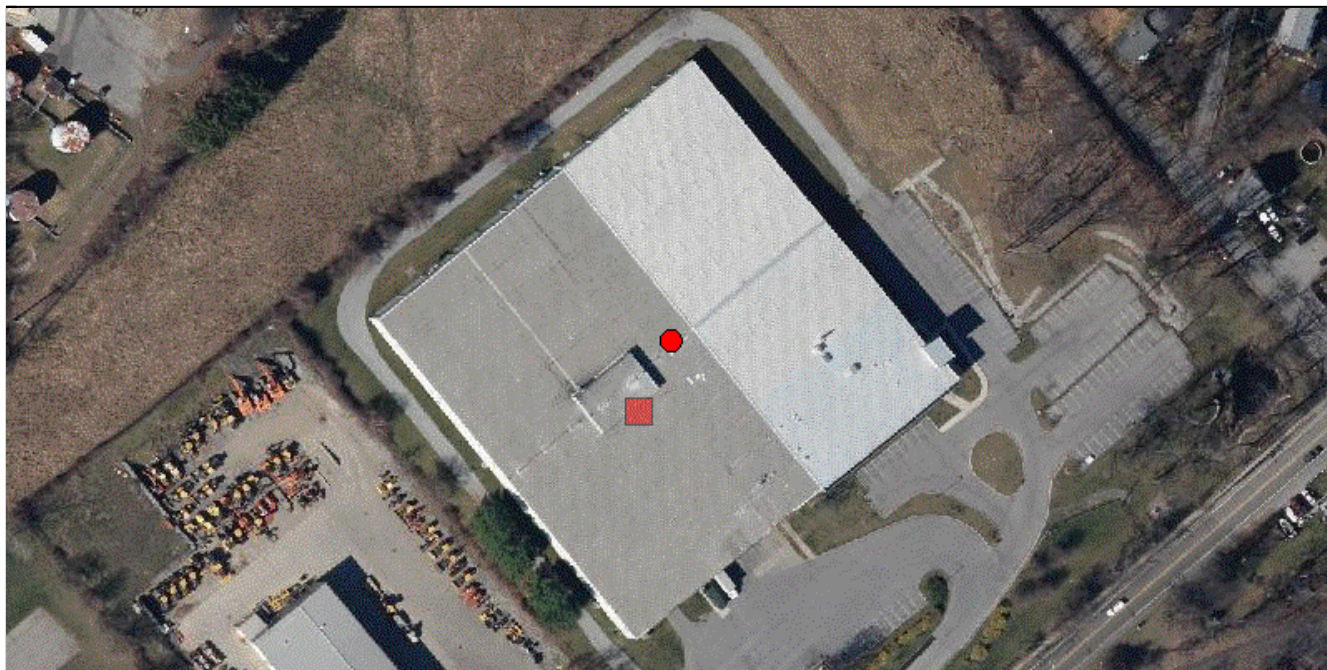


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Author: HLD  
Not a legal document



# Environmental Resource Mapper



The coordinates of the point you clicked on are:

UTM 18	Easting:	587855.575	Northing:	4596696.827
Longitude/Latitude	Longitude:	-73.947	Latitude:	41.517

The approximate address of the point you clicked on is:

511 Fishkill Ave, Beacon, New York, 12508

**County:** Dutchess

**City:** Beacon

**USGS Quad:** WAPPINGERS FALLS

**DEC Region**

**Region 3:**

(Lower Hudson Valley) Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester counties. For more information visit <http://www.dec.ny.gov/about/607.html>.

## Rare Plants and Rare Animals

**This location is in the vicinity of Bats Listed as Endangered or Threatened -- Contact NYSDEC Regional Office**

If your project or action is within or near an area with a rare animal, a permit may be required if the species is listed as endangered or threatened and the department determines the action may be harmful to the species or its habitat.

If your project or action is within or near an area with rare plants and/or significant natural communities, the environmental impacts may need to be addressed.

The presence of a unique geological feature or landform near a project, unto itself, does not trigger a requirement for a NYS DEC permit. Readers are advised, however, that there is the chance that a unique feature may also show in another data layer (ie. a wetland) and thus be subject to permit jurisdiction.

Please refer to the "Need a Permit?" tab for permit information or other authorizations regarding these natural resources.

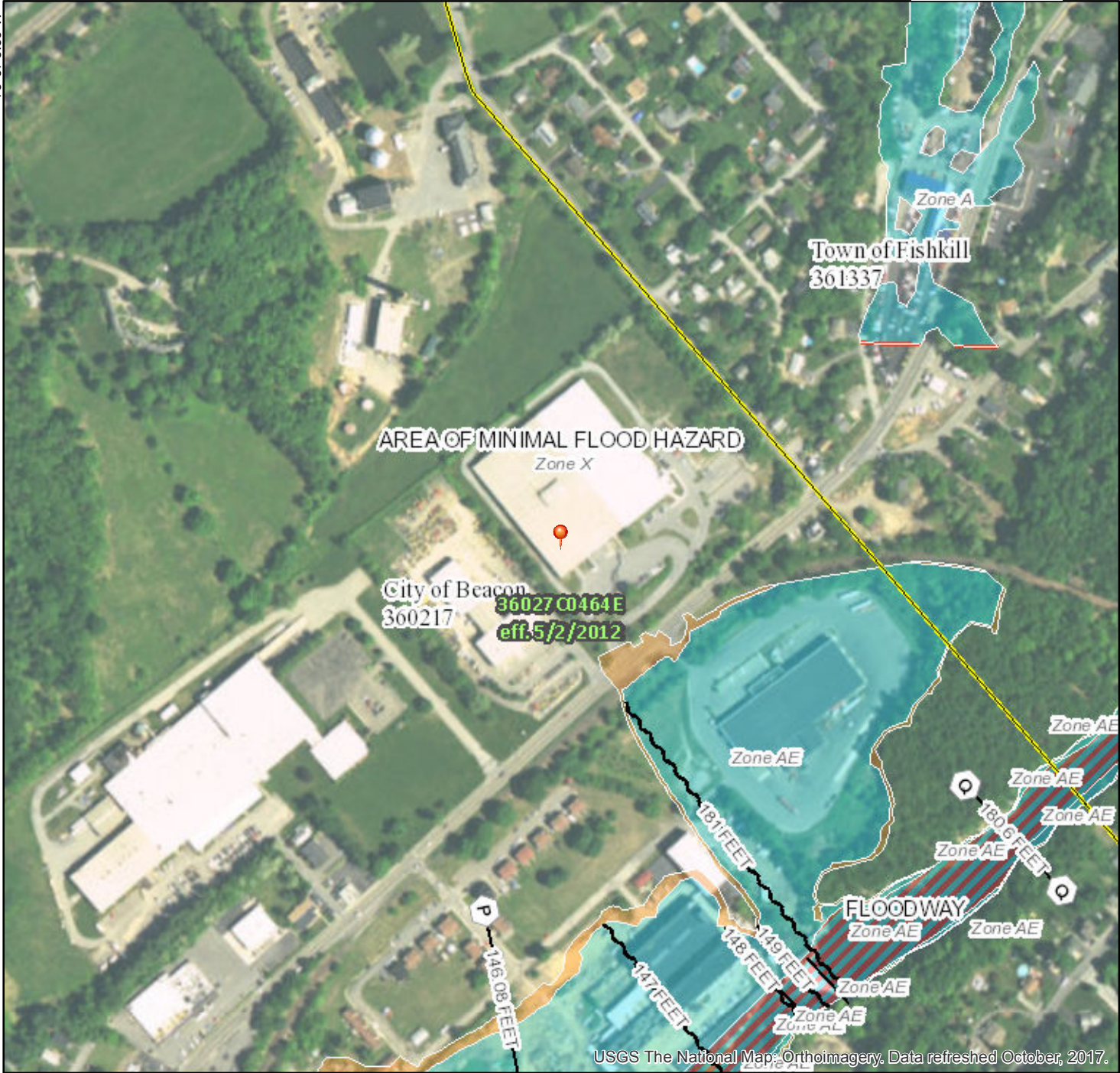
**Disclaimer:** If you are considering a project or action in, or near, a wetland or a stream, a NYS DEC permit may be required. The Environmental Resources Mapper does not show all natural resources which are regulated by NYS DEC, and for which permits from NYS DEC are required. For example, Regulated Tidal Wetlands, and Wild, Scenic, and Recreational Rivers, are currently not included on the maps.



# National Flood Hazard Layer FIRMMette



41°31'13.32"N



## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D

OTHER AREAS		Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
OTHER FEATURES		Profile Baseline
		Hydrographic Feature

MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/18/2018 at 1:58:31 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

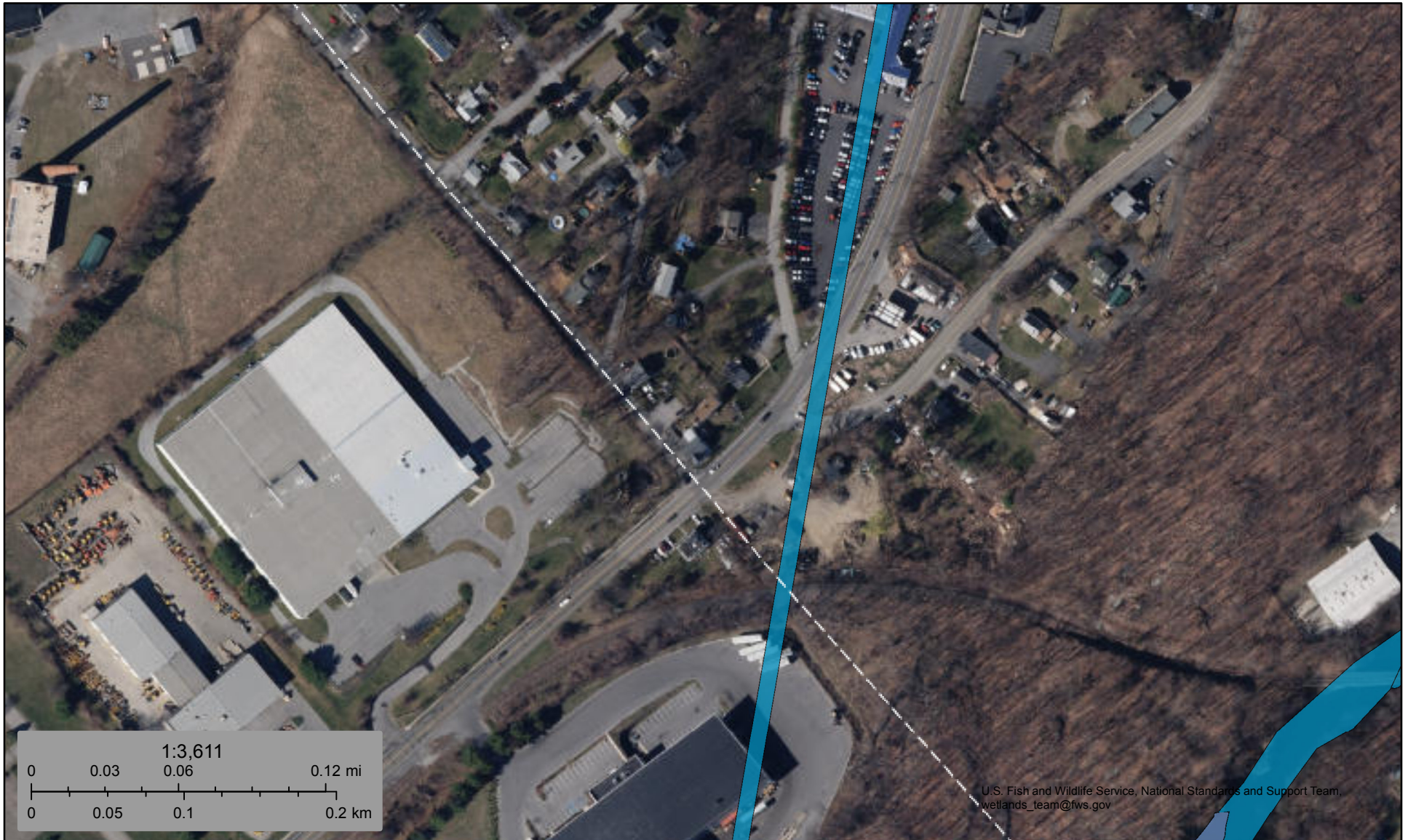




U.S. Fish and Wildlife Service

# National Wetlands Inventory


511 Fishkill Avenue



U.S. Fish and Wildlife Service, National Standards and Support Team,  
wetlands\_team@fws.gov

December 24, 2018

## Wetlands

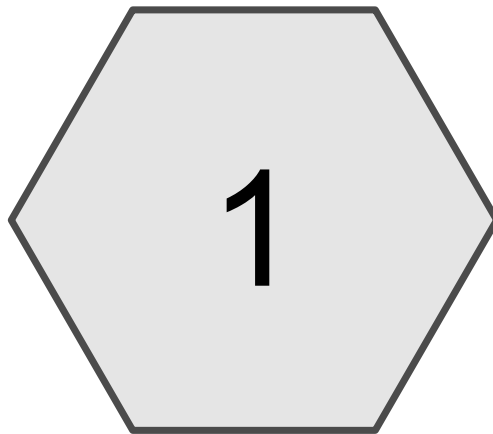
	Estuarine and Marine Deepwater		Freshwater Emergent Wetland		Lake
	Estuarine and Marine Wetland		Freshwater Forested/Shrub Wetland		Other
			Freshwater Pond		Riverine

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.

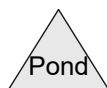
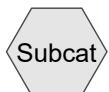


**APPENDIX D**

**PRE-DEVELOPMENT HYDROCAD MODEL**



1



**Routing Diagram for PRE CONDITIONS**

Prepared by Hudson Land Design, P.C. , Printed 12/24/2018  
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**PRE CONDITIONS**

Prepared by Hudson Land Design, P.C.

Printed 12/24/2018

HydroCAD® 10.00-20 s/n 04797 © 2017 HydroCAD Software Solutions LLC

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**Area Listing (selected nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.780	80	>75% Grass cover, Good, HSG D (1)
0.082	96	Gravel surface, HSG D (1)
0.008	98	Paved parking, HSG D (1)
0.068	77	Woods, Good, HSG D (1)

## PRE CONDITIONS

Prepared by Hudson Land Design, P.C.

HydroCAD® 10.00-20 s/n 04797 © 2017 HydroCAD Software Solutions LLC

511 Fishkill Ave Pre Conditions 2018-1226

Type III 24-hr 1 YEAR Rainfall=2.61"

Printed 12/24/2018

### Summary for Subcatchment 1: 1

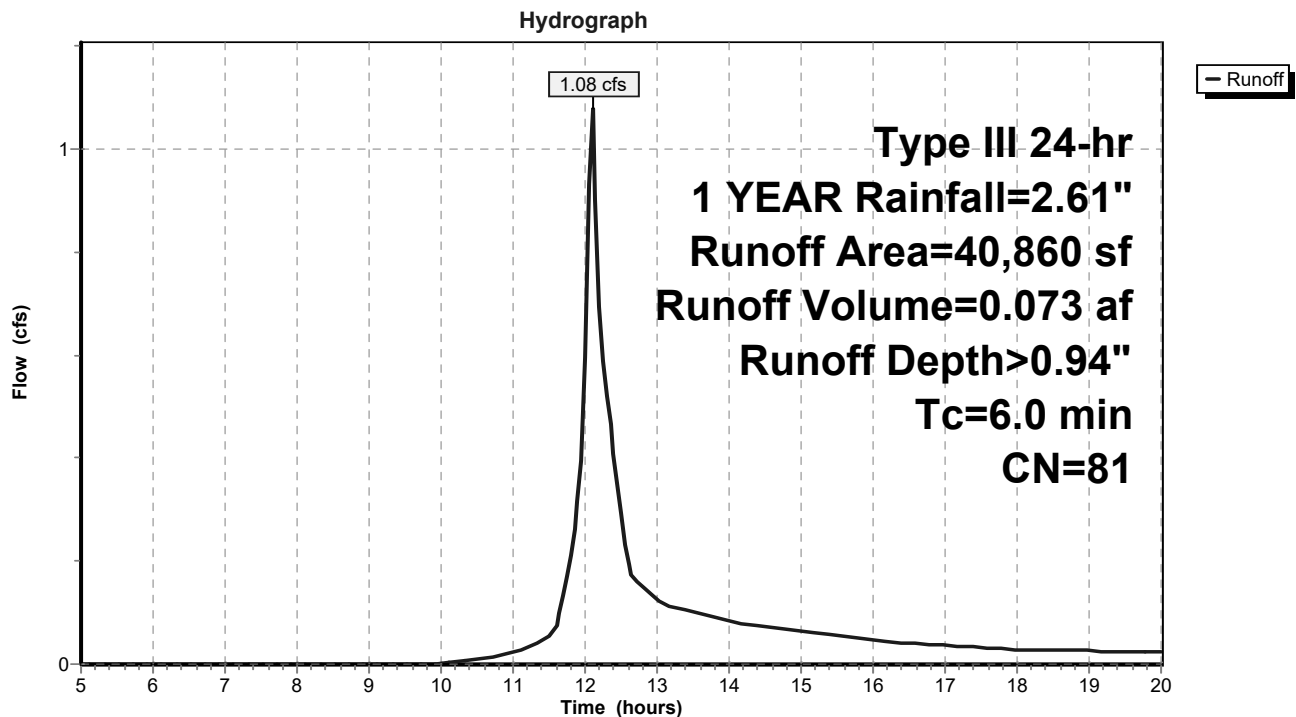
Runoff = 1.08 cfs @ 12.10 hrs, Volume= 0.073 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 1 YEAR Rainfall=2.61"

Area (sf)	CN	Description
33,986	80	>75% Grass cover, Good, HSG D
3,561	96	Gravel surface, HSG D
345	98	Paved parking, HSG D
2,968	77	Woods, Good, HSG D
40,860	81	Weighted Average
40,515		99.16% Pervious Area
345		0.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, S1

### Subcatchment 1: 1



## PRE CONDITIONS

Prepared by Hudson Land Design, P.C.

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511 Fishkill Ave Pre Conditions 2018-1226

Type III 24-hr 10 YEAR Rainfall=4.69"

Printed 12/24/2018

### Summary for Subcatchment 1: 1

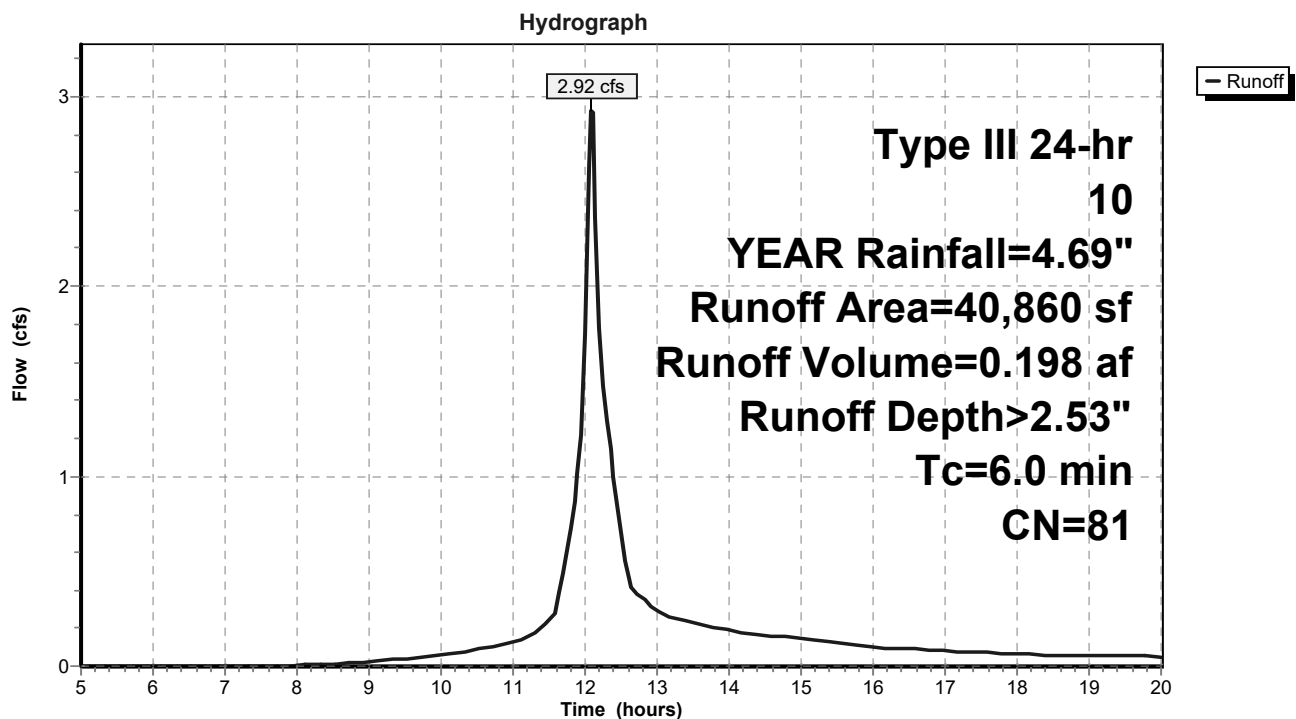
Runoff = 2.92 cfs @ 12.09 hrs, Volume= 0.198 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10 YEAR Rainfall=4.69"

Area (sf)	CN	Description
33,986	80	>75% Grass cover, Good, HSG D
3,561	96	Gravel surface, HSG D
345	98	Paved parking, HSG D
2,968	77	Woods, Good, HSG D
40,860	81	Weighted Average
40,515		99.16% Pervious Area
345		0.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, S1

### Subcatchment 1: 1



## PRE CONDITIONS

Prepared by Hudson Land Design, P.C.

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511 Fishkill Ave Pre Conditions 2018-1226

Type III 24-hr 100 YEAR Rainfall=8.29"

Printed 12/24/2018

### Summary for Subcatchment 1: 1

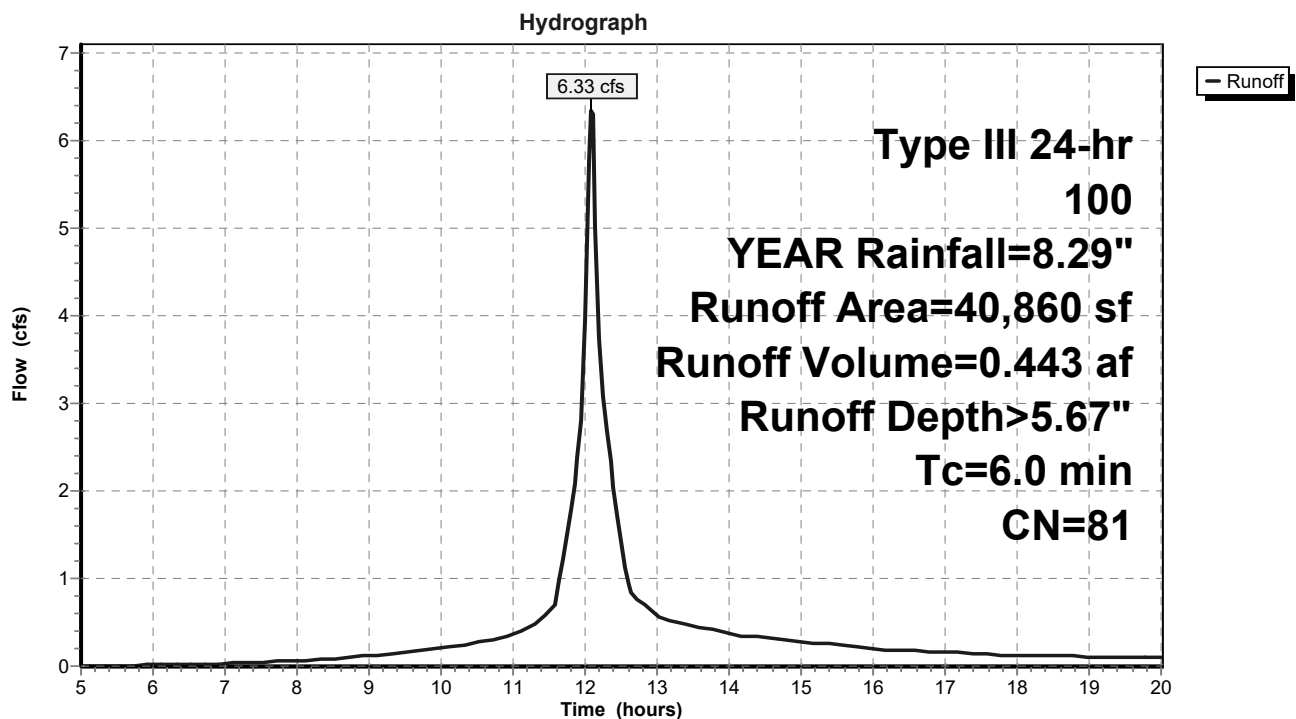
Runoff = 6.33 cfs @ 12.09 hrs, Volume= 0.443 af, Depth> 5.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100 YEAR Rainfall=8.29"

Area (sf)	CN	Description
33,986	80	>75% Grass cover, Good, HSG D
3,561	96	Gravel surface, HSG D
345	98	Paved parking, HSG D
2,968	77	Woods, Good, HSG D
40,860	81	Weighted Average
40,515		99.16% Pervious Area
345		0.84% Impervious Area

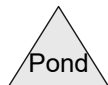
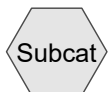
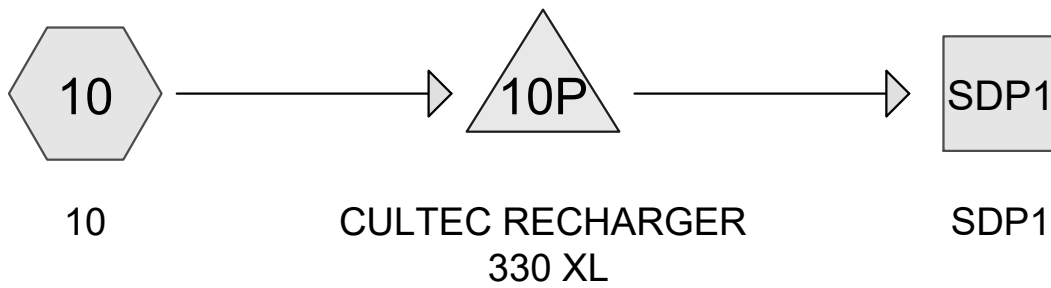
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, S1

### Subcatchment 1: 1



**APPENDIX E**

**POST-DEVELOPMENT HYDROCAD MODEL**





**POST CONDITIONS 2019-0129**

Prepared by Hudson Land Design, P.C.

Printed 1/28/2019

HydroCAD® 10.00-20 s/n 04797 © 2017 HydroCAD Software Solutions LLC

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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.342	80	>75% Grass cover, Good, HSG D (10)
0.002	96	Gravel surface, HSG D (10)
0.717	98	Paved parking, HSG D (10)
0.068	77	Woods, Good, HSG D (10)

## POST CONDITIONS 2019-0129

Prepared by Hudson Land Design, P.C.

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511 Fishkill Avenue Post Conditions  
Type III 24-hr 1 YEAR Rainfall=2.61"

Printed 1/28/2019

### Summary for Subcatchment 10: 10

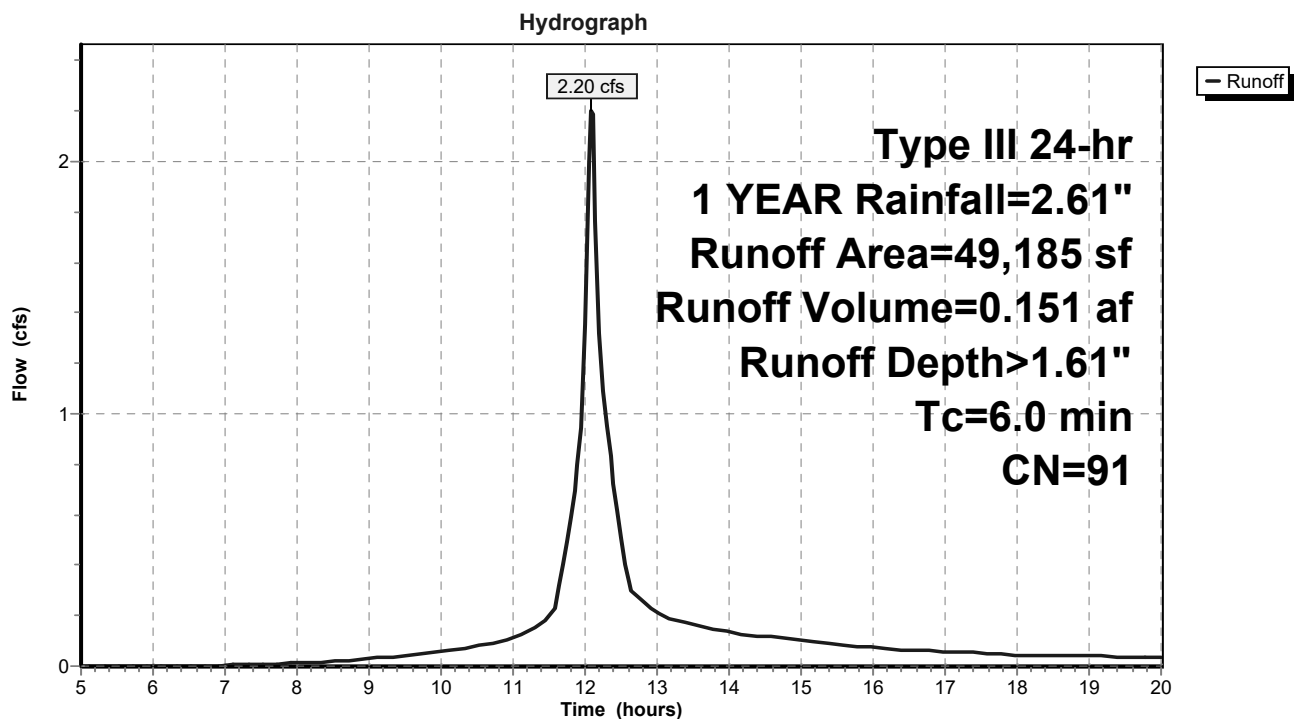
Runoff = 2.20 cfs @ 12.09 hrs, Volume= 0.151 af, Depth> 1.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 1 YEAR Rainfall=2.61"

Area (sf)	CN	Description
14,881	80	>75% Grass cover, Good, HSG D
31,242	98	Paved parking, HSG D
2,968	77	Woods, Good, HSG D
94	96	Gravel surface, HSG D
49,185	91	Weighted Average
17,943		36.48% Pervious Area
31,242		63.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, S1

### Subcatchment 10: 10



## POST CONDITIONS 2019-0129

Prepared by Hudson Land Design, P.C.

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511 Fishkill Avenue Post Conditions  
Type III 24-hr 1 YEAR Rainfall=2.61"

Printed 1/28/2019

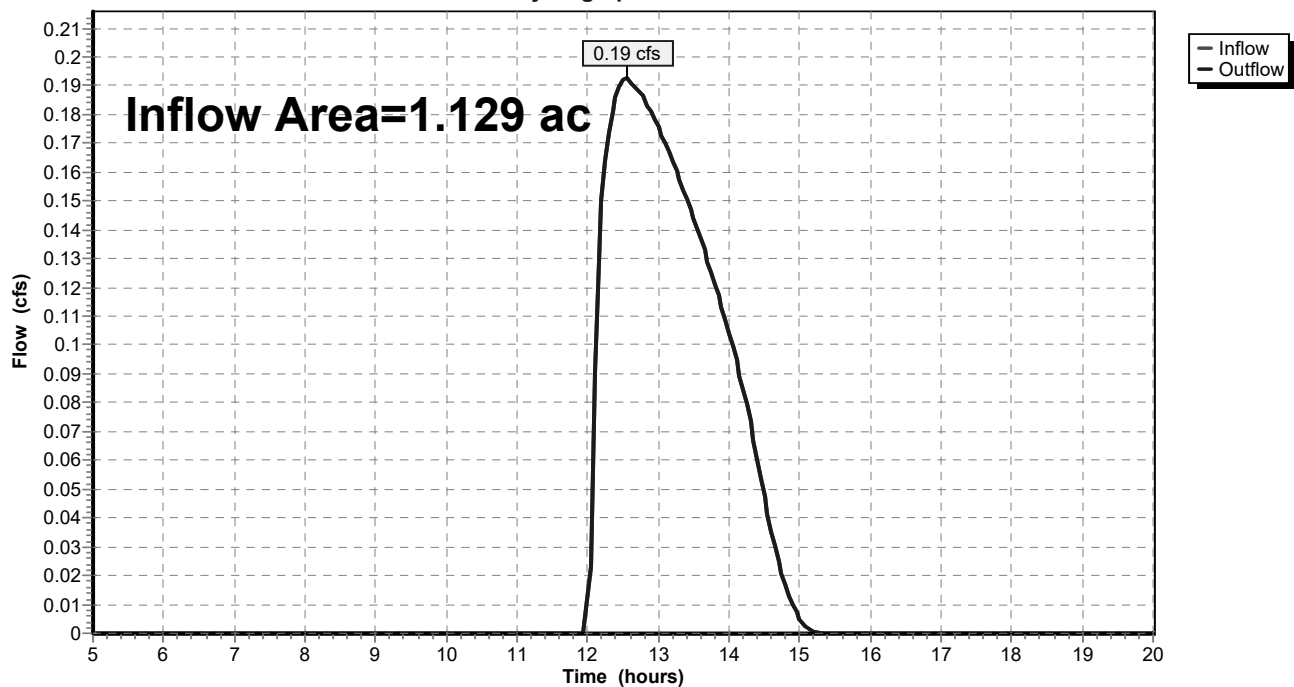
### Summary for Reach SDP1: SDP1

Inflow Area = 1.129 ac, 63.52% Impervious, Inflow Depth = 0.31" for 1 YEAR event  
Inflow = 0.19 cfs @ 12.55 hrs, Volume= 0.029 af  
Outflow = 0.19 cfs @ 12.55 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach SDP1: SDP1

Hydrograph



## POST CONDITIONS 2019-0129

Prepared by Hudson Land Design, P.C.

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511 Fishkill Avenue Post Conditions

Type III 24-hr 1 YEAR Rainfall=2.61"

Printed 1/28/2019

### Summary for Pond 10P: CULTEC RECHARGER 330 XL

Inflow Area = 1.129 ac, 63.52% Impervious, Inflow Depth > 1.61" for 1 YEAR event  
Inflow = 2.20 cfs @ 12.09 hrs, Volume= 0.151 af  
Outflow = 0.41 cfs @ 12.55 hrs, Volume= 0.151 af, Atten= 81%, Lag= 27.6 min  
Discarded = 0.22 cfs @ 12.55 hrs, Volume= 0.122 af  
Primary = 0.19 cfs @ 12.55 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 214.94' @ 12.55 hrs Surf.Area= 2,346 sf Storage= 2,225 cf

Plug-Flow detention time= 48.9 min calculated for 0.151 af (100% of inflow)  
Center-of-Mass det. time= 48.5 min ( 826.0 - 777.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.55'	1,986 cf	<b>35.33'W x 66.40'L x 3.55'H Prismaoid</b> 8,328 cf Overall - 3,364 cf Embedded = 4,964 cf x 40.0% Voids
#2	214.05'	3,364 cf	<b>Cultec R-330XLHD x 63 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 7 rows
		5,350 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	213.50'	<b>12.0" Round Culvert X 4.00</b> L= 31.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 213.50' / 212.80' S= 0.0226 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	214.15'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	214.95'	<b>21.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#4	Discarded	213.55'	<b>4.000 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 11.00'

**Discarded OutFlow** Max=0.22 cfs @ 12.55 hrs HW=214.94' (Free Discharge)  
↑**4=Exfiltration** ( Controls 0.22 cfs)

**Primary OutFlow** Max=0.19 cfs @ 12.55 hrs HW=214.94' (Free Discharge)  
↑**1=Culvert** (Passes 0.19 cfs of 14.66 cfs potential flow)  
↑**2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 3.93 fps)  
↑**3=Orifice/Grate** ( Controls 0.00 cfs)

# POST CONDITIONS 2019-0129

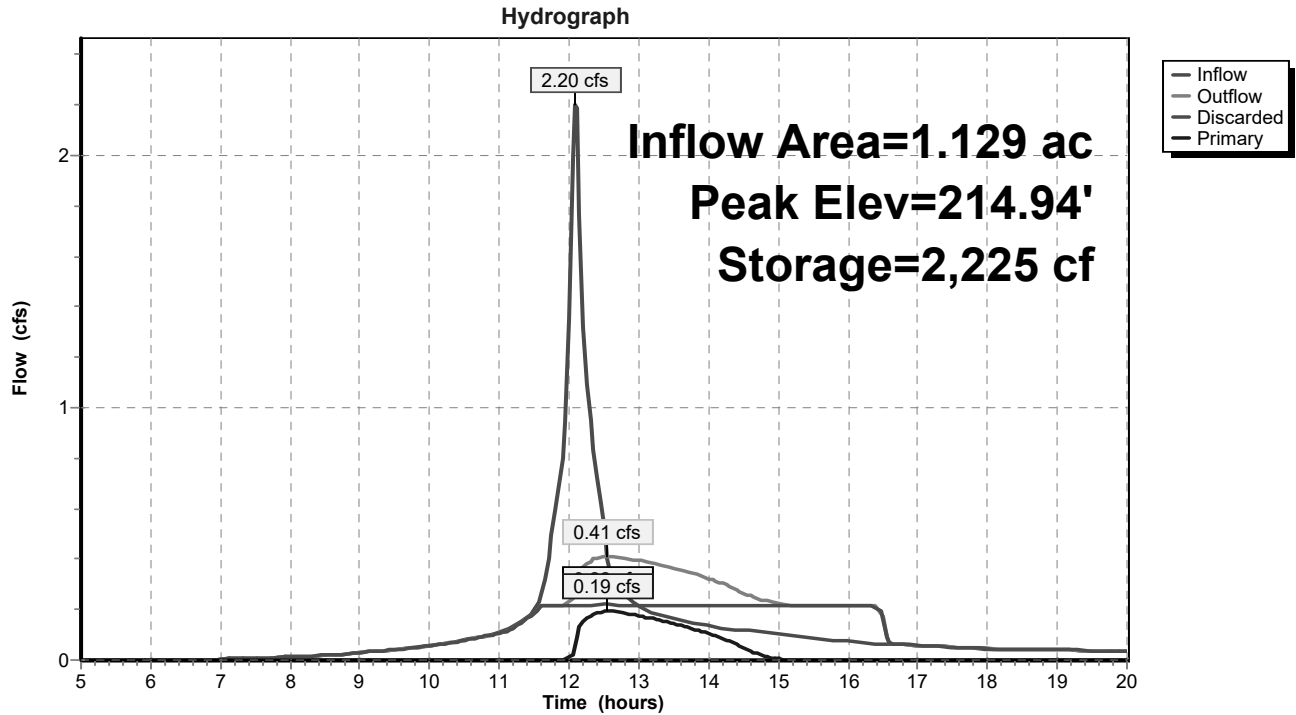
Prepared by Hudson Land Design, P.C.

HydroCAD® 10.00-20 s/n 04797 © 2017 HydroCAD Software Solutions LLC

511 Fishkill Avenue Post Conditions  
Type III 24-hr 1 YEAR Rainfall=2.61"

Printed 1/28/2019

## Pond 10P: CULTEC RECHARGER 330 XL



## POST CONDITIONS 2019-0129

Prepared by Hudson Land Design, P.C.

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511 Fishkill Avenue Post Conditions  
Type III 24-hr 10 YEAR Rainfall=4.69"

Printed 1/28/2019

### Summary for Subcatchment 10: 10

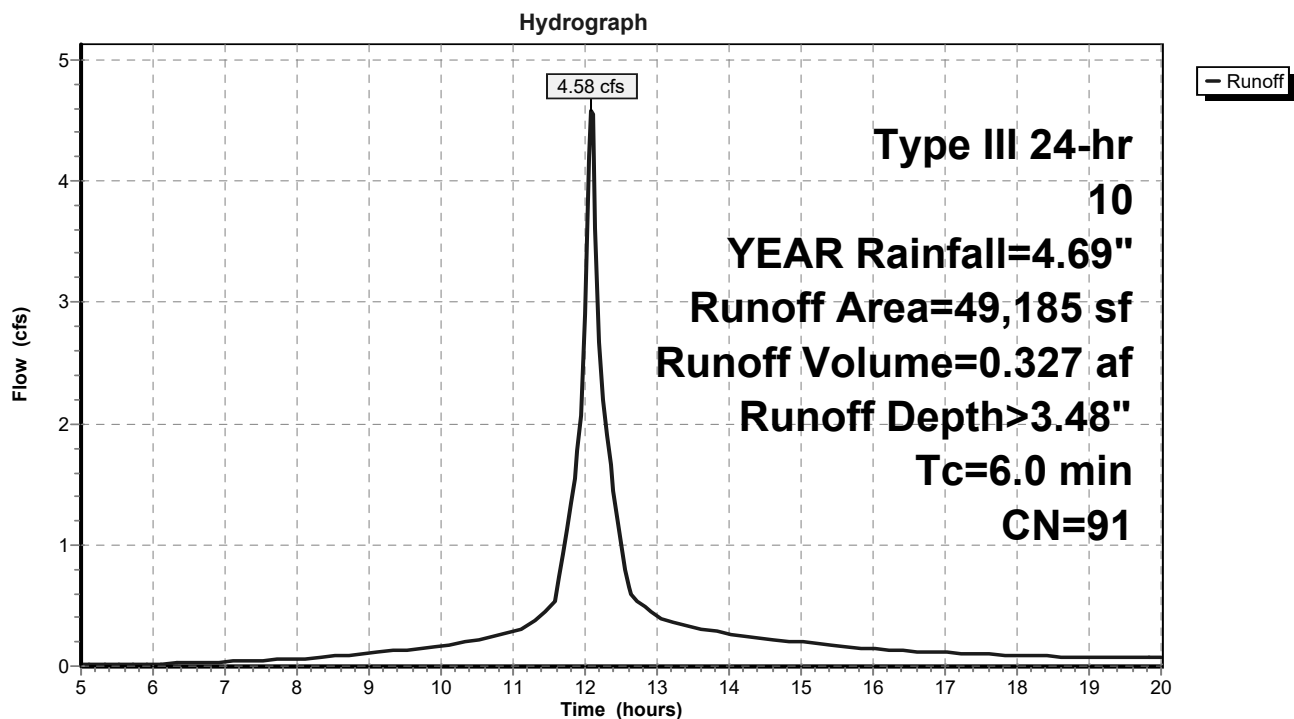
Runoff = 4.58 cfs @ 12.09 hrs, Volume= 0.327 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10 YEAR Rainfall=4.69"

Area (sf)	CN	Description
14,881	80	>75% Grass cover, Good, HSG D
31,242	98	Paved parking, HSG D
2,968	77	Woods, Good, HSG D
94	96	Gravel surface, HSG D
49,185	91	Weighted Average
17,943		36.48% Pervious Area
31,242		63.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, S1

### Subcatchment 10: 10



## POST CONDITIONS 2019-0129

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511 Fishkill Avenue Post Conditions  
Type III 24-hr 10 YEAR Rainfall=4.69"

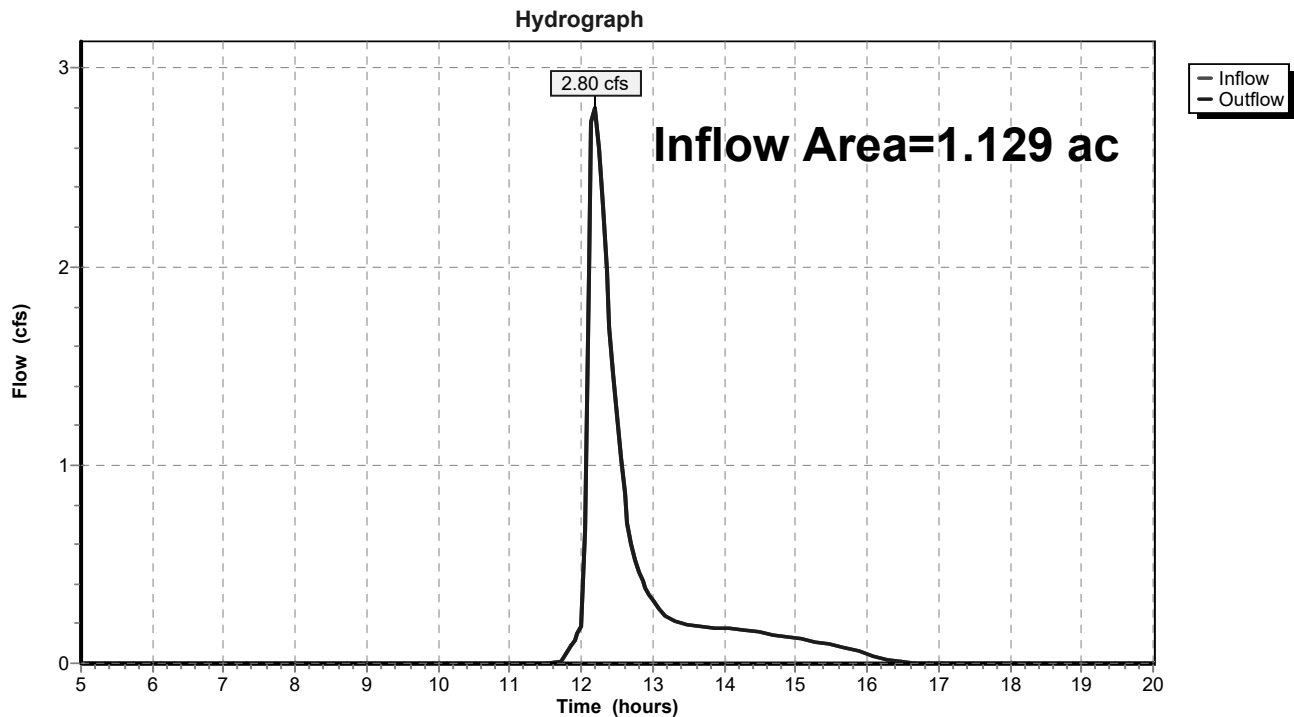
Printed 1/28/2019

### Summary for Reach SDP1: SDP1

Inflow Area = 1.129 ac, 63.52% Impervious, Inflow Depth = 1.53" for 10 YEAR event  
Inflow = 2.80 cfs @ 12.19 hrs, Volume= 0.144 af  
Outflow = 2.80 cfs @ 12.19 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach SDP1: SDP1



**POST CONDITIONS 2019-0129**

Prepared by Hudson Land Design, P.C.

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511 Fishkill Avenue Post Conditions  
Type III 24-hr 10 YEAR Rainfall=4.69"

Printed 1/28/2019

**Summary for Pond 10P: CULTEC RECHARGER 330 XL**

Inflow Area = 1.129 ac, 63.52% Impervious, Inflow Depth > 3.48" for 10 YEAR event  
 Inflow = 4.58 cfs @ 12.09 hrs, Volume= 0.327 af  
 Outflow = 3.02 cfs @ 12.19 hrs, Volume= 0.327 af, Atten= 34%, Lag= 6.0 min  
 Discarded = 0.22 cfs @ 12.19 hrs, Volume= 0.183 af  
 Primary = 2.80 cfs @ 12.19 hrs, Volume= 0.144 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 215.58' @ 12.19 hrs Surf.Area= 2,346 sf Storage= 3,413 cf

Plug-Flow detention time= 41.7 min calculated for 0.326 af (100% of inflow)  
 Center-of-Mass det. time= 41.2 min ( 800.6 - 759.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.55'	1,986 cf	<b>35.33'W x 66.40'L x 3.55'H Prismaoid</b> 8,328 cf Overall - 3,364 cf Embedded = 4,964 cf x 40.0% Voids
#2	214.05'	3,364 cf	<b>Cultec R-330XLHD x 63 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 7 rows
5,350 cf			Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	213.50'	<b>12.0" Round Culvert X 4.00</b> L= 31.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 213.50' / 212.80' S= 0.0226 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	214.15'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	214.95'	<b>21.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#4	Discarded	213.55'	<b>4.000 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 11.00'

**Discarded OutFlow** Max=0.22 cfs @ 12.19 hrs HW=215.57' (Free Discharge)  
 ↳ **4=Exfiltration** ( Controls 0.22 cfs)

**Primary OutFlow** Max=2.77 cfs @ 12.19 hrs HW=215.57' (Free Discharge)  
 ↳ **1=Culvert** (Passes 2.77 cfs of 18.95 cfs potential flow)  
 ↳ **2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.48 fps)  
 ↳ **3=Orifice/Grate** (Orifice Controls 2.51 cfs @ 2.86 fps)



**POST CONDITIONS 2019-0129**

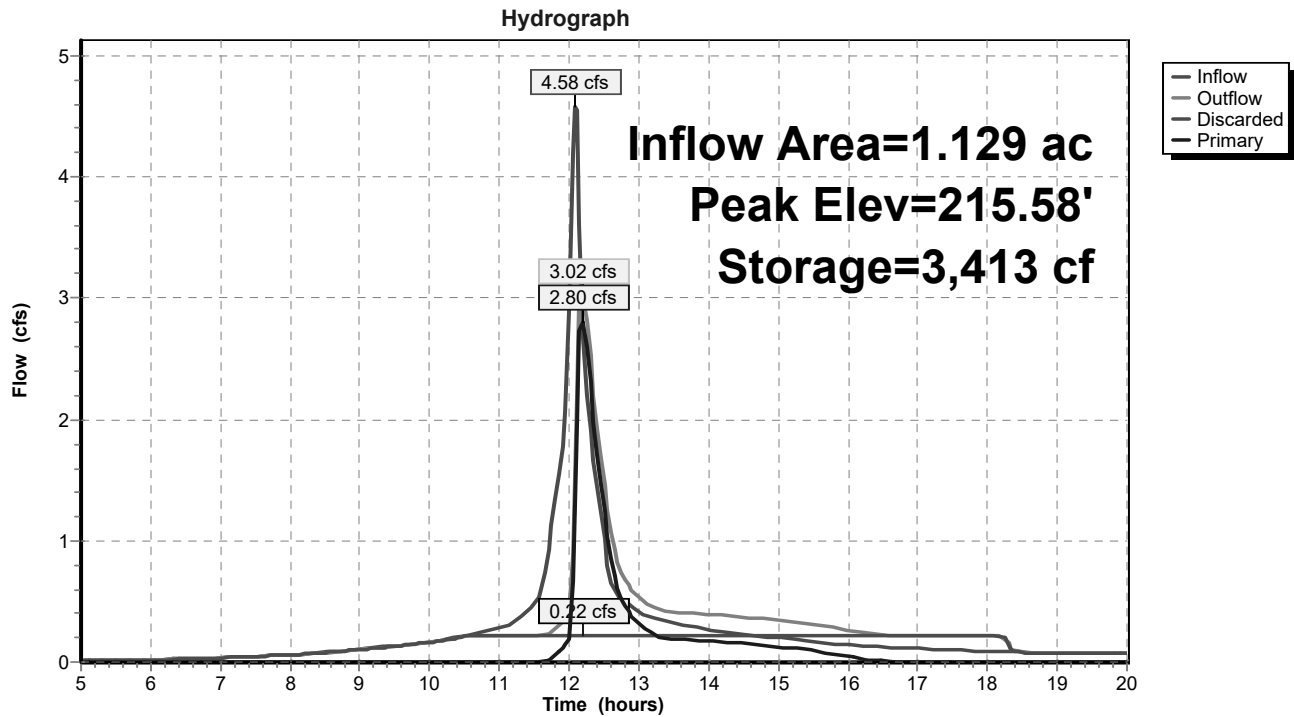
Prepared by Hudson Land Design, P.C.

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511 Fishkill Avenue Post Conditions  
Type III 24-hr 10 YEAR Rainfall=4.69"

Printed 1/28/2019

**Pond 10P: CULTEC RECHARGER 330 XL**



## POST CONDITIONS 2019-0129

Prepared by Hudson Land Design, P.C.

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511 Fishkill Avenue Post Conditions

Type III 24-hr 100 YEAR Rainfall=8.29"

Printed 1/28/2019

### Summary for Subcatchment 10: 10

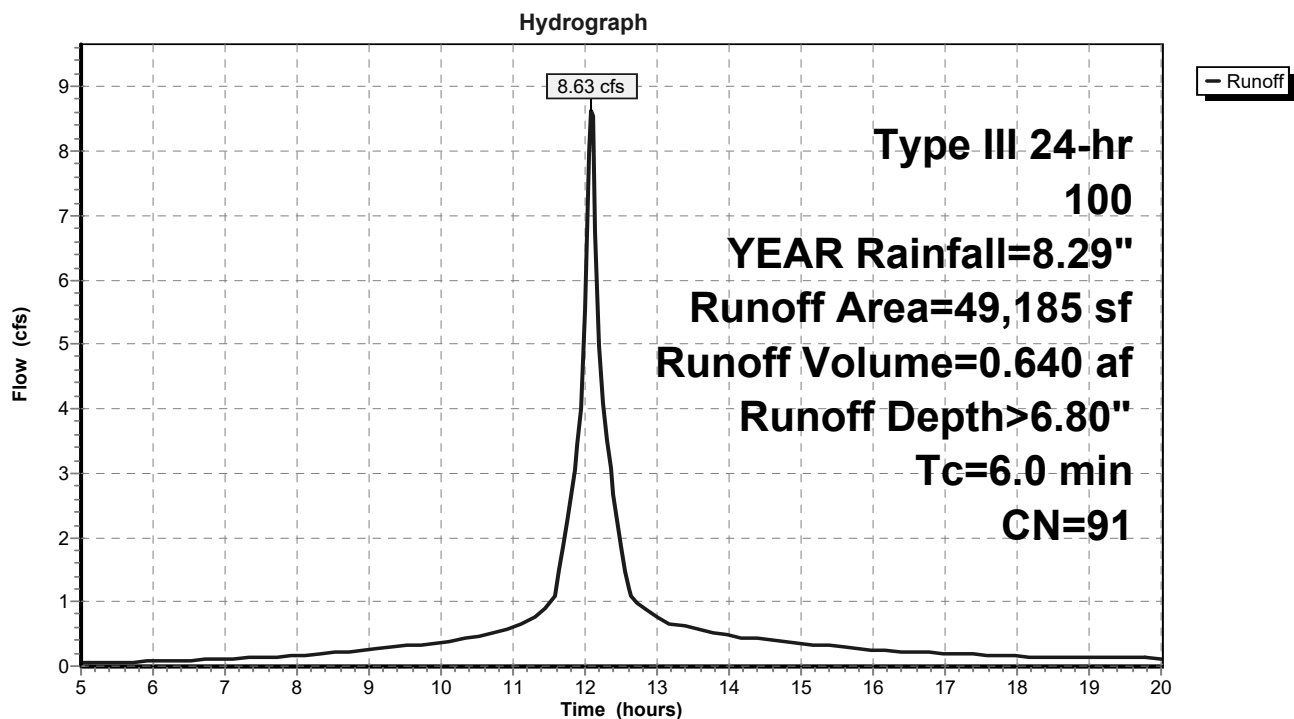
Runoff = 8.63 cfs @ 12.09 hrs, Volume= 0.640 af, Depth> 6.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100 YEAR Rainfall=8.29"

Area (sf)	CN	Description
14,881	80	>75% Grass cover, Good, HSG D
31,242	98	Paved parking, HSG D
2,968	77	Woods, Good, HSG D
94	96	Gravel surface, HSG D
49,185	91	Weighted Average
17,943		36.48% Pervious Area
31,242		63.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, S1

### Subcatchment 10: 10



## POST CONDITIONS 2019-0129

Prepared by Hudson Land Design, P.C.

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511 Fishkill Avenue Post Conditions  
Type III 24-hr 100 YEAR Rainfall=8.29"

Printed 1/28/2019

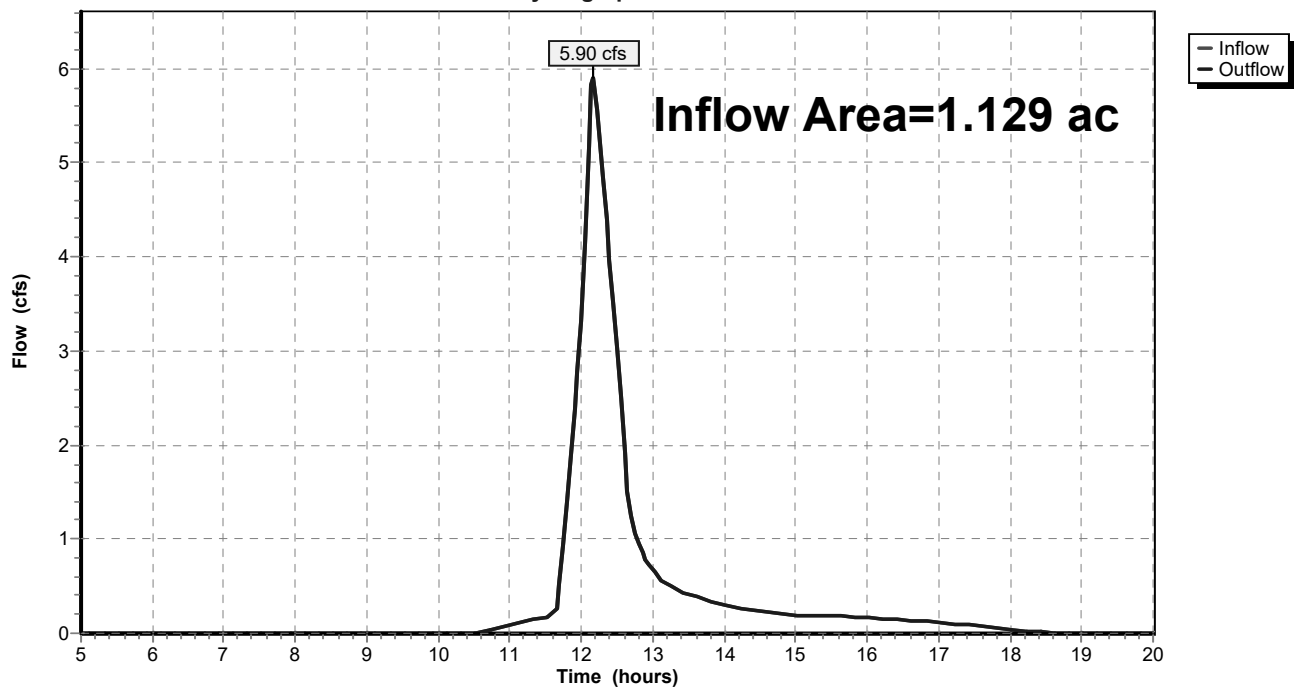
### Summary for Reach SDP1: SDP1

Inflow Area = 1.129 ac, 63.52% Impervious, Inflow Depth = 4.18" for 100 YEAR event  
Inflow = 5.90 cfs @ 12.17 hrs, Volume= 0.394 af  
Outflow = 5.90 cfs @ 12.17 hrs, Volume= 0.394 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach SDP1: SDP1

Hydrograph



**POST CONDITIONS 2019-0129**

Prepared by Hudson Land Design, P.C.

HydroCAD® 10.00-20 s/n 04797 © 2017 HydroCAD Software Solutions LLC

511 Fishkill Avenue Post Conditions

Type III 24-hr 100 YEAR Rainfall=8.29"

Printed 1/28/2019

**Summary for Pond 10P: CULTEC RECHARGER 330 XL**

Inflow Area = 1.129 ac, 63.52% Impervious, Inflow Depth > 6.80" for 100 YEAR event  
 Inflow = 8.63 cfs @ 12.09 hrs, Volume= 0.640 af  
 Outflow = 6.12 cfs @ 12.17 hrs, Volume= 0.632 af, Atten= 29%, Lag= 5.1 min  
 Discarded = 0.22 cfs @ 12.17 hrs, Volume= 0.239 af  
 Primary = 5.90 cfs @ 12.17 hrs, Volume= 0.394 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 216.91' @ 12.17 hrs Surf.Area= 2,346 sf Storage= 5,175 cf

Plug-Flow detention time= 38.6 min calculated for 0.630 af (99% of inflow)  
 Center-of-Mass det. time= 33.5 min ( 780.5 - 747.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.55'	1,986 cf	<b>35.33'W x 66.40'L x 3.55'H Prismaoid</b> 8,328 cf Overall - 3,364 cf Embedded = 4,964 cf x 40.0% Voids
#2	214.05'	3,364 cf	<b>Cultec R-330XLHD x 63 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 7 rows
		5,350 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	213.50'	<b>12.0" Round Culvert X 4.00</b> L= 31.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 213.50' / 212.80' S= 0.0226 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	214.15'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	214.95'	<b>21.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#4	Discarded	213.55'	<b>4.000 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 11.00'

**Discarded OutFlow** Max=0.22 cfs @ 12.17 hrs HW=216.86' (Free Discharge)  
 ↳ **4=Exfiltration** ( Controls 0.22 cfs)

**Primary OutFlow** Max=5.81 cfs @ 12.17 hrs HW=216.86' (Free Discharge)  
 ↳ **1=Culvert** (Passes 5.81 cfs of 25.60 cfs potential flow)  
 ↳ **2=Orifice/Grate** (Orifice Controls 0.38 cfs @ 7.75 fps)  
 ↳ **3=Orifice/Grate** (Orifice Controls 5.43 cfs @ 6.21 fps)

**POST CONDITIONS 2019-0129**

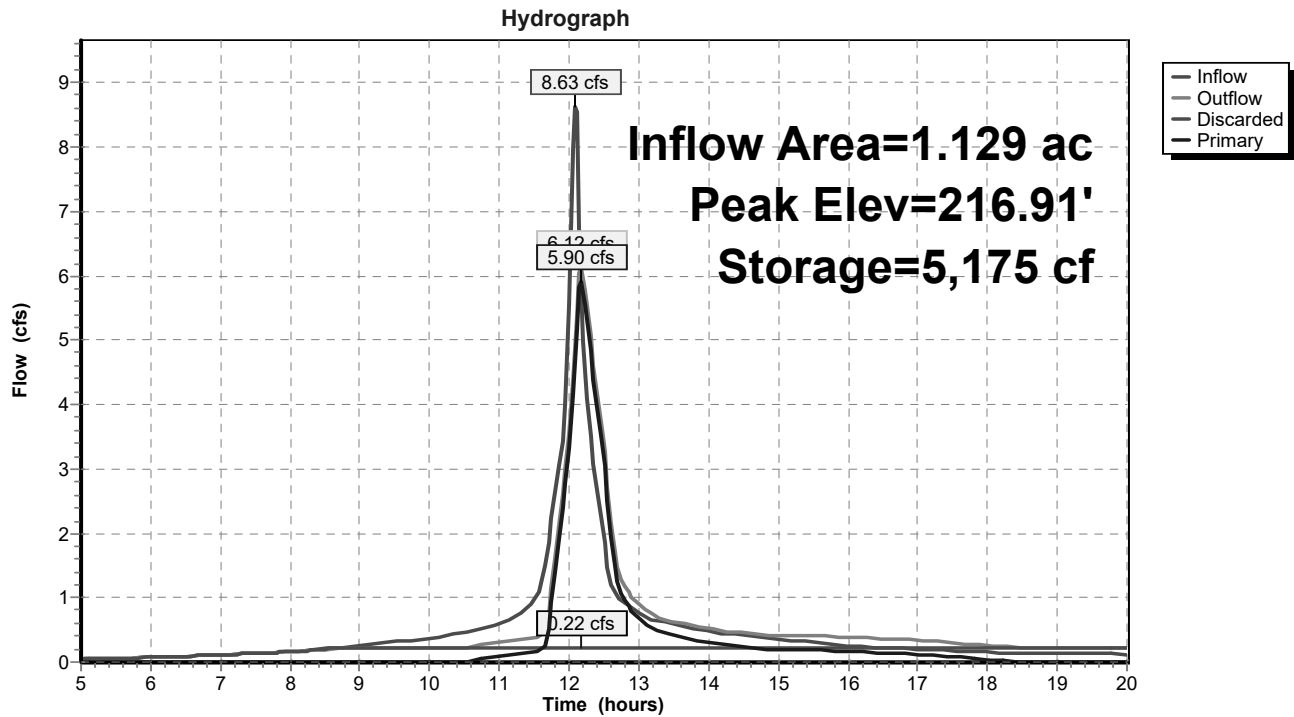
Prepared by Hudson Land Design, P.C.

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511 Fishkill Avenue Post Conditions  
Type III 24-hr 100 YEAR Rainfall=8.29"

Printed 1/28/2019

**Pond 10P: CULTEC RECHARGER 330 XL**



**APPENDIX F**

**STORMWATER MANAGEMENT PRACTICE DESIGN**

Project: 511 Fishkill Avenue  
 Description: Stormwater Management Design  
 By/Date: DGK 12/21/2018 (revised 1/29/2019) Reviewed/Date: AG 1/29/2019



**STORMWATER MANAGEMENT PRACTICE:**  
**Subcatchment 10**

**1) Determine Required Water Quality Volume & Stormwater Management Practice**

Water quality volume to be treated will be calculated using the 90th percentile rainfall from Chapter 10 of the New York State Storm Water Design Manual (January 2015), hereinafter referred to as NYSSDM.

$$WQ_v = 43,560 \times [P \times R_v \times A] / 12$$

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

Watershed	P (in)	Impervious Area (ac)	Impervious (Coverage %)	R <sub>v</sub>	Total Area (ac)	WQ <sub>v</sub> (cf)	Pre-Treatment Practice	Treatment Practice
Subcatchment 10	1.40	0.720	63.7	0.62	1.130	3,580	WQ Inlet	Infiltration

Note: Pretreatment will be handled via hydrodynamic device

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

Design Infiltration Rate (I<sub>d</sub>): 4.00 inches per hour

**3) Determine Required Pre-Treatment Volume**

Determine Pre-Treatment Volume

Design Infiltration Rate: 4.00 inches per hour  
 Required Minimum Pretreatment Volume: 50%

Watershed	Required WQ <sub>v</sub> (cf)	Required Pre-Treatment Volume (cf)	Pre-Treatment Practice	Treatment Practice
Subcatchment 10	3,580	1,790	WQ Inlet	Infiltration

Notes:  
 1) Pretreatment volumes per § 6.3.3 of the NYSSDM (January 2015).

**4) Determine Runoff Reduction Volume (RR<sub>v</sub>)**

Goal: Provide 100% RR<sub>v</sub> by implementing Green Infrastructure techniques and Stormwater Management Practices

$$RR_v = 43,560 \times [P \times R_v \times A] / 12$$

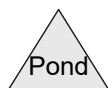
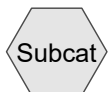
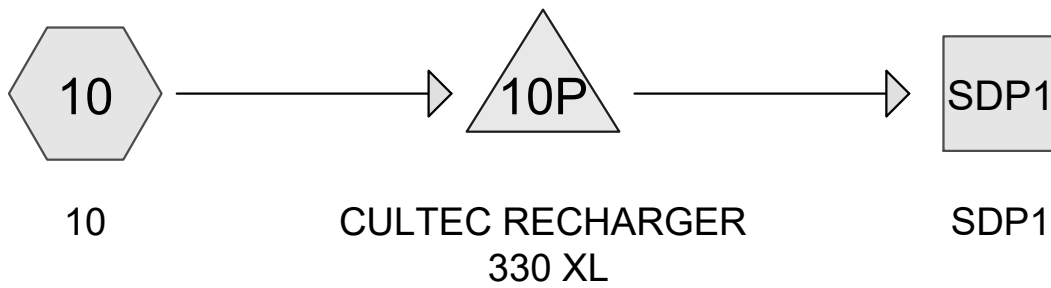
Where:  
 RR<sub>v</sub> = Runoff Reduction Volume (cf)  
 P = 90 % Rainfall Event Number (in), per Figure 4.1  
 R<sub>v</sub> = 0.05 + 0.009 x I, where I is % impervious area  
 A = Watershed (ac)  
 R<sub>v</sub>: 0.62  
 100% RR<sub>v</sub>: 3,580 cf  
 \* Minimum R<sub>v</sub> of 0.2 not applicable to RR<sub>v</sub> calculations (use actual calculated R<sub>v</sub>).

For projects that cannot meet 100% RR<sub>v</sub>: Implement Specific Reduction Factor (S), which provides an absolute minimum acceptable RR<sub>v</sub>.

Drainage Area with Hydrologic Soil Group A:	0.000 acres	Corresponding S: 0.55
Drainage Area with Hydrologic Soil Group B:	0.000 acres	Corresponding S: 0.40
Drainage Area with Hydrologic Soil Group C:	0.000 acres	Corresponding S: 0.30
Drainage Area with Hydrologic Soil Group D:	1.130 acres	Corresponding S: 0.20
Total Area:	1.130 acres	Calculated S: 0.20
Total Area Matches		

Minimum RR<sub>v</sub> (acre-feet) = [(P)(R<sub>v</sub>)(A<sub>i</sub>)]/12  
 Calculated A<sub>i</sub>: 0.144  
 Calculated R<sub>v</sub>\*: 0.95  
 Calculated Minimum RR<sub>v</sub>: 695 cf

Where:  
 P = 90 % Rainfall Event Number (in), per Figure 4.1  
 R<sub>v</sub>\* = 0.05 + 0.009 x I, where I is % impervious area (100%)  
 A<sub>i</sub> = (S)(A<sub>ic</sub>)  
 A<sub>ic</sub> = Total area of new impervious cover





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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.342	80	>75% Grass cover, Good, HSG D (10)
0.002	96	Gravel surface, HSG D (10)
0.717	98	Paved parking, HSG D (10)
0.068	77	Woods, Good, HSG D (10)

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.129	HSG D	10
0.000	Other	

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.342	0.000	0.342	>75% Grass cover, Good	10
0.000	0.000	0.000	0.002	0.000	0.002	Gravel surface	10
0.000	0.000	0.000	0.717	0.000	0.717	Paved parking	10
0.000	0.000	0.000	0.068	0.000	0.068	Woods, Good	10

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Type III 24-hr WQv Rainfall=1.40"

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### Summary for Subcatchment 10: 10

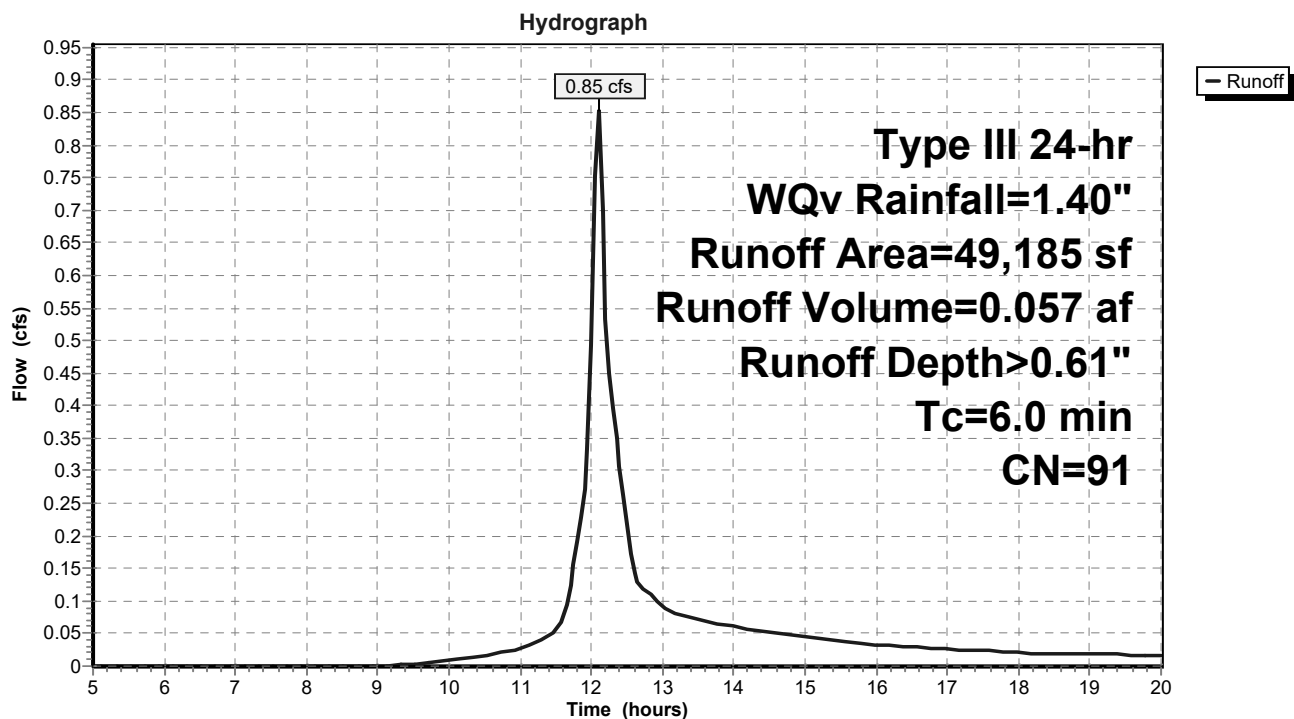
Runoff = 0.85 cfs @ 12.09 hrs, Volume= 0.057 af, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr WQv Rainfall=1.40"

Area (sf)	CN	Description
14,881	80	>75% Grass cover, Good, HSG D
31,242	98	Paved parking, HSG D
2,968	77	Woods, Good, HSG D
94	96	Gravel surface, HSG D
49,185	91	Weighted Average
17,943		36.48% Pervious Area
31,242		63.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, S1

### Subcatchment 10: 10



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Type III 24-hr WQv Rainfall=1.40"

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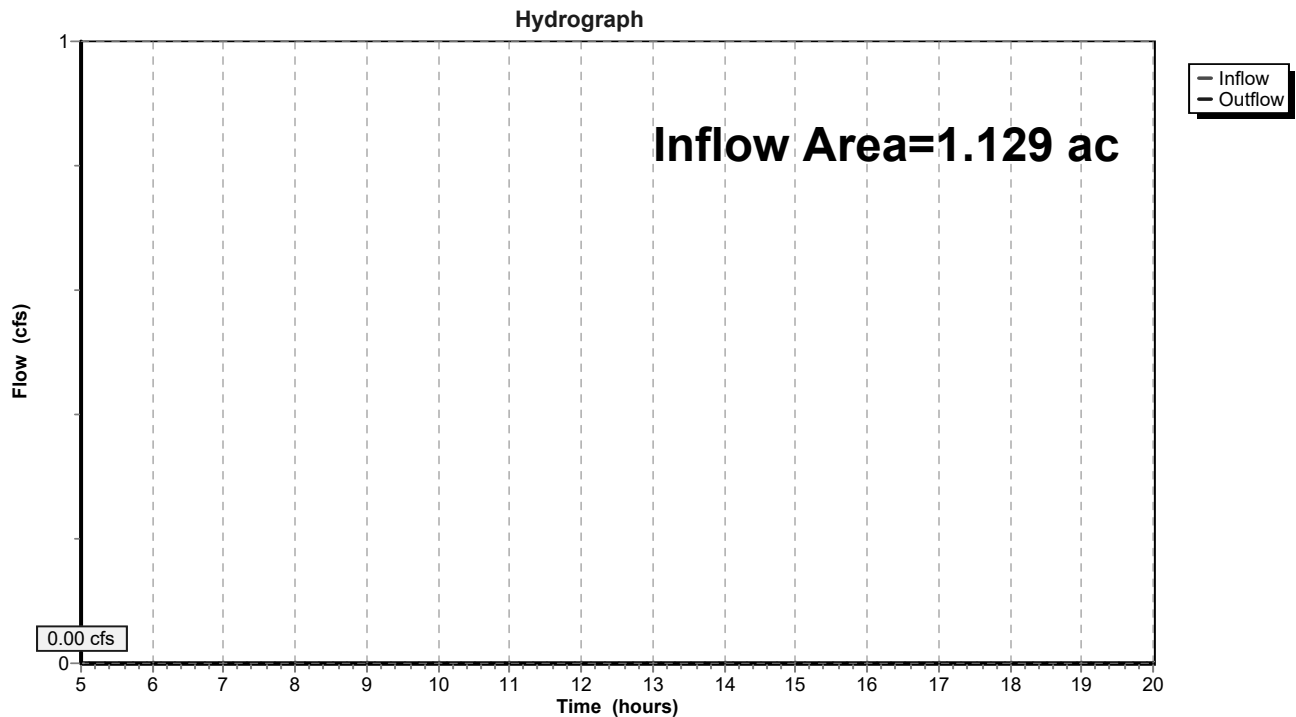
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### Summary for Reach SDP1: SDP1

Inflow Area = 1.129 ac, 63.52% Impervious, Inflow Depth = 0.00" for WQv event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach SDP1: SDP1



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Type III 24-hr WQv Rainfall=1.40"

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**Summary for Pond 10P: CULTEC RECHARGER 330 XL**

Inflow Area = 1.129 ac, 63.52% Impervious, Inflow Depth > 0.61" for WQv event  
 Inflow = 0.85 cfs @ 12.09 hrs, Volume= 0.057 af  
 Outflow = 0.22 cfs @ 12.50 hrs, Volume= 0.057 af, Atten= 74%, Lag= 24.3 min  
 Discarded = 0.22 cfs @ 12.50 hrs, Volume= 0.057 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 214.11' @ 12.50 hrs Surf.Area= 2,346 sf Storage= 589 cf

Plug-Flow detention time= 16.9 min calculated for 0.057 af (100% of inflow)  
 Center-of-Mass det. time= 16.5 min ( 816.2 - 799.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	213.55'	1,986 cf	<b>35.33'W x 66.40'L x 3.55'H Prismaoid</b> 8,328 cf Overall - 3,364 cf Embedded = 4,964 cf x 40.0% Voids
#2	214.05'	3,364 cf	<b>Cultec R-330XLHD x 63 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 7 rows
		5,350 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	213.50'	<b>12.0" Round Culvert X 4.00</b> L= 31.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 213.50' / 212.80' S= 0.0226 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	214.15'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	214.95'	<b>21.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#4	Discarded	213.55'	<b>4.000 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 11.00'

**Discarded OutFlow** Max=0.22 cfs @ 12.50 hrs HW=214.11' (Free Discharge)  
 ↳ **4=Exfiltration** ( Controls 0.22 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=213.55' (Free Discharge)  
 ↳ **1=Culvert** (Passes 0.00 cfs of 0.04 cfs potential flow)  
 ↳ ↳ **2=Orifice/Grate** ( Controls 0.00 cfs)  
 ↳ ↳ **3=Orifice/Grate** ( Controls 0.00 cfs)

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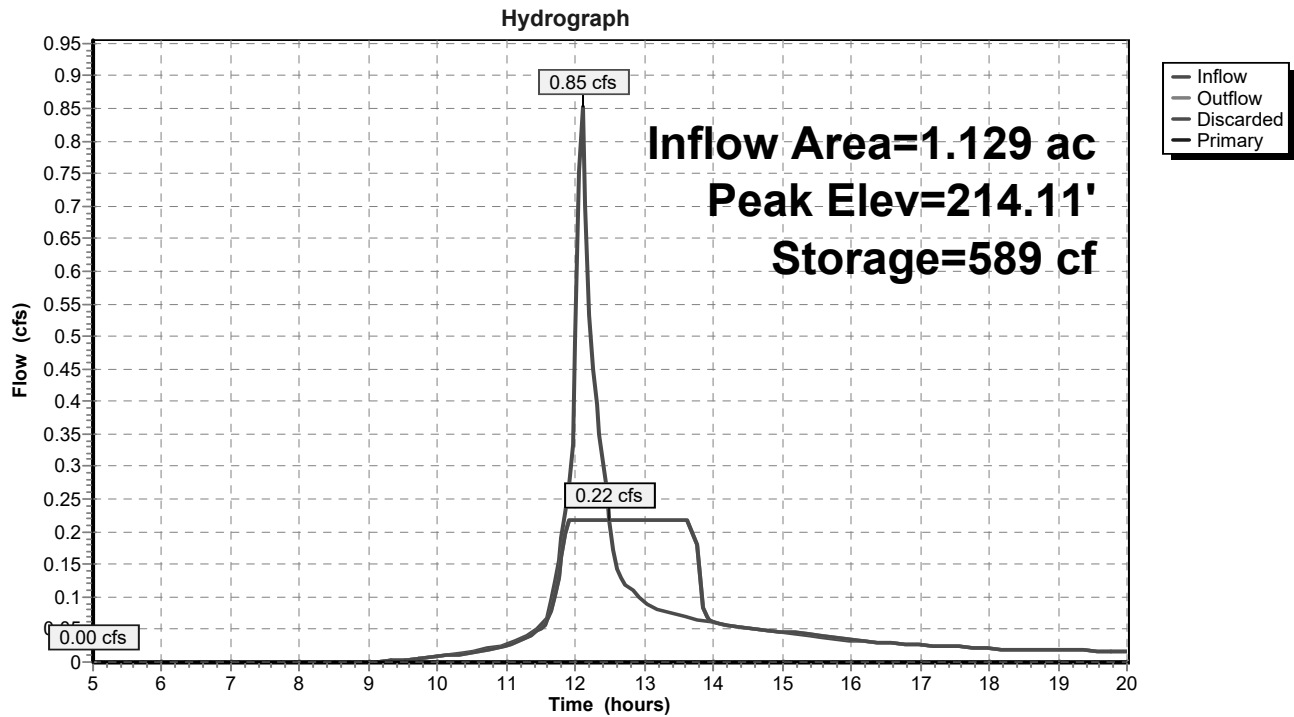
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Type III 24-hr WQv Rainfall=1.40"

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**Pond 10P: CULTEC RECHARGER 330 XL**



# D E E P   T E S T   R E S U L T S

Date: 12/05/2018

Name of property: 511 Fishkill Avenue

(C) Beacon

TAX GRID #

--	--	--	--	--	--	--	--	--	--	--	--	--	--

Owner of property: Diamond Properties, LLC

Engineer: Hudson Land Design

Person directing test: Daniel G. Koehler, P.E.

C/o Beacon Rep: Eric Rogge, P.E.

HOLE #	LOT #	TOTAL DEPTH	ROCK DEPTH	WATER DEPTH	MOTTLING DEPTH	SOIL DESCRIPTION
DT-1	1	100"	None Observed	None Observed	None Observed	0"-6" TOPSOIL, 6"-24" SANDY-CLAY LOAM WITH GRAVEL, 24"-48" SANDY-CLAY LOAM WITH COBBLES, 48"-100" BROWN SILTY-CLAY LOAM WITH COBBLES
DT-2	1	101"	None Observed	None Observed	None Observed	0"-6" TOPSOIL, 6"-30" SANDY-CLAY LOAM WITH GRAVEL, 30"-101" SILTY-CLAY LOAM WITH COBBLES

General remarks (terrain; weather; springs, streams, etc.)

---



## INFILTRATION TEST DATA

Project: 511 Fishkill Avenue

City of Beacon

Date: 12/02/2018

By: Daniel G. Koehler, P.E.

Test Hole #	Test Hole Bottom Elevation	Soil Type	Soaked	TEST RUNS					
				*	1	2	3	4	5
IT 1	212.0	Brown Silty-Clay Loam	Yes	Finish	14:15	15:15	16:15		
				Start	13:15	14:15	15:15		
				Depth (in)	8"	6"	4"		

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: 12/02/2017

Signature: \_\_\_\_\_

License No. (P.E.) \_\_\_\_\_

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:

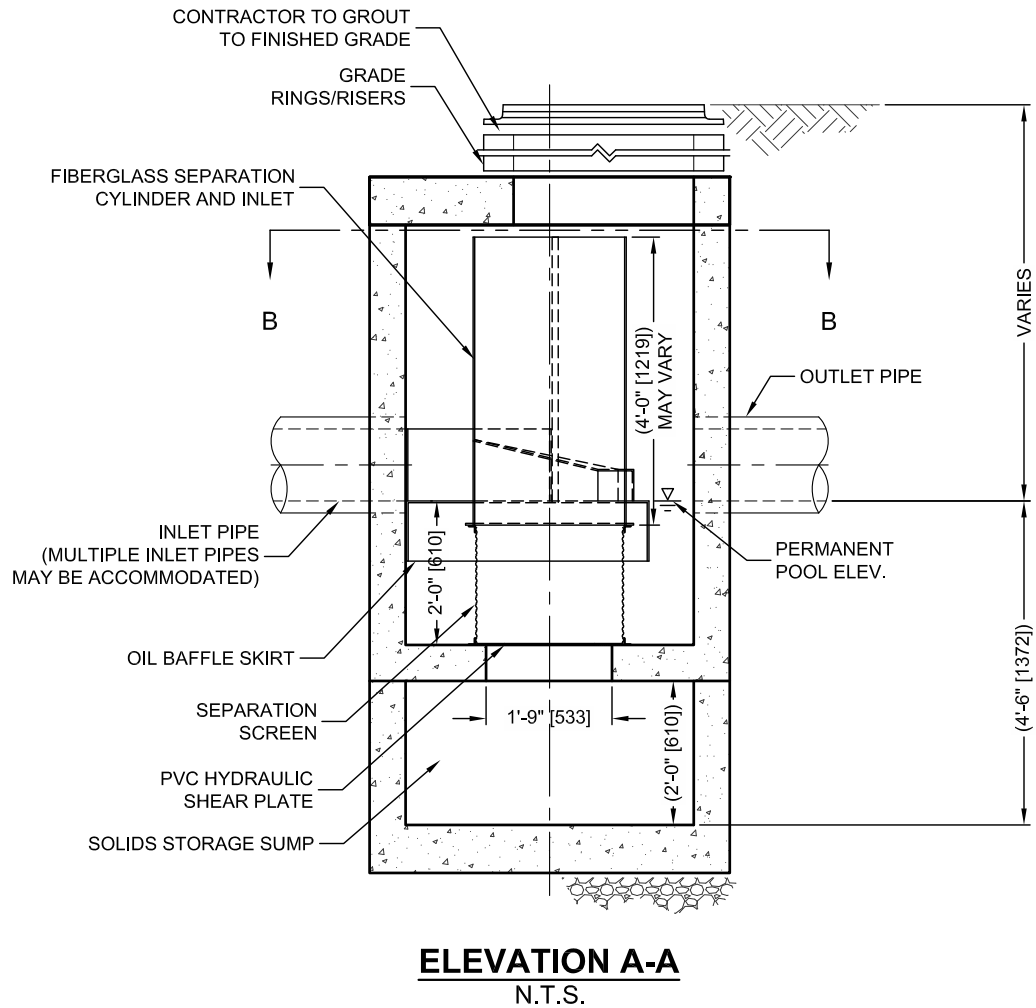
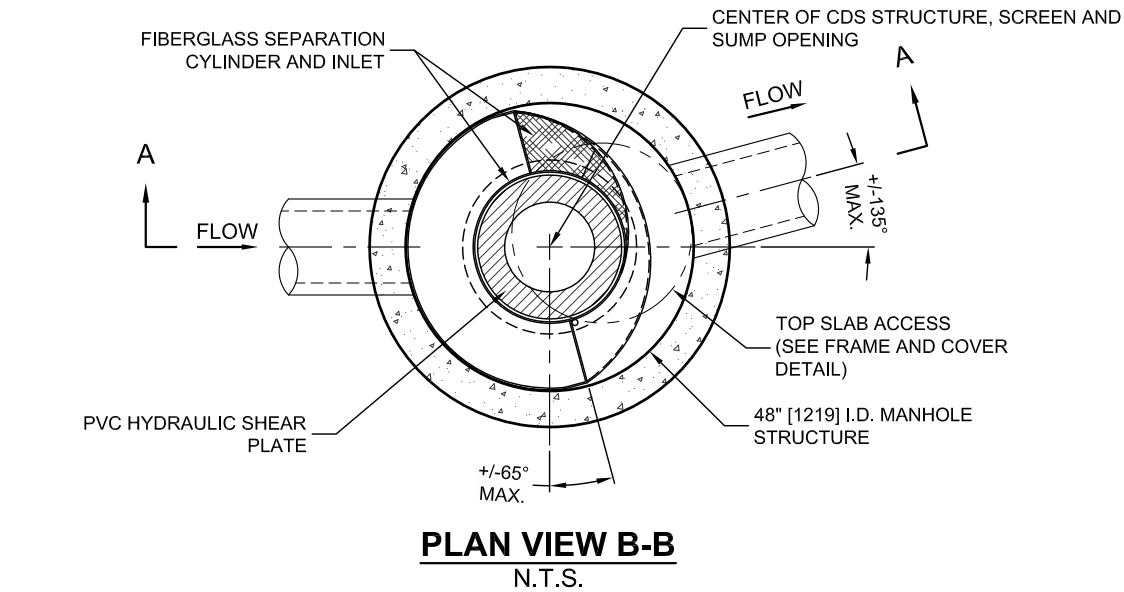
Structure ID	Treatment Device	NYSDEC Approved Treatment Flow (cfs)
WQI1	CDS2015-4 (CDS-4)	0.93

#### 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.

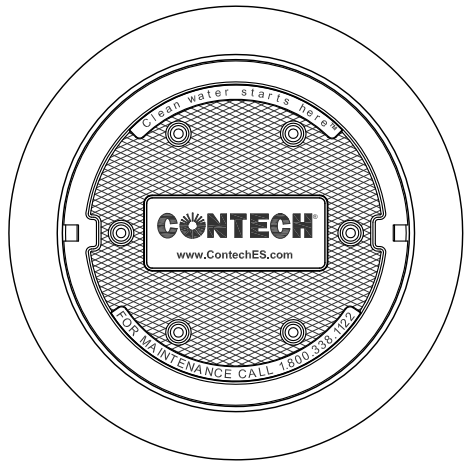
Please contact us if you have any questions or need any additional information. Again, thank you for your interest in the CDS system. We look forward to receiving your feedback and working with you.

I:\COMMON\CAD\TREATMENT\22 CDS\40 STANDARD DRAWINGS\IN\DEP NAMING-SIZING\CDS-CDWG\CDS-4-C DTL.DWG 1/17/2017 10:12 AM



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**
- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
  - DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
  - FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. [www.ContechES.com](http://www.ContechES.com)
  - CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
  - 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.
  - 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**
- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
  - CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
  - CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
  - CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
  - 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](http://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

## 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.

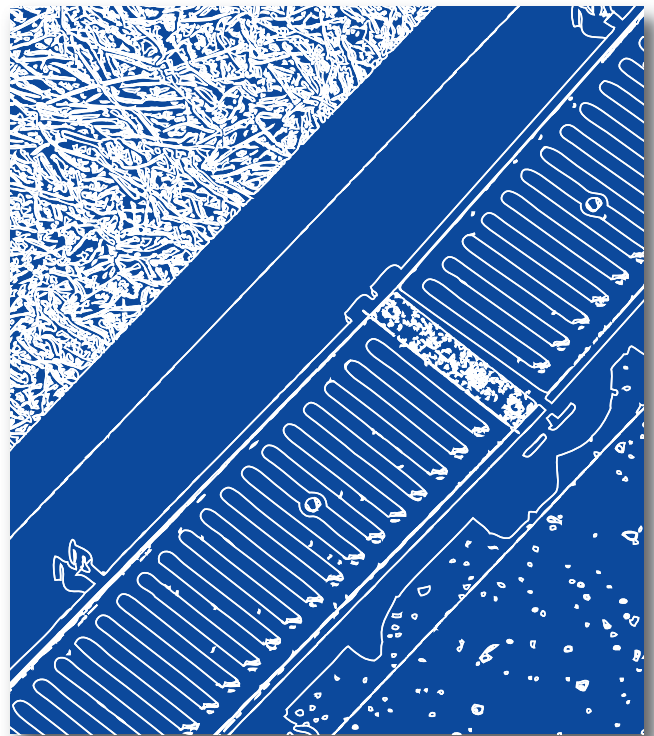
[amessina@cultec.com](mailto:amessina@cultec.com) **Direct:** 475-289-7115 **Office:** 203-775-4416 ext. 115 [www.cultec.com](http://www.cultec.com)  

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# TECHNICAL SPECIFICATION GUIDE

## **EZ-TRACK™** **DURA SLOPE™ TRENCH DRAIN SYSTEM**



### **NDS Customer Service**

851 N. Harvard Ave, Lindsay, CA 93247

Phone: (800) 726-1994 • (559) 562-9888

Fax: (800) 726-1998 • (559) 562-4488

[www.NDSPRO.com](http://www.NDSPRO.com)



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This information is relevant *only* to the product(s) identified within this document and is not intended for use with any other products. Please consult NDS Technical Services at (888) 825-4716 or e-mail TechService@NDSPRO.COM if you have any questions pertaining to specifications, installations, or recommended applications that are beyond the scope of this document.  
 BEFORE BEGINNING ANY PROJECT, CONSULT A CURRENT EDITION OF THESE SPECS AT: WWW.NDSPRO.COM

## Overview

NDS, the leading manufacturer of structural foam polyolefin drainage structures and landscape products, is pleased to introduce the EZ-Track<sup>™</sup> Dura Slope<sup>™</sup> Trench Drain System.

The EZ-Track<sup>™</sup> Dura Slope<sup>™</sup> Trench Drain System is comprised of dependable, high-quality Dura Slope<sup>™</sup> and the new Dura Slope<sup>™</sup> Radius Coupling. Designed specifically for track installations, the radius coupling allows 3 degrees of movement between each Dura Slope<sup>™</sup> channel section, making an 80 to 120 foot radius easily achievable. With its lightweight channel and interlocking pieces that snap smoothly into place, the EZ-Track<sup>™</sup> system saves time and labor while providing a superior drainage system that is simple to maintain.

Each component of the EZ-Track<sup>™</sup> Dura Slope<sup>™</sup> Trench Drain System has been specifically designed and manufactured to ensure strength, structural integrity, and durability while incorporating excellent hydraulic characteristics and chemical resistance. The new EZ-Track<sup>™</sup> system presents an economical and lightweight alternative to traditional polymer concrete trench drain systems, while offering ease of installation.

### NDS Customer Service

851 N. Harvard Ave, Lindsay, CA 93247  
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Fax: (800) 726-1998 • (559) 562-4488  
[www.NDSPRO.com](http://www.NDSPRO.com)

## Product Specifications

### Dura Slope™ Trench Drains

<b>Material</b>	Manufactured from molded, structural foam HDPE with UV inhibitors.
<b>Channel Sizes</b>	48" length, 6" width, 3.998" to 12.062" inner depth range.
<b>Strength</b>	Material withstands a compressive strength of 2,900 psi, with a material tensile stress of 4,550 psi and material flexural strength of 5,800 psi.
<b>Weight per Unit</b>	Ranges between 7.452 lbs. for shallow trench drains to 16.06 lbs for deep trench drains
<b>Pre-Sloped Run Lengths</b>	194 feet of continuous slope; 266 feet with neutral sections added.
<b>Pipe Outlet Sizes</b>	3", 4", 6", 8" pipe.

### Dura Slope™ Trench Drain Grates

<b>Materials</b>	Cast iron, ductile iron, plastic (structural foam polyolefin).
<b>Sizes</b>	24" length, 6" width.
<b>Weight per Unit</b>	Ranges between 2.92 lbs. for polyolefin to 16.0 lbs. for ductile iron.
<b>Colors</b>	Black, gray, white, green, sand, red.
<b>Load Class</b>	Loads are based upon encasing the product in concrete, and on grate selection. Plastic (structural foam polyolefin) meets Class B load rating (61-175 psi), while ductile iron and cast iron meet Class D load rating (326-575 psi).

### Dura Slope™ Radius Couplings

<b>Material</b>	Manufactured from molded, structural foam HDPE with UV inhibitors.
<b>Sizes</b>	All couplings are 1.125" long and 6.95" wide, and are available with inner depths of 6.35", 7.36", 8.37", and 9.37".

### Dura Slope™ Radius Coupling Grates

<b>Materials</b>	Plastic (structural foam polyolefin), ductile iron.
<b>Sizes</b>	1.125" length, 6" width.
<b>Colors</b>	Black, gray, white, green, sand, red
<b>Load Class</b>	Loads are based upon encasing the product in concrete, and on grate selection. Plastic (structural foam polyolefin) meets Class B load rating (61-175 psi), while ductile iron meets Class D load rating (326-575 psi)..



## Product Features

### Durable Material:

Polyethylene is tough and hard to break, not brittle like polymer concrete, reducing breakage and eliminating costly delays. UV inhibitors protect against deterioration and discoloration due to exposure to sunlight.

### Lightweight:

Dura Slope™ is light and easy to carry. At 7.5 to 16 lbs. per trench drain section, there's less time and effort spent to install.

### Ease of Assembly:

Interlocking tongue and groove joints on both Dura Slope™ trench drains and Dura Slope™ radius couplings allow parts to slide into place easily, then lock with a snap. No special tools, clamps or screws are needed.



### Curved Radius Forms Quickly and Easily:

The Dura Slope™ radius coupling has a  $\pm 3^\circ$  range of angular motion. This feature allows Dura Slope™ trench drains to form a curved radius at the end of the track.

### Flexibility of Design:

The EZ-Track™ system allows for flexibility of design by allowing various radii to be created. Extended to its maximum range of  $3.18^\circ$ , the tightest radius possible with one radius coupling between each Dura Slope™ trench drain section would be 72 ft. This would consist of 60 4-foot Dura Slope™ trench drain sections and 59 radius couplings. To obtain a larger radius, simply add additional trench drains and couplings to the length of the run. With EZ-Track™, the most common track radii of 80' - 120' is easily obtained.

### Reduced Clogging of System:

6-inch-wide grates on the Dura Slope™ trench drains and radius couplings mean less debris build up and clogging than a slot drain, with a higher inflow capacity. To clean out the drain, simply remove the grate.

### Neutral and Sloped Sections Available:

While the EZ-Track™ radius sections remain neutral to allow for the insertion of the radius coupling, EZ-Track™ straight runs may be sloped or neutral due to the offerings of the Dura Slope™ product line. For an example of an application with both neutral and sloped sections, please refer to the "EZ-Track™ Applications" section of this guide.

### Joints Locked on Straight Runs:

DuraLoc™ integral joint lock between sections of Dura Slope™ trench drain prevent joint movement during installation, securing alignment and ensuring straight trench drain runs.

### Various Grate Options:

EZ-Track™ offers grates that are ADA compliant, as well as a heel-proof option. Grates are available in cast iron, ductile iron, and plastic.

### Blank Grates and Grate Screws Included:

Each section of Dura Slope™ trench drain comes with a blank grate insert that eliminates the use of plywood. Each Dura Slope™ radius coupling includes a standard grate, which can be used as a blank or as a functioning grate. Grate screws are included with all Dura Slope™ trench drains and radius couplings.

### Traffic Rated:

Depending on the grate selection, EZ-Track™ is rated up to Class D, for heavy vehicular traffic.

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## Dura Slope™ Trench Drain System

### Material Composition

Dura Slope™ is manufactured from molded, structural foam HDPE with UV inhibitors, with a nominal outside top dimension of 6-5/8" (168.3mm). Trench drain has an inside nominal flow path width of 4" (101.6mm), with a bottom radius of 2" (50.8mm) to facilitate sediment removal. The system includes neutral and pre-sloped sections to provide variable trench depth as required by site conditions. Pre-sloped sections have a slope of 0.7%.

Dura Slope™ trench drain and grates are designed to withstand loads up to Load Class D (up to 575psi), when installed per the appropriate installation methods (see NDS installation instructions and grate specifications included in the Dura Slope™ catalog). Grates are installed per manufacturer load rating recommendations, and are attached to the trench drain using stainless steel screws with the manufacturer-supplied Pro Fit™ locking system. The trench drain includes Leveloc™ integral re-bar supports located at 24" (60cm) intervals along each side of the trench drain to provide height adjustment using #4 re-bar (1/2") during installation. The trench drain has tongue and groove Dura Loc™ joints that ensure precise alignment during installation, with snap-lock mechanisms to eliminate joint movement.

### Molding Technique

Dura Slope™ is proudly manufactured in the U.S.A. in Lindsay, California. The trench drains are injection molded to exacting specifications to a temperature range that will not damage the molecular chain of the polymer. The use of high quality resins coupled with computerized manufacturing technologies guarantees the Dura Slope™ trench drain system will preserve in strength over time.

### Testing Methods

The Dura Slope™ trench drain and grates undergo a battery of tests with each production run, as is the process with all of the products manufactured by NDS. All of the manufacturing tests are conducted within the manufacturing cycle to assure a quality-finished product.

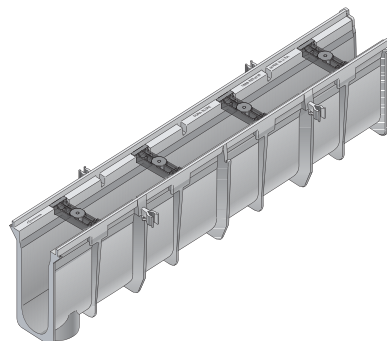
Compression tests are used to determine the load strength of NDS trench drains. Material absorption rate shall not exceed .01%. Material shall withstand a compressive strength of 2900 psi. Material tensile stress shall be 4550 psi and material flexural strength shall be 5800 psi. The Dura Slope™ System has the ability to withstand freeze/thaw cycles and provide chemical resistance, including road salt.

# DURA SLOPE™

## TRENCH DRAINS

Dura Slope™ is a 6-5/8" wide, 4-foot-long trench drain system. Each trench drain section is molded of gray structural foam polyethylene with UV inhibitors, and has a 4" inside diameter with a 2" radius bottom. The system consists of 4-foot trench drain sections, including 24 pre-sloped trench drain sections and 9 neutral trench drain sections. The sloped trench drain sections have a built-in slope of 0.7%, and enable the system to extend to a length of 96 feet with a continuous slope.

Offering trench drains in both neutral and pre-sloped sections of various depths allow for flexibility of design, and make the EZ-Track™ Dura Slope™ trench drain system ideal for a wide range of track applications.



Part No.	Description	Flow Rate GPM	Min. Inner Depth	Max. Inner Depth	Min. Outer Depth	Max. Outer Depth	Wt. Ea. (lbs.)
DS-090N	3.99" Deep Neutral Dura Slope™ Trench Drain	75	3.998	3.998	5.354	5.760	7.45
DS-091	3.99" to 4.34" Deep Dura Slope™ Trench Drain	75	3.998	3.998	5.690	5.770	7.52
DS-091N	4.34" Deep Neutral Dura Slope™ Trench Drain	89	4.334	4.334	5.692	6.103	7.81
DS-092	4.34" to 4.67" Deep Dura Slope™ Trench Drain	89	4.334	4.670	6.062	6.106	7.92
DS-093	4.67" to 5.00" Deep Dura Slope™ Trench Drain	103	4.670	5.006	6.362	6.442	8.27
DS-094	5.00" to 5.34" Deep Dura Slope™ Trench Drain	117	5.006	5.342	6.698	6.778	8.64
DS-094N	5.34" Deep Neutral Dura Slope™ Trench Drain	131	5.342	5.342	6.700	7.111	8.93
DS-095	5.34" to 5.68" Deep Dura Slope™ Trench Drain	131	5.342	5.678	7.034	7.114	8.99
DS-096	5.68" to 6.01" Deep Dura Slope™ Trench Drain	145	5.678	6.014	7.370	7.450	9.36
DS-097	6.01" to 6.35" Deep Dura Slope™ Trench Drain	159	6.014	6.350	7.706	7.786	9.74
DS-097N	6.35" Deep Neutral Dura Slope™ Trench Drain	173	6.350	6.350	7.708	8.119	10.04
DS-098	6.35" to 6.69" Deep Dura Slope™ Trench Drain	173	6.350	6.686	8.042	8.122	10.11
DS-099	6.69" to 7.02" Deep Dura Slope™ Trench Drain	187	6.686	7.022	8.378	8.458	10.48
DS-100	7.02" to 7.36" Deep Dura Slope™ Trench Drain	201	7.022	7.358	8.714	8.794	10.86
DS-100N	7.36" Deep Neutral Dura Slope™ Trench Drain	215	7.358	7.358	8.716	9.127	11.16
DS-101	7.36" to 7.69" Deep Dura Slope™ Trench Drain	215	7.358	7.694	9.050	9.130	11.23
DS-102	7.69" to 8.03" Deep Dura Slope™ Trench Drain	229	7.694	8.030	9.386	9.466	11.60
DS-103	8.03" to 8.37" Deep Dura Slope™ Trench Drain	243	8.030	8.366	9.722	9.802	11.98
DS-103N	8.37" Deep Neutral Dura Slope™ Trench Drain	257	8.366	8.366	9.724	10.135	12.27
DS-104	8.37" to 8.70" Deep Dura Slope™ Trench Drain	257	8.366	8.702	10.058	10.138	12.34
DS-105	8.70" to 9.04" Deep Dura Slope™ Trench Drain	271	8.702	9.038	10.394	10.474	12.71
DS-106	9.04" to 9.37" Deep Dura Slope™ Trench Drain	285	9.038	9.374	10.730	10.810	13.07
DS-106N	9.37" Deep Neutral Dura Slope™ Trench Drain	299	9.374	9.374	10.732	11.143	13.39
DS-107	9.37" to 9.70" Deep Dura Slope™ Trench Drain	299	9.374	9.710	11.066	11.146	13.4
DS-108	9.70" to 10.05" Deep Dura Slope™ Trench Drain	313	9.710	10.046	11.402	11.482	13.83
DS-109	10.05" to 10.38" Deep Dura Slope™ Trench Drain	327	10.046	10.382	11.738	11.818	14.20
DS-109N	10.38" Deep Neutral Dura Slope™ Trench Drain	341	10.382	10.382	11.740	12.151	14.50
DS-110	10.38" to 10.71" Deep Dura Slope™ Trench Drain	341	10.382	10.718	12.074	12.154	14.57
DS-111	10.71" to 11.05" Deep Dura Slope™ Trench Drain	355	10.718	11.054	12.410	12.490	14.95
DS-112	11.05" to 11.39" Deep Dura Slope™ Trench Drain	368	11.054	11.390	12.746	12.826	15.32
DS-112N	11.39" Deep Neutral Dura Slope™ Trench Drain	382	11.390	11.390	12.785	13.158	15.6
DS-113	11.39" to 11.72" Deep Dura Slope™ Trench Drain	382	11.390	11.726	13.082	13.162	15.69
DS-114	11.72" to 12.06" Deep Dura Slope™ Trench Drain	396	11.726	12.062	13.418	13.498	16.06

Note: All dimensions are nominal. All weights are for shipping purposes only. Availability is subject to change.

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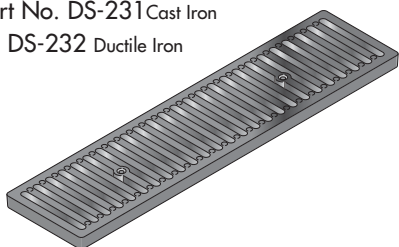
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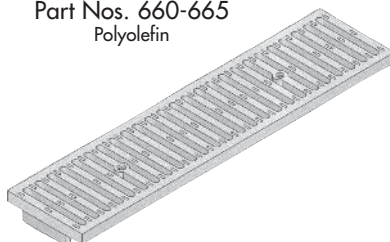
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# DURA SLOPE™ TRENCH DRAIN GRATES

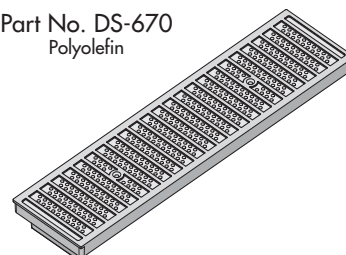
Part No. DS-231 Cast Iron  
DS-232 Ductile Iron



Part Nos. 660-665  
Polyolefin



Part No. DS-670  
Polyolefin



Part No.	Description	Color	Pkg. Qty.	Wt. Ea. (lbs.)	Inflow Capacity (GPM)	Specifications
660	2 ft. Trench Drain Grate	White	12	2.92	27	2 ft. structural foam polyolefin secured trench drain grate with UV inhibitors. ADA compliant. Open surface area 20.61 square inches per foot.
661	2 ft. Trench Drain Grate	Dark Gray	12	2.92	27	
661LG	2 ft. Trench Drain Grate	Gray	12	2.92	27	
662	2 ft. Trench Drain Grate	Green	12	2.92	27	
663	2 ft. Trench Drain Grate	Black	12	2.92	27	
664	2 ft. Trench Drain Grate	Sand	12	2.92	27	
665	2 ft. Trench Drain Grate	Brick Red	12	2.92	27	
DS-670	2 ft. Plastic Perforated Trench Drain Grate	Gray	12	3.0	11.3	2 ft. structural foam polyolefin, secured trench drain grate with UV inhibitors, light traffic rated, heel-proof, ADA compliant. Open surface area 9.36 square inches per foot. .
DS-231	2 ft. Cast Iron Trench Drain Grate	Black	1	15.00	22.6	2 ft. heavy duty cast iron trench drain grate. ADA compliant Open surface area 15.27 square inches per foot. H-20 Load Rating.
DS-232	2 ft. Ductile Iron Trench Drain Grate	Black	1	16.00	22.6	2 ft. heavy duty ductile iron trench drain grate. ADA compliant Open surface area 15.27 square inches per foot. H-20 Load Rating.

All Dura Slope™ Trench Drain Grates are ADA Compliant

Part No. DS-670 is Heel-Proof

Use with Dura Slope™ Trench Drains and Dura Slope™ Catch Basins

# DURA SLOPE<sup>™</sup>

## RADIUS COUPLINGS

Dura Slope<sup>™</sup> radius couplings are made from 100% high density polyethylene, and are injection molded to exacting specifications.

Each radius coupling comes with a plastic (HDPE) standard grate attached with two grate screws. The standard grate can be utilized as a blank grate insert (eliminating the use of plywood during installation), but also functions as a plastic grate with a Class B load rating of 61-175 psi.

### Radius Coupling Depths

Dura Slope<sup>™</sup> radius couplings are available in four neutral depths, and were designed to connect neutral Dura Slope<sup>™</sup> trench drain sections of the same depth. For a guide to the Dura Slope<sup>™</sup> trench drain sections and their corresponding radius coupling, see the table below:



DSRC-103

DSRC-097

Radius Coupling Part Number and Description	Corresponding Dura Slope <sup>™</sup> Trench Drain
DSRC-097: 6.35" Deep Dura Slope <sup>™</sup> Radius Coupling	DS-097N: 6.35" Deep Neutral Dura Slope <sup>™</sup> Trench Drain
DSRC-100: 7.36" Deep Dura Slope <sup>™</sup> Radius Coupling	DS-100N: 7.36" Deep Neutral Dura Slope <sup>™</sup> Trench Drain
DSRC-103: 8.37" Deep Dura Slope <sup>™</sup> Radius Coupling	DS-103N: 8.37" Deep Neutral Dura Slope <sup>™</sup> Trench Drain
DSRC-106: 9.37" Deep Dura Slope <sup>™</sup> Radius Coupling	DS-106N: 9.37" Deep Neutral Dura Slope <sup>™</sup> Trench Drain

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# DURA SLOPE™ RADIUS COUPLING GRATES



Part No. DS-681LGMG  
(included with every radius  
coupling)

Part Nos. DS-660MG - 665MG  
Polyolefin

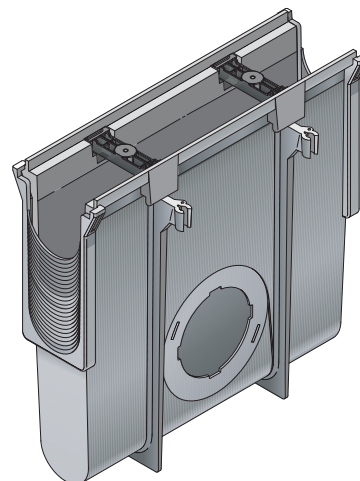
Part No. DS-232MG  
Ductile Iron

Part No.	Description	Color	Pkg. Qty.	Wt. Ea. (lbs.)	Load Class	Specifications
DS-660MG	1.25" Plastic Slotted Radius Coupling Grate	White	6	0.08	Class B (61-175 psi)	Structural Foam Polyolefin Radius Coupling Mini Grate with UV inhibitors
DS-661MG	1.25" Plastic Slotted Radius Coupling Grate	Dark Gray	6	0.08	Class B (61-175 psi)	Structural Foam Polyolefin Radius Coupling Mini Grate with UV inhibitors
DS-661LGMG	1.25" Plastic Slotted Radius Coupling Grate	Light Gray	6	0.08	Class B (61-175 psi)	Structural Foam Polyolefin Radius Coupling Mini Grate with UV inhibitors
DS-662MG	1.25" Plastic Slotted Radius Coupling Grate	Green	6	0.08	Class B (61-175 psi)	Structural Foam Polyolefin Radius Coupling Mini Grate with UV inhibitors
DS-663MG	1.25" Plastic Slotted Radius Coupling Grate	Black	6	0.08	Class B (61-175 psi)	Structural Foam Polyolefin Radius Coupling Mini Grate with UV inhibitors
DS-664MG	1.25" Plastic Slotted Radius Coupling Grate	Sand	6	0.08	Class B (61-175 psi)	Structural Foam Polyolefin Radius Coupling Mini Grate with UV inhibitors
DS-665MG	1.25" Plastic Slotted Radius Coupling Grate	Brick Red	6	0.08	Class B (61-175 psi)	Structural Foam Polyolefin Radius Coupling Mini Grate with UV inhibitors
DS-681LGMG	1.25" Plastic Standard Radius Coupling Grate	Light Gray	6	0.16	Class B (61-175 psi)	Structural Foam Polyolefin Radius Coupling Mini Grate with UV inhibitors
DS-232MG	1.25" Ductile Iron Radius Coupling Grate	Black	6	0.93	Class D (326-575 psi)	Heavy Duty Ductile Iron Radius Coupling Mini Grate

All Dura Slope™ Radius Coupling Grates are ADA Compliant  
Part No. DS-681LGMG is Heel-Proof

## DURA SLOPE™ CATCH BASIN

The Dura Slope™ in-line Catch Basin is designed to fit all depth ranges of the Dura Slope™ trench drain sections. Catch basin inlets are designed to be sized as required to accept the Dura Slope™ trench drain section. The Dura Slope™ catch basin is 2 feet long and 2 feet deep with an outlet on both sides of the basin. One Universal Adapter Plug, one blank grate insert and two grate screws are included with each Dura Slope™ in-line catch basin. NDS universal basin outlets are used to adapt the catch basin to 3", 4", 6" and 8" pipe.



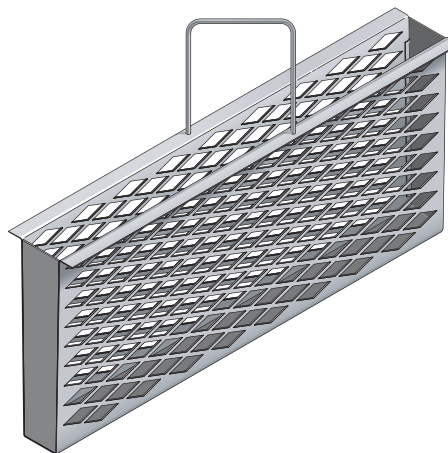
Part No.	Description	Color	Pkg. Qty.	Wt. Ea. (lbs.)	Product Class
DS-340	Dura Slope in-line Catch Basins  DS-340 Available for use of one or two outlets Use #1242, #1243, #1245, #1266, #1206, or #1888 Universal Outlets	Gray	1	12.00	25DS
Note: All dimensions are nominal. All weights are for shipping purposes only. Availability is subject to change.					

# DURA SLOPE<sup>™</sup>

## TRASH BUCKET

The Dura Slope<sup>™</sup> Trash Bucket is made to fit inside the Dura Slope<sup>™</sup> Catch Basin (part number DS-340). It has a handle for easy removal to clean leaves and debris; it requires removal of the grate. Made of zinc plated steel, it is durable to climatic conditions. The Trash Bucket is not intended for use with any of the Dura Slope<sup>™</sup> trench drains..

Note – DS-240 Trash Bucket is not for use with the DS-200 Ductile Iron Frame.



Part No.	Description	Color	Pkg. Qty.	Wt. Ea. (lbs.)	Product Class
DS-240	Dura Slope Trash Bucket Trash Bucket fits inside DS340 Catch Basin Note – DS-240 Trash Bucket is not for use with the DS-200 Ductile Iron Frame.	Steel Zinc Plated Steel	1	5.0	25DS
Note: All dimensions are nominal. All weights are for shipping purposes only. Availability is subject to change.					

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## EZ-Track™ Applications

The majority of full track applications will require a radius within 80 –130 feet, as recommended by the American Sports Builders Association (ASBA).

Depth of the trench drain, sloped vs. non-sloped runs, and number of catch basins required per system will vary with the volume of water and surface area requiring drainage, and should be assessed on a site-to-site basis.

Following are two potential track applications and the materials list for each.

### Application Example 1:

Track Radius: 103 ft. (complies with standards set for NFHS competition)

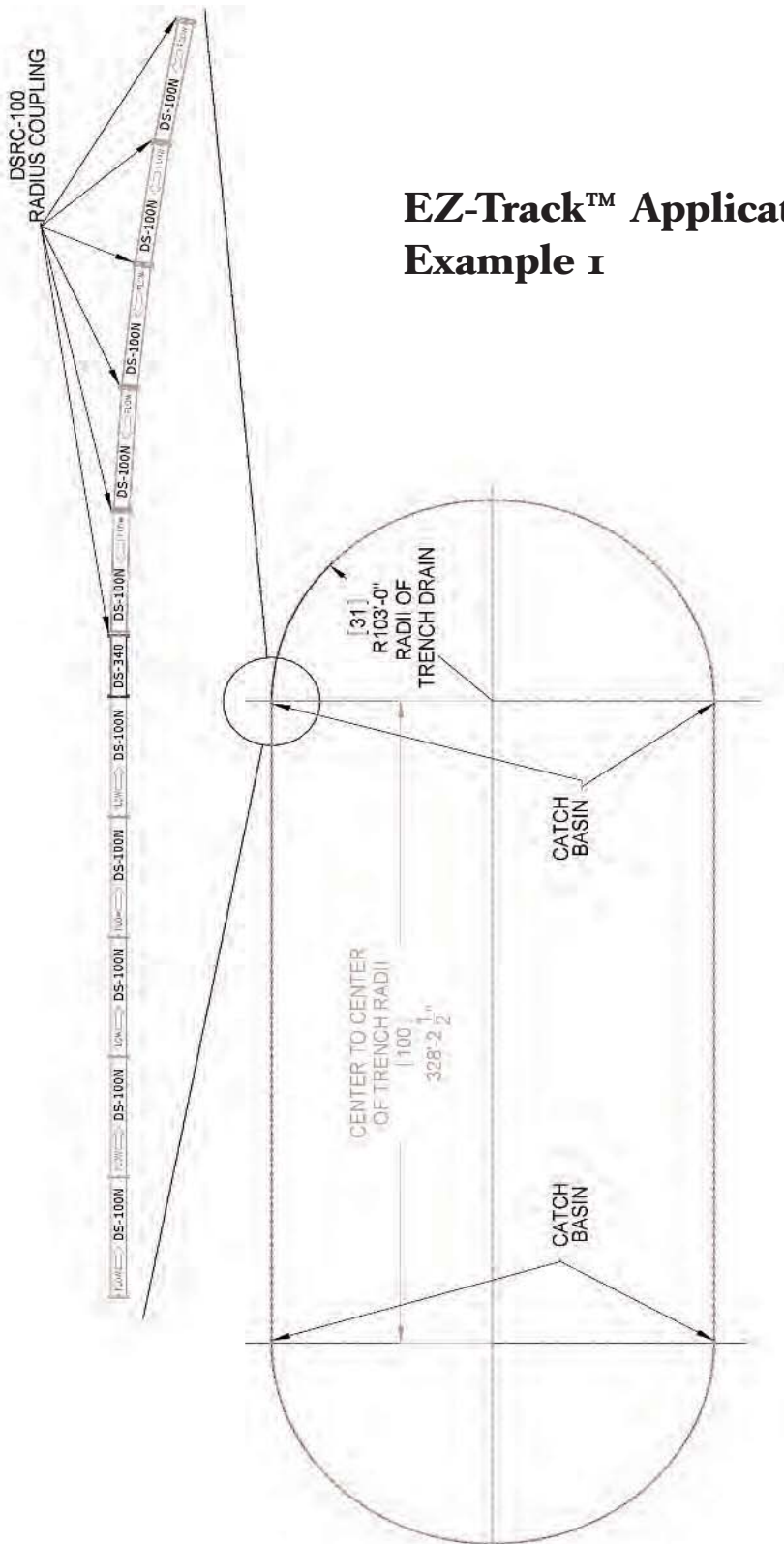
Sloped or Non-Sloped: All non-sloped

Number of Catch Basins: 4

Trench Drain Depth: 7.36"

Grate Selection: Ductile Iron (black).

Qty	Description	Part Number	Package Qty.
320	4' x 7.36" Dura Slope™ Trench Drain	DS-100N	1
644	2' Ductile Iron Trench Drain Grate	DS-232	1
4	2' Dura Slope™ In-Line Catch Basin	DS-340	1
4	6" Universal Locking Outlet	1266	20
160	1.125" x 7.36" Dura Slope™ Radius Coupling	DSRC-100	6
160	1.25" Radius Coupling Ductile Iron Mini Grate	DS-232MG	6



## EZ-Track™ Application Example 1

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## Application Example 2:

Track Radius: 103 ft. (complies with standards set for NFHS competition)

Sloped or Non-Sloped: Non-sloped on radii, sloped on straight runs

Number of Catch Basins: 4

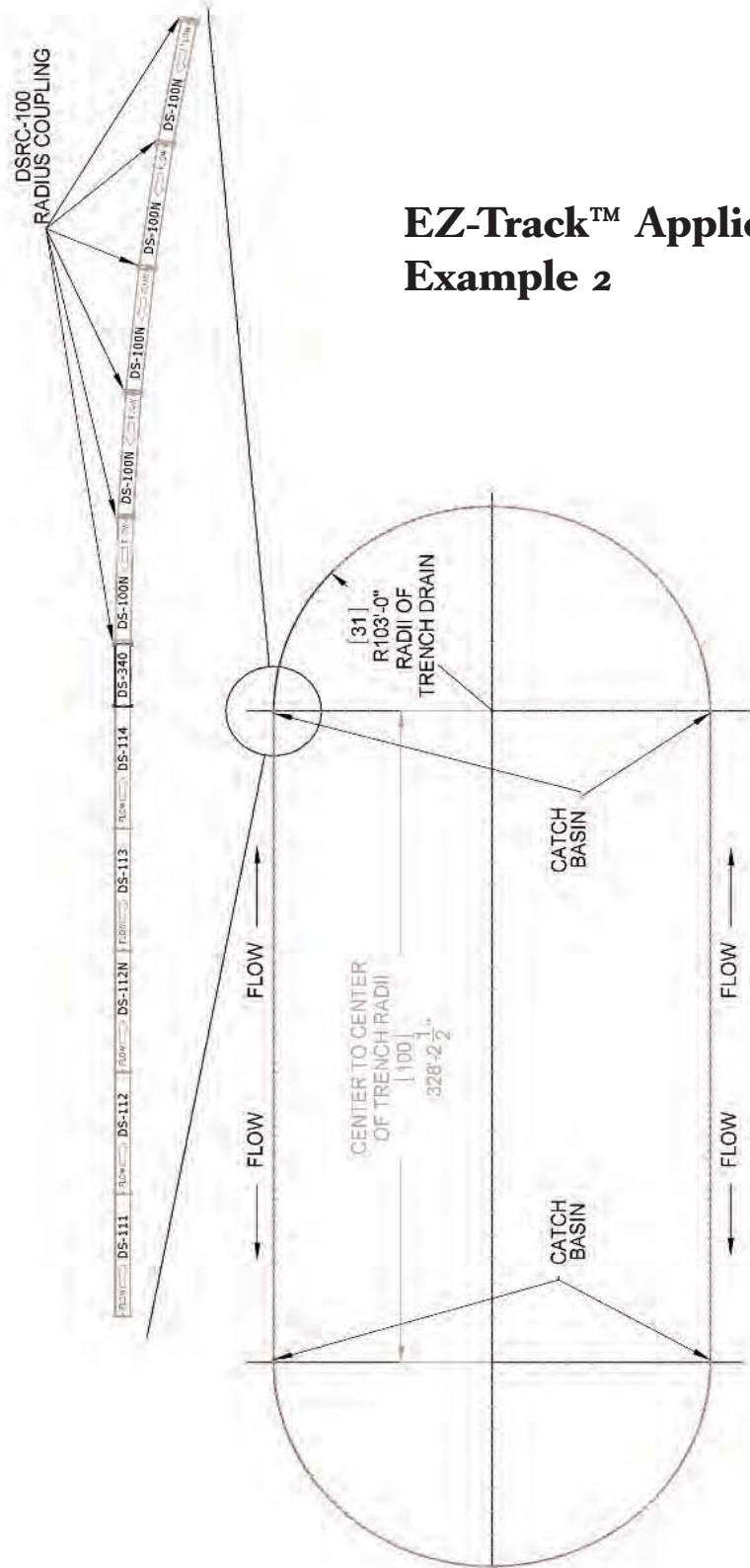
Trench Drain Depth: 7.36" on the radii, 3.99" to 12.06" on straight runs

Grate Selection: Plastic slotted (light gray)

## Materials List:

Qty	Description	Part Number
6	3.99" Deep Neutral Dura Slope™ Trench Drain	DS-090N
4	3.99" to 4.34" Deep Dura Slope™ Trench Drain	DS-091
8	4.34" Deep Neutral Dura Slope™ Trench Drain	DS-091N
4	4.34" to 4.67" Deep Dura Slope™ Trench Drain	DS-092
4	4.67" to 5.00" Deep Dura Slope™ Trench Drain	DS-093
4	5.00" to 5.34" Deep Dura Slope™ Trench Drain	DS-094
8	5.34" Deep Neutral Dura Slope™ Trench Drain	DS-094N
4	5.34" to 5.68" Deep Dura Slope™ Trench Drain	DS-095
4	5.68" to 6.01" Deep Dura Slope™ Trench Drain	DS-096
4	6.01" to 6.35" Deep Dura Slope™ Trench Drain	DS-097
8	6.35" Deep Neutral Dura Slope™ Trench Drain	DS-097N
4	6.35" to 6.69" Deep Dura Slope™ Trench Drain	DS-098
4	6.69" to 7.02" Deep Dura Slope™ Trench Drain	DS-099
4	7.02" to 7.36" Deep Dura Slope™ Trench Drain	DS-100
166	7.36" Deep Neutral Dura Slope™ Trench Drain	DS-100N
4	7.36" to 7.69" Deep Dura Slope™ Trench Drain	DS-101
4	7.69" to 8.03" Deep Dura Slope™ Trench Drain	DS-102
4	8.03" to 8.37" Deep Dura Slope™ Trench Drain	DS-103
8	8.37" Deep Neutral Dura Slope™ Trench Drain	DS-103N
4	8.37" to 8.70" Deep Dura Slope™ Trench Drain	DS-104
4	8.70" to 9.04" Deep Dura Slope™ Trench Drain	DS-105
4	9.04" to 9.37" Deep Dura Slope™ Trench Drain	DS-106
8	9.37" Deep Neutral Dura Slope™ Trench Drain	DS-106N
4	9.37" to 9.70" Deep Dura Slope™ Trench Drain	DS-107
4	9.70" to 10.05" Deep Dura Slope™ Trench Drain	DS-108
4	10.05" to 10.38" Deep Dura Slope™ Trench Drain	DS-109
8	10.38" Deep Neutral Dura Slope™ Trench Drain	DS-109N
4	10.38" to 10.71" Deep Dura Slope™ Trench Drain	DS-110
4	10.71" to 11.05" Deep Dura Slope™ Trench Drain	DS-111
4	11.05" to 11.39" Deep Dura Slope™ Trench Drain	DS-112
4	11.39" Deep Neutral Dura Slope™ Trench Drain	DS-112N
4	11.39" to 11.72" Deep Dura Slope™ Trench Drain	DS-113
4	11.72" to 12.06" Deep Dura Slope™ Trench Drain	DS-114
644	2' Plastic Channel Grate	661
4	2' Dura Slope™ In-Line Catch Basin	DS-340
4	8" Universal Outlet	1888
160	1.125" x 7.36" Dura Slope™ Radius Coupling	DSRC-100
160	1.25" Plastic Slotted Radius Coupling Mini Grate	DS-681LGMG

## EZ-Track™ Application Example 2



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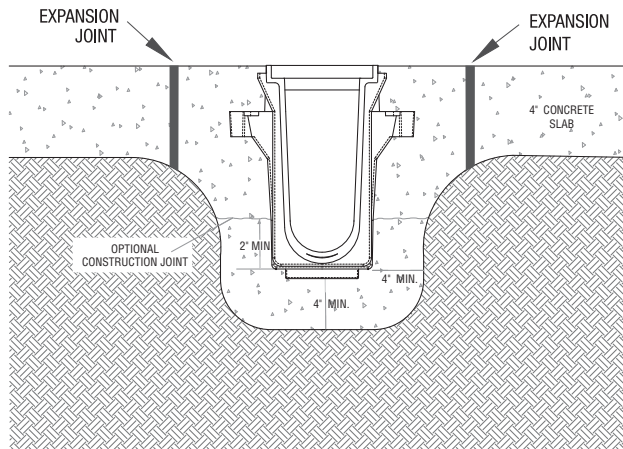
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## LOAD CLASS INSTALLATION

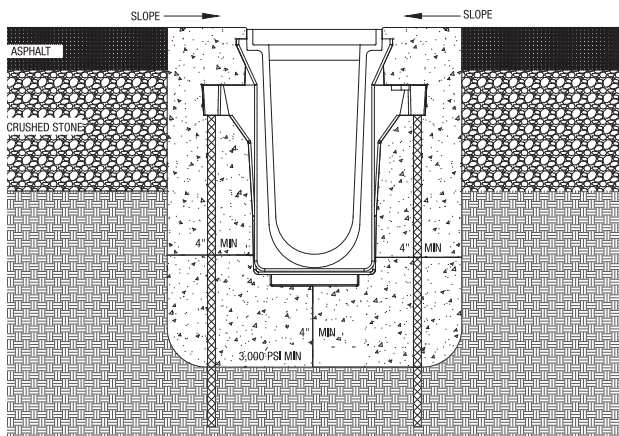
Note: For all load class installations recess Dura Slope below grade: 1/4" for vehicular traffic, 1/8" for pedestrian traffic. When using iron frame DS-200 no additional recess is needed.

### Class A

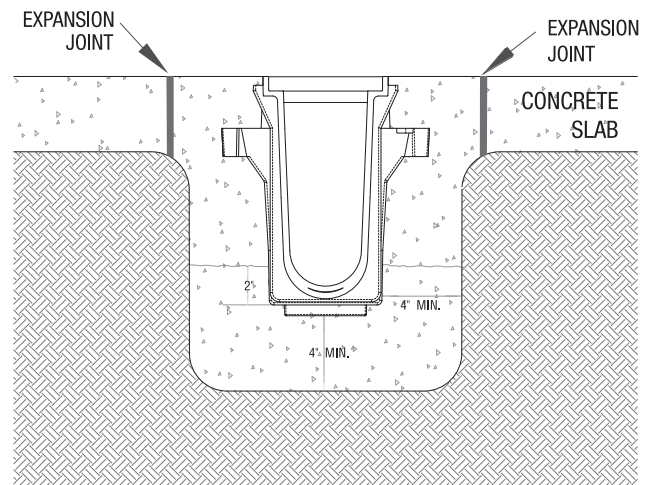


Set trench drain in channel surrounded by 4" of concrete or thickness of the concrete slab with a minimum of 2,500 psi.

### Class B



Set trench drain in channel surrounded by 4" of concrete with a minimum of 3,000 psi. Install #4 re-bar to stabilize drain while concrete is being poured. Make sure re-bar is 1" below finished surface.



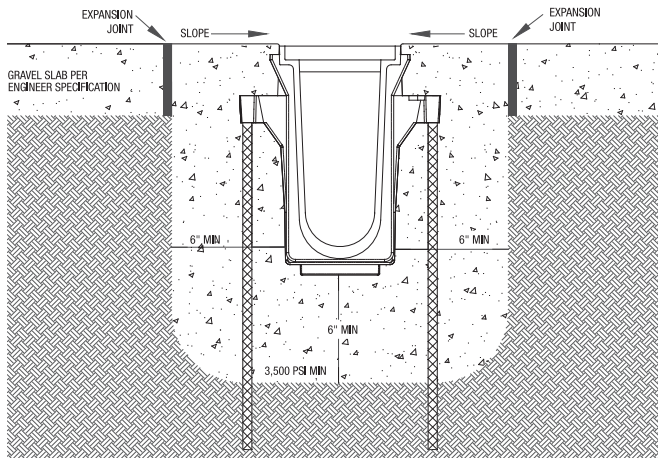
Set trench drain in channel surrounded by 4" of concrete or thickness of the concrete slab with a minimum of 3,000 psi.



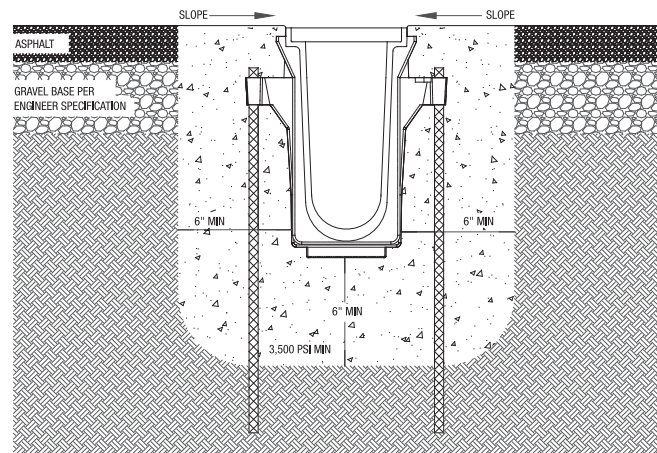
## LOAD CLASS INSTALLATION

Note: For all load class installations recess Dura Slope below grade: 1/4" for vehicular traffic, 1/8" for pedestrian traffic. When using iron frame DS-200 no additional recess is needed.

### Class C

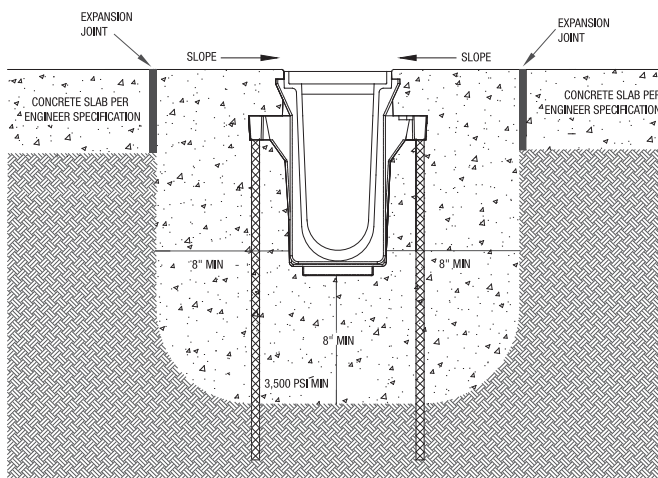


Set trench drain in channel surrounded by 6" of concrete with a minimum of 3,500 psi. Install #4 re-bar to stabilize drain while concrete is being poured. Make sure re-bar is 1" below finished surface.



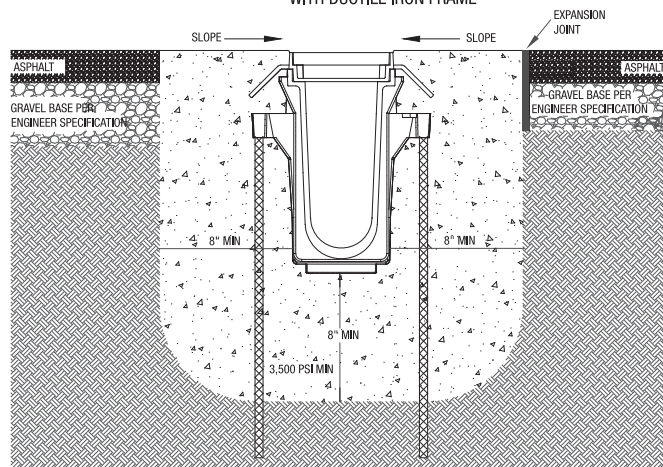
Set trench drain in channel surrounded by 6" of concrete with a minimum of 3,500 psi. Install #4 re-bar to stabilize drain while concrete is being poured. Make sure re-bar is 1" below finished surface.

### Class D



Set trench drain in channel surrounded by 8" of concrete with a minimum of 3,500 psi. Install #4 re-bar to stabilize drain while concrete is being poured. Make sure re-bar is 1" below finished surface.

USE ONLY DS-231 CAST IRON  
OR DS-232 DUCTILE IRON GRATES  
WITH DUCTILE IRON FRAME



Set trench drain in channel surrounded by 8" of concrete with a minimum of 3,500 psi. Install #4 re-bar to stabilize drain while concrete is being poured. Make sure re-bar is 1" below finished surface.

#### NDS Customer Service

851 N. Harvard Ave, Lindsay, CA 93247

Phone: (800) 726-1994 • (559) 562-9888

Fax: (800) 726-1998 • (559) 562-4488

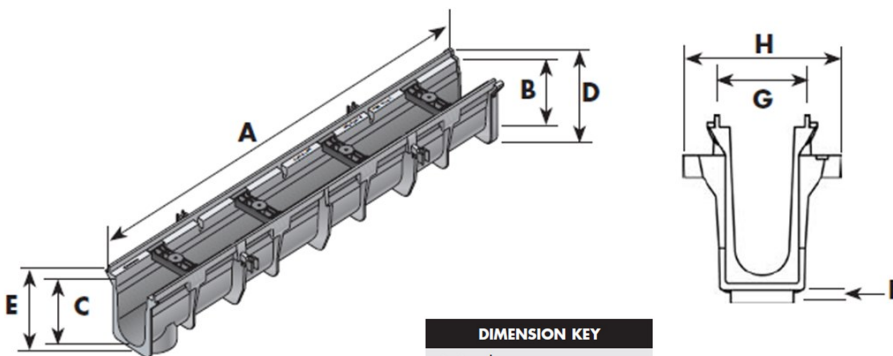
[www.NDSPRO.com](http://www.NDSPRO.com)



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851 N. Harvard Ave, Lindsay, CA 93247  
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## DURA SLOPE<sup>TM</sup> CHANNEL DRAINS

**Specifications:** NDS Dura Slope<sup>TM</sup> is a 6 $\frac{1}{8}$ " wide, 48" long trench drain system with a built-in slope of 0.7%. Each channel section is molded of gray structural foam polyethylene with UV inhibitors and has a 4" inside diameter with a 2" radius bottom. The system consists of 4-foot channel sections including 24 pre-sloped channel sections and 9 neutral channel sections. The sloped channel sections enable the system to extend to a length of 96 feet with a continuous slope. Add neutral channels to extend the system run to an excess of 132 feet. By incorporating central collection through the use of the catch basin assembly, the Dura Slope<sup>TM</sup> trench drain system can be extended to lengths up to 266 feet. Dura Slope<sup>TM</sup> channels are designed with the pre-installed ProFit<sup>TM</sup> locking system, which maintains structural integrity during installation and locking devices for the grating. LevelLoc<sup>TM</sup> integral re-bar supports are located at 24" intervals along each side of the channel and contain an internal protruding knob designed to grip #3 or #4 re-bar ( $\frac{3}{8}$ " –  $\frac{1}{2}$ " for easier channel height adjustment during installation. DuraLoc<sup>TM</sup> tongue and groove ends connect allowing for a precise fit and ensure straight channel runs, incorporating an integral snap-lock feature that prevents joint movement during channel installation. Each channel section is molded with a bottom outlet allowing for system versatility and ensuring proper drainage. Expansion joints must be provided parallel to each side of the drain run.



### DIMENSION KEY

A: Length  
 B: Min. Inner Depth  
 C: Max. Inner Depth  
 D: Min. Outer Depth  
 E: Max. Outer Depth

### COMMON DIMENSION FOR ALL CHANNEL SECTIONS

F: Bottom Outlet Depth 0.65"  
 G: Width 6"  
 H: Re-bar Lock Width 10.185"

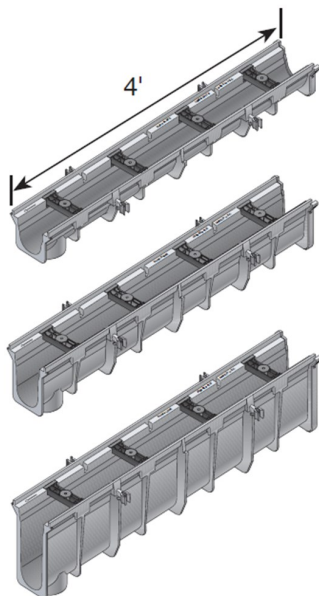
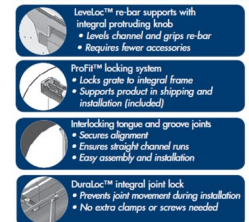
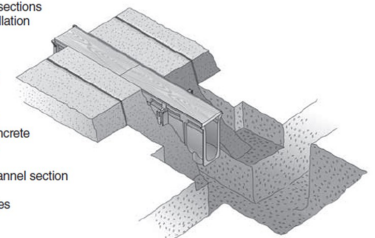
Lightweight 4 ft. modular sections  
 Easier handling and installation  
 Lower freight costs

2" radius bottom  
 Minimizes debris build-up

Polyethylene material  
 Durable and inexpensive  
 Less breakage versus concrete  
 High chemical resistance

Bottom outlet on each channel section  
 System versatility  
 Requires fewer accessories

0.7% built-in slope  
 Maintain optimum flow rates throughout system



PART NUMBERS	WEIGHT (LBS)	FLOW RATE GPM	LPM	A	B	C	D	E	PRODUCT CLASS
DS-090N	7.452	75	284	48"	3.998	3.998	5.354	5.760	25DS
DS-091	7.524	75	284	48"	3.998	4.334	5.690	5.770	25DS
DS-091N	7.812	89	337	48"	4.334	4.334	5.692	6.103	25DS
DS-092	7.929	89	337	48"	4.334	4.670	6.026	6.106	25DS
DS-a093	8.269	103	390	48"	4.670	5.006	6.362	6.442	25DS
DS-094	8.638	117	443	48"	5.006	5.342	6.698	6.778	25DS
DS-094N	8.926	131	496	48"	5.342	5.342	6.700	7.111	25DS
DS-095	8.998	131	496	48"	5.342	5.678	7.034	7.114	25DS
DS-096	9.369	145	549	48"	5.678	6.014	7.370	7.450	25DS
DS-097	9.741	159	602	48"	6.014	6.350	7.706	7.786	25DS
DS-097N	10.040	173	655	48"	6.350	6.350	7.708	8.119	25DS
DS-098	10.112	173	655	48"	6.350	6.686	8.042	8.122	25DS
DS-099	10.484	187	708	48"	6.686	7.022	8.378	8.458	25DS
DS-100	10.856	201	761	48"	7.022	7.358	8.714	8.794	25DS
DS-100N	11.156	215	814	48"	7.358	7.358	8.716	9.127	25DS
DS-101	11.228	215	814	48"	7.358	7.694	9.050	9.130	25DS
DS-102	11.599	229	867	48"	7.694	8.030	9.386	9.466	25DS
DS-103	11.971	243	920	48"	8.030	8.366	9.722	9.802	25DS
DS-103N	12.271	257	973	48"	8.366	8.366	9.724	10.135	25DS
DS-104	12.343	257	973	48"	8.366	8.702	10.058	10.138	25DS
DS-105	12.714	271	1026	48"	8.702	9.038	10.394	10.474	25DS
DS-106	13.086	285	1079	48"	9.038	9.374	10.730	10.810	25DS
DS-106N	13.386	299	1132	48"	9.374	9.374	10.732	11.143	25DS
DS-107	13.458	299	1132	48"	9.374	9.710	11.066	11.146	25DS
DS-108	13.829	313	1185	48"	9.710	10.046	11.402	11.482	25DS
DS-109	14.201	327	1238	48"	10.046	10.382	11.738	11.818	25DS
DS-109N	14.501	341	1291	48"	10.382	10.382	11.740	12.151	25DS
DS-110	14.573	341	1291	48"	10.382	10.718	12.074	12.154	25DS
DS-111	14.945	355	1344	48"	10.718	11.054	12.410	12.490	25DS
DS-112	15.316	369	1393	48"	11.054	11.390	12.746	12.826	25DS
DS-112N	15.616	382	1446	48"	11.390	11.390	12.785	13.158	25DS
DS-113	15.688	382	1446	48"	11.390	11.726	13.082	13.162	25DS
DS-114	16.060	396	1499	48"	11.726	12.062	13.418	13.498	25DS





**Providing Stormwater and  
Septic Solutions Since 1986**

#### **CULTEC, Inc.**

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P.O. Box 280  
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Website: [www.cultec.com](http://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**

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

<b>Chamber Storage</b>	7.459 ft <sup>3</sup> /ft 52.21 ft <sup>3</sup> /unit 391 gal 0.69 m <sup>3</sup> /m 1.48 m <sup>3</sup> /unit 1478.44 L
<b>Min. Installed Storage</b>	11.32 ft <sup>3</sup> /ft 79.26 ft <sup>3</sup> /unit 593 gal 1.05 m <sup>3</sup> /m 2.24 m <sup>3</sup> /unit 2244.25 L
<b>Min. Area Required per Unit</b>	33.83 ft <sup>2</sup> 3.14 m <sup>2</sup>
<b>Min. Center-to-Center Spacing (Design Unit Width)</b>	4.83 ft 1.47 m
<b>Max. Allowable Cover</b>	3.66 m 12 ft
<b>Max. Inlet Opening in End Wall</b>	24 in 600 mm
<b>Max. Allowable O.D. in Side Portal</b>	11.75 in 298 mm
<b>Compatible Feed Connector</b>	<u>HVLV FC-24 Feed Connector</u>

## 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](#)



**CONTECH**<sup>®</sup>  
ENGINEERED SOLUTIONS

CDS<sup>®</sup>



Solutions  
Guide



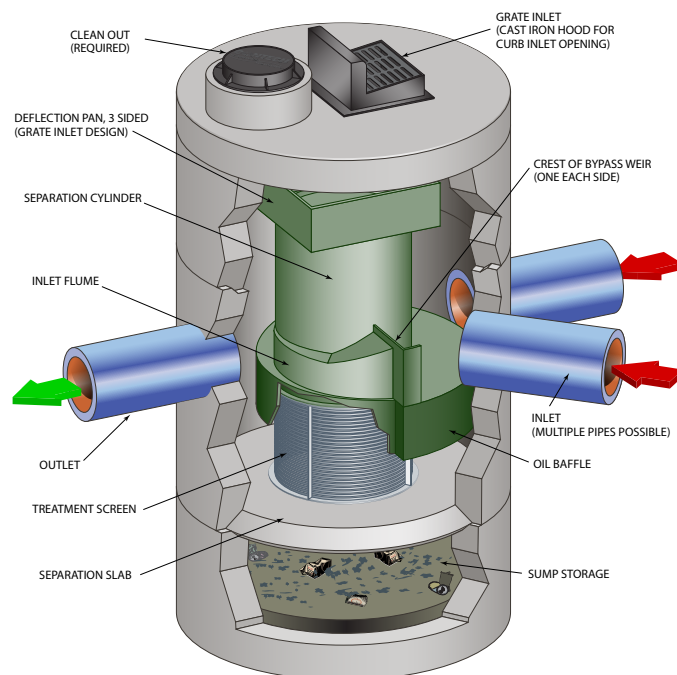
# Continuous Deflective Separation - CDS®



## Superior Stormwater Trash and Sediment Removal

The CDS is a swirl concentrator hybrid technology that uses continuous deflective separation – a combination of swirl concentration and indirect screening to screen, separate and trap debris, sediment, and hydrocarbons from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material debris 2.4 mm or larger, without binding. CDS retains all captured pollutants, even at high flow rates, and provides easy access for maintenance.

CDS is used to meet trash Total Maximum Daily Load (TMDL) requirements, for stormwater quality control, inlet and outlet pollution control, and as pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and a variety of green infrastructure practices.



Learn more about the CDS system at  
[www.ContechES.com/CDS](http://www.ContechES.com/CDS) ❖ ❖ ❖

## CDS® Approvals

CDS has been verified by some of the most stringent stormwater technology evaluation organizations in North America, including:

- Washington State Department of Ecology
- New Jersey Department of Environmental Protection
- Canadian Environmental Technology Verification (ETV)



## CDS® Features & Benefits

Feature	Benefit
1. Captures and retains 100% of floatables and neutrally buoyant debris 2.4 mm or larger	1. Superior pollutant removal
2. Self-cleaning screen	2. Ease of maintenance
3. Isolated storage sump eliminates scour potential	3. Excellent pollutant retention
4. Internal bypass	4. Eliminates the need for additional structures
5. Multiple pipe inlets and 90-180° angles	5. Design flexibility
6. Numerous regulatory approvals	6. Proven performance



# The CDS® Screen

Traditional approaches to trash control typically involve “direct screening” that can easily become clogged, as trash is pinned to the screen as water passes through. Clogged screens can lead to flooding as water backs up.

The design of the CDS screen is fundamentally different. Flow is introduced to the screen face which is louvered so that it is smooth in the downstream direction. The effect created is called “Continuous Deflective Separation.” The power of the incoming flow is harnessed to continually shear debris off the screen and to direct trash and sediment toward the center of the separation cylinder.

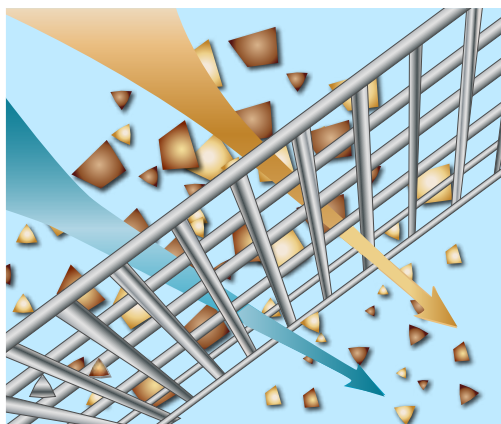
## Key Features:

### Self-Cleaning Screening Technology

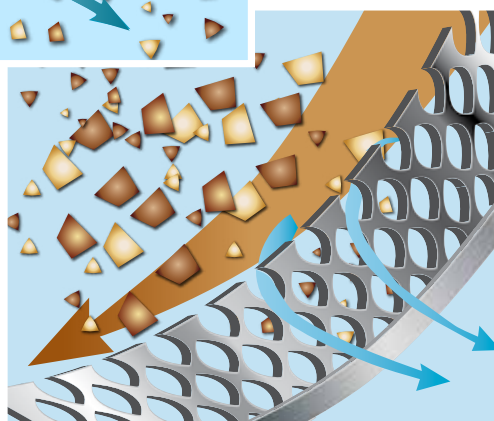
- CDS Screen captures neutrally buoyant materials missed by other separator systems.
- Screen is hydraulically designed to be self-cleaning.
- Runoff entering the separation cylinder must pass through the screen prior to discharge, eliminating potential for scouring previously captured trash at high flow rates.



## The CDS Screen — Self-Cleaning Screening Technology ❖ ❖ ❖



**Direct Screening** – particles that are larger than the aperture size of the screen can cause clogging, resulting in flooding if not maintained frequently.



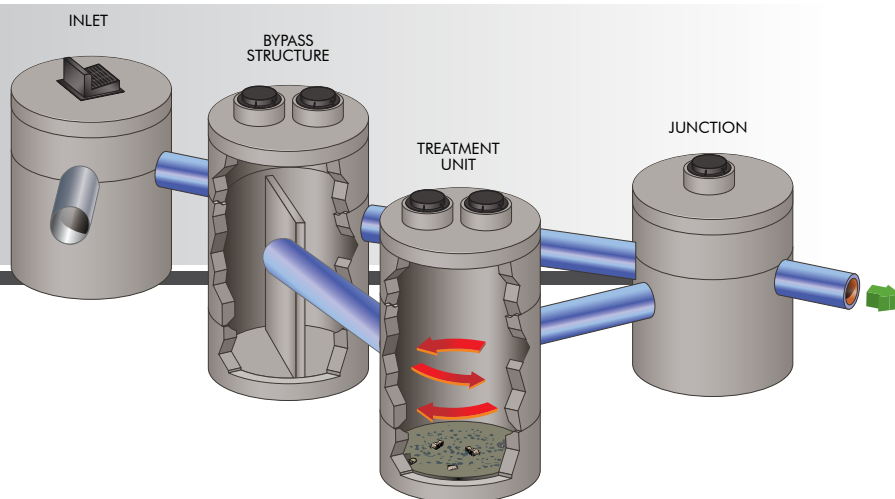
**Continuous Deflective Separation Indirect Screening** – water velocities within the swirl chamber continually shear debris off the screen to keep it clean.

# CDS® Configuration - One System that Can Do It All!

The CDS effectively treats stormwater runoff while reducing the number of structures on your site.

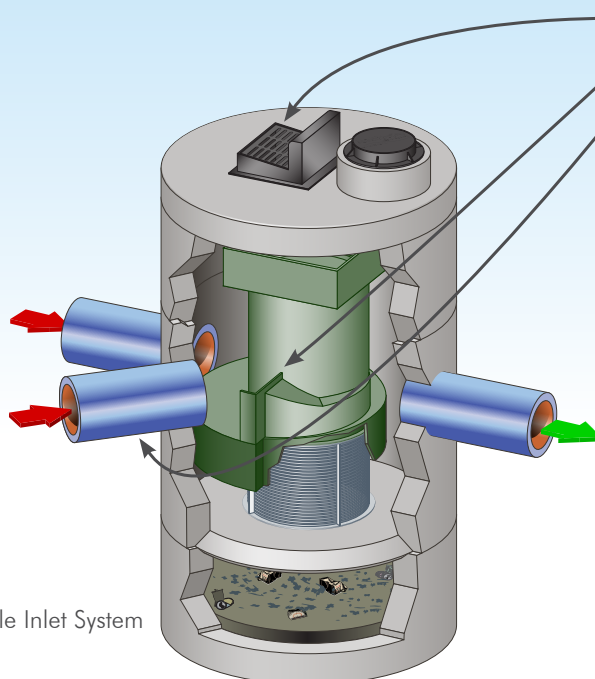
## WHY GO THROUGH ALL THIS?

### TRADITIONAL STORMWATER TREATMENT SITE DESIGN



## ONE SYSTEM CAN DO IT ALL!

- Inline, offline, grate inlet, and drop inlet configurations available
- Internal and external peak bypass options available



Save Time, Space, and Money with CDS®

- Grate inlet option available
- Internal bypass weir
- Accepts multiple inlets at a variety of angles
- Advanced hydrodynamic separator
- Captures and retains 100% of floatables and neutrally buoyant debris 2.4 mm or larger
- Indirect screening capability keeps screen from clogging
- Retention of all captured pollutants, even at high flows
- Performance verified by NJCAT, WA Ecology, and ETV Canada

# CDS® Applications

CDS is commonly used in the following stormwater applications:

- Stormwater quality control – trash, debris, sediment, and hydrocarbon removal
- Urban retrofit and redevelopment
- Inlet and outlet protection
- Pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and Low Impact Development designs.



CDS provides trash control.



CDS pretreats a bioswale.



CDS pretreats a rainwater harvesting cistern.



CDS standalone system removes trash and sediment.

# CDS® Models and Capacities

CDS MODEL		Treatment Flow Rates <sup>1</sup>			Estimated Maximum Peak Conveyance Flow <sup>3</sup> (cfs)/(L/s)	Minimum Sump Storage Capacity <sup>4</sup> (yd <sup>3</sup> )/(m <sup>3</sup> )	Minimum Oil Storage Capacity <sup>4</sup> (gal)/(L)
		75 microns (cfs)/(L/s)	125 microns <sup>2</sup> (cfs)/(L/s)	Trash & Debris (cfs)/(L/s)			
PRECAST	CDS2015-4	0.5 (14.2)	0.7 (19.8)	1.0 (28.3)	10 (283)	0.9 (0.7)	61 (232)
	CDS2015-5	0.5 (14.2)	0.7(19.8)	1.0 (28.3)	10 (283)	1.5 (1.1)	83 (313)
	CDS2020-5	0.7 (19.8)	1.1 (31.2)	1.5 (42.5)	14 (396)	1.5 (1.1)	99 (376)
	CDS2025-5	1.1 (31.2)	1.6 (45.3)	2.2 (62.3)	14 (396)	1.5 (1.1)	116 (439)
	CDS3020-6	1.4 (39.6)	2.0 (56.6)	2.8 (79.3)	20 (566)	2.1 (1.6)	184 (696)
	CDS3025-6	1.7 (48.1)	2.5 (70.8)	3.5 (99.2)	20 (566)	2.1 (1.6)	210 (795)
	CDS3030-6	2.0 (56.6)	3.0 (85.0)	4.2 (118.9)	20 (566)	2.1 (1.6)	236 (895)
	CDS3035-6	2.6 (73.6)	3.8 (106.2)	5.3 (150.0)	20 (566)	2.1 (1.6)	263 (994)
	CDS4030-8	3.1 (87.7)	4.5 (127.4)	6.3 (178.3)	30 (850)	5.6 (4.3)	426 (1612)
	CDS4040-8	4.1 (116.1)	6.0 (169.9)	8.4 (237.8)	30 (850)	5.6 (4.3)	520 (1970)
	CDS4045-8	5.1 (144.4)	7.5 (212.4)	10.5 (297.2)	30 (850)	5.6 (4.3)	568 (2149)
	CDS5640-10	6.1 (172.7)	9.0 (254.9)	12.6 (356.7)	50 (1416)	8.7 (6.7)	758 (2869)
	CDS5653-10	9.5 (268.9)	14.0 (396.5)	19.6 (554.8)	50 (1416)	8.7 (6.7)	965 (3652)
	CDS5668-10	12.9 (365.1)	19.0 (538.1)	26.6 (752.9)	50 (1416)	8.7 (6.7)	1172 (4435)
	CDS5678-10	17.0 (481.2)	25.0 (708.0)	35.0 (990.7)	50 (1416)	8.7 (6.7)	1309 (4956)
CAST-IN-PLACE	CDS9280-12	27.2 (770.2)	40.0 (1132.7)	56.0 (1585.7)	Offline	16.8 (12.8)	N/A
	CDS9290-12	35.4 (1002.4)	52.0 (1472.5)	72 (2038.8)		16.8 (12.8)	
	CDS92100-12	42.8 (1212.0)	63.0 (1783.9)	88 (2491.9)		16.8 (12.8)	
	CDS150134-22	100.7 (2851.5)	148.0 (4190.9)	270 (7645.6)		56.3 (43.0)	
	CDS200164-26	183.6 (5199.0)	270.0 (7645.6)	378.0 (10703.8)		78.7 (60.2)	
	CDS240160-32	204 (5776.6)	300.0 (8495.1)	420.0 (8495.1)		119.1 (91.1)	
	Additional Cast-in-Place models available upon request.						

1. Alternative PSD/D<sub>50</sub> sizing is available upon request.
2. 125 micron flows are based on the CDS Washington State Department of Ecology approval for 80% removal of a particle size distribution (PSD) having a mean particle size (D<sub>50</sub>) of 125 microns.
3. Estimated maximum peak conveyance flow is calculated using conservative values and may be exceeded on sites with lower inflow velocities and sufficient head over the weir.
4. Sump and oil capacities can be customized to meet site needs



# CDS® Maintenance

Systems vary in their maintenance needs, and the selection of a cost-effective and easy-to-access treatment system can mean a huge difference in maintenance expenses for years to come.

A CDS unit is designed to minimize maintenance and make it as easy and inexpensive as possible to keep our systems working properly.

## Inspection

Inspection is the key to effective maintenance. Pollutant deposition and transport may vary from year to year and site to site. Semi-annual inspections will help ensure that the system is cleaned out at the appropriate time. Inspections should be performed more frequently where site conditions may cause rapid accumulation of pollutants.



Most CDS units can easily be cleaned in 30 minutes.

## Recommendations for CDS Maintenance

The recommended cleanout of solids within the CDS unit's sump should occur at 75% of the sump capacity. Access to the CDS unit is typically achieved through two manhole access covers – one allows inspection and cleanout of the separation chamber and sump, and another allows inspection and cleanout of sediment captured and retained behind the screen. A vacuum truck is recommended for cleanout of the CDS unit and can be easily accomplished in less than 30 minutes for most installations.

## DYOHDS™ Tool

### Design Your Own Hydrodynamic Separator

#### Features

- Choose from three HDS technologies - CDS®, Vortechs® and VortSentry® HS
- Site specific questions ensure the selected unit will comply with site constraints
- Unit size based on selected mean particle size and targeted removal percentage
- Localized rainfall data allows for region specific designs
- PDF report includes detailed performance calculations, specification and standard drawing for the unit that was sized



Design Your Own (DYO) Hydrodynamic Separator  
online at [www.ContechES.com/dyohds](http://www.ContechES.com/dyohds)



## Next Steps

### Learn more

See our CDS systems in action at [www.ContechES.com/videos](http://www.ContechES.com/videos)

### Connect with Us

We're here to make your job easier – and that includes being able to get in touch with us when you need to. [www.ContechES.com/localresources](http://www.ContechES.com/localresources)

### Start a Project

If you are ready to begin a project, visit us at [www.ContechES.com/startaproject](http://www.ContechES.com/startaproject)

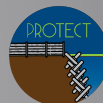
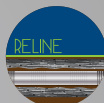
Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, retaining walls, sanitary sewer, stormwater, erosion control and soil stabilization products.

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266 related foreign patents or other patents pending.

CDS is a registered trademark or licensed trademark of Contech Engineered Solutions LLC.

**CONTECH**  
ENGINEERED SOLUTIONS

## COMPLETE SITE SOLUTIONS



#### Stormwater Solutions

Helping to satisfy stormwater management requirements on land development projects

- Stormwater Treatment
- Detention/Infiltration
- Rainwater Harvesting
- Biofiltration/Bioretenation

#### Pipe Solutions

Meeting project needs for durability, hydraulics, corrosion resistance, and stiffness

- Corrugated Metal Pipe (CMP)
- Steel Reinforced Polyethylene (SRPE)
- High Density Polyethylene (HDPE)
- Polyvinyl Chloride (PVC)

#### Structures Solutions

Providing innovative options and support for crossings, culverts, and bridges

- Plate, Precast & Truss bridges
- Hard Armor
- Retaining Walls
- Tunnel Liner Plate

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CDS Brochure - 06/2017 (PDF)

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**FSC**

**APPENDIX G**

**PRE-CONSTRUCTION SITE ASSESSMENT CHECKLIST**

## I. PRE-CONSTRUCTION MEETING DOCUMENTS

**Project Name** \_\_\_\_\_  
**Permit No.** \_\_\_\_\_ **Date of Authorization** \_\_\_\_\_  
**Name of Operator** \_\_\_\_\_  
**Prime Contractor** \_\_\_\_\_

### a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional<sup>1</sup> conduct an assessment of the site prior to the commencement of construction<sup>2</sup> and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization<sup>3</sup> using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

**b. Operators Certification**

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

**Name (please print):** \_\_\_\_\_

**Title** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone:** \_\_\_\_\_ **Email:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**c. Qualified Professional's Credentials & Certification**

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

**Name (please print):** \_\_\_\_\_

**Title** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone:** \_\_\_\_\_ **Email:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

#### **d. Pre-construction Site Assessment Checklist**

**(NOTE: Provide comments below as necessary)**

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

**Yes No NA**

- ☐ ☐ ☐ Has a Notice of Intent been filed with the NYS Department of Conservation?
- ☐ ☐ ☐ Is the SWPPP on-site? Where? \_\_\_\_\_
- ☐ ☐ ☐ Is the Plan current? What is the latest revision date? \_\_\_\_\_
- ☐ ☐ ☐ Is a copy of the NOI (with brief description) onsite? Where? \_\_\_\_\_
- ☐ ☐ ☐ Have all contractors involved with stormwater related activities signed a contractor's certification?

##### **2. Resource Protection**

**Yes No NA**

- ☐ ☐ ☐ Are construction limits clearly flagged or fenced?
- ☐ ☐ ☐ Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
- ☐ ☐ ☐ Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

##### **3. Surface Water Protection**

**Yes No NA**

- ☐ ☐ ☐ Clean stormwater runoff has been diverted from areas to be disturbed.
- ☐ ☐ ☐ Bodies of water located either on site or in the vicinity of the site have been identified and protected.
- ☐ ☐ ☐ Appropriate practices to protect on-site or downstream surface water are installed.
- ☐ ☐ ☐ Are clearing and grading operations divided into areas <5 acres?

##### **4. Stabilized Construction Entrance**

**Yes No NA**

- ☐ ☐ ☐ A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
- ☐ ☐ ☐ Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
- ☐ ☐ ☐ Sediment tracked onto public streets is removed or cleaned on a regular basis.

##### **5. Perimeter Sediment Controls**

**Yes No NA**

- ☐ ☐ ☐ Silt fence material and installation comply with the standard drawing and specifications.
- ☐ ☐ ☐ Silt fences are installed at appropriate spacing intervals
- ☐ ☐ ☐ Sediment/detention basin was installed as first land disturbing activity.
- ☐ ☐ ☐ Sediment traps and barriers are installed.

##### **6. Pollution Prevention for Waste and Hazardous Materials**

**Yes No NA**

- ☐ ☐ ☐ The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
- ☐ ☐ ☐ The plan is contained in the SWPPP on page \_\_\_\_\_
- ☐ ☐ ☐ Appropriate materials to control spills are onsite. Where? \_\_\_\_\_

**APPENDIX H**

**INFILTRATION AREA CONSTRUCTION INSPECTION**

**CHECKLIST**

## Infiltration Basin Construction Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
<b>1. Pre-Construction</b>		
Runoff diverted		
Soil permeability tested		
Groundwater / bedrock depth		
<b>2. Excavation</b>		
Size and location		
Side slopes stable		
Excavation does not compact subsoils		
<b>3. Embankment</b>		
Barrel		
Anti-seep collar or Filter diaphragm		
Fill material		



CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
<b>4. Final Excavation</b>		
Drainage area stabilized		
Sediment removed from facility		
Basin floor tilled		
Facility stabilized		
<b>5. Final Inspection</b>		
Pretreatment facility in place		
Inlets / outlets		
Contributing watershed stabilized before flow is routed to the facility		

**Comments:**[illegible]

**Actions to be Taken:**

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## Open Channel System Construction Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
<b>1. Pre-Construction</b>		
Pre-construction meeting		
Runoff diverted		
Facility location staked out		
<b>2. Excavation</b>		
Size and location		
Side slope stable		
Soil permeability		
Groundwater / bedrock		
Lateral slopes completely level		
Longitudinal slopes within design range		
Excavation does not compact subsoils		
<b>3. Check dams</b>		
Dimensions		
Spacing		
Materials		

**Comments:**[illegible]

## This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

## CDS® Inspection and Maintenance Guide

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## Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

## Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allow both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine whether the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

## Cleaning

Cleaning of a CDS system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.





CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities



#### Support

- Drawings and specifications are available at [www.contechstormwater.com](http://www.contechstormwater.com).
- Site-specific design support is available from our engineers.

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## CDS Inspection & Maintenance Log

CDS Model: \_\_\_\_\_ Location: \_\_\_\_\_

[illegible]

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.



# Contactor® & Recharger® Stormwater Chambers The Chamber With The Stripe®



## Operation and Maintenance Guidelines

# Operation & Maintenance

*This manual contains guidelines recommended by CULTEC, Inc. and may be used in conjunction with, but not to supersede, local regulations or regulatory authorities. OSHA Guidelines must be followed when inspecting or cleaning any structure.*

## Introduction

The CULTEC Subsurface Stormwater Management System is a high-density polyethylene (HDPE) chamber system arranged in parallel rows surrounded by washed stone. The CULTEC chambers create arch-shaped voids within the washed stone to provide stormwater detention, retention, infiltration, and reclamation. Filter fabric is placed between the native soil and stone interface to prevent the intrusion of fines into the system. In order to minimize the amount of sediment which may enter the CULTEC system, a sediment collection device (stormwater pretreatment device) is recommended upstream from the CULTEC chamber system. Examples of pretreatment devices include, but are not limited to, an appropriately sized catch basin with sump, pretreatment catchment device, oil grit separator, or baffled distribution box. Manufactured pretreatment devices may also be used in accordance with CULTEC chambers. Installation, operation, and maintenance of these devices shall be in accordance with manufacturer's recommendations. Almost all of the sediment entering the stormwater management system will be collected within the pretreatment device.

Best Management Practices allow for the maintenance of the preliminary collection systems prior to feeding the CULTEC chambers. The pretreatment structures shall be inspected for any debris that will restrict inlet flow rates. Outfall structures, if any, such as outlet control must also be inspected for any obstructions that would restrict outlet flow rates. OSHA Guidelines must be followed when inspecting or cleaning any structure.

## Operation and Maintenance Requirements

### I. Operation

CULTEC stormwater management systems shall be operated to receive only stormwater run-off in accordance with applicable local regulations. CULTEC subsurface stormwater management chambers operate at peak performance when installed in series with pretreatment. Pretreatment of suspended solids is superior to treatment of solids once they have been introduced into the system. The use of pretreatment is adequate as long as the structure is maintained and the site remains stable with finished impervious surfaces such as parking lots, walkways, and pervious areas are properly maintained. If there is to be an unstable condition, such as improvements to buildings or parking areas, all proper silt control measures shall be implemented according to local regulations.

### II. Inspection and Maintenance Options

- A. The CULTEC system may be equipped with an inspection port located on the inlet row. The inspection port is a circular cast box placed in a rectangular concrete collar. When the lid is removed, a 6-inch (150 mm) pipe with a screw-in plug will be exposed. Remove the plug. This will provide access to the CULTEC Chamber row below. From the surface, through this access, the sediment may be measured at this location. A stadia rod may be used to measure the depth of sediment if any in this row. If the depth of sediment is in excess of 3 inches (76 mm), then this row should be cleaned with high pressure water through a culvert cleaning nozzle. This would be carried out through an upstream manhole or through the CULTEC StormFilter Unit (or other pre-treatment device). CCTV inspection of this row can be deployed through this access port to determine if any sediment has accumulated in the inlet row.
- B. If the CULTEC bed is not equipped with an inspection port, then access to the inlet row will be through an upstream manhole or the CULTEC StormFilter.
  - 1. **Manhole Access**

This inspection should only be carried out by persons trained in confined space entry and sewer inspection services. After the manhole cover has been removed a gas detector must be lowered into the manhole to ensure that there are not high concentrations of toxic gases present. The inspector should be lowered into the manhole with the proper safety equipment as per OSHA requirements. The inspector may be able to observe sediment from this location. If this is not possible, the inspector will need to deploy a CCTV robot to permit viewing of the sediment.

## 2. StormFilter Access

Remove the manhole cover to allow access to the unit. Typically a 30-inch (750 mm) pipe is used as a riser from the StormFilter to the surface. As in the case with manhole access, this access point requires a technician trained in confined space entry with proper gas detection equipment. This individual must be equipped with the proper safety equipment for entry into the StormFilter. The technician will be lowered onto the StormFilter unit. The hatch on the unit must be removed. Inside the unit are two filters which may be removed according to StormFilter maintenance guidelines. Once these filters are removed the inspector can enter the StormFilter unit to launch the CCTV camera robot.

- C. The inlet row of the CULTEC system is placed on a polyethylene liner to prevent scouring of the washed stone beneath this row. This also facilitates the flushing of this row with high pressure water through a culvert cleaning nozzle. The nozzle is deployed through a manhole or the StormFilter and extended to the end of the row. The water is turned on and the inlet row is back-flushed into the manhole or StormFilter. This water is to be removed from the manhole or StormFilter using a vacuum truck.

## III. Maintenance Guidelines

The following guidelines shall be adhered to for the operation and maintenance of the CULTEC stormwater management system:

- A. The owner shall keep a maintenance log which shall include details of any events which would have an effect on the system's operational capacity.
- B. The operation and maintenance procedure shall be reviewed periodically and changed to meet site conditions.
- C. Maintenance of the stormwater management system shall be performed by qualified workers and shall follow applicable occupational health and safety requirements.
- D. Debris removed from the stormwater management system shall be disposed of in accordance with applicable laws and regulations.

## IV. Suggested Maintenance Schedules

### A. Minor Maintenance

The following suggested schedule shall be followed for routine maintenance during the regular operation of the stormwater system:

Frequency	Action
Monthly in first year	Check inlets and outlets for clogging and remove any debris as required.
Spring and Fall	Check inlets and outlets for clogging and remove any debris as required.
One year after commissioning and every third year following	Check inlets and outlets for clogging and remove any debris as required.

### B. Major Maintenance

The following suggested maintenance schedule shall be followed to maintain the performance of the CULTEC stormwater management chambers. Additional work may be necessary due to insufficient performance and other issues that might be found during the inspection of the stormwater management chambers. (See table on next page)



## Major Maintenance *(continued)*

	Frequency	Action
Inlets and Outlets	Every 3 years	<ul style="list-style-type: none"> <li>Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.</li> </ul>
	Spring and Fall	<ul style="list-style-type: none"> <li>Check inlet and outlets for clogging and remove any debris as required.</li> </ul>
CULTEC Stormwater Chambers	2 years after commissioning	<ul style="list-style-type: none"> <li>Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique.</li> <li>Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.</li> </ul>
	9 years after commissioning every 9 years following	<ul style="list-style-type: none"> <li>Clean stormwater management chambers and feed connectors of any debris.</li> <li>Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique.</li> <li>Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.</li> </ul>
	45 years after commissioning	<ul style="list-style-type: none"> <li>Clean stormwater management chambers and feed connectors of any debris.</li> <li>Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required.</li> <li>Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique.</li> </ul>
	45 to 50 years after commissioning	<ul style="list-style-type: none"> <li>Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection.</li> <li>Attain the appropriate approvals as required.</li> <li>Establish a new operation and maintenance schedule.</li> </ul>
Surrounding Site	Monthly in 1 <sup>st</sup> year	<ul style="list-style-type: none"> <li>Check for depressions in areas over and surrounding the stormwater management system.</li> </ul>
	Spring and Fall	<ul style="list-style-type: none"> <li>Check for depressions in areas over and surrounding the stormwater management system.</li> </ul>
	Yearly	<ul style="list-style-type: none"> <li>Confirm that no unauthorized modifications have been performed to the site.</li> </ul>

For additional information concerning the maintenance of CULTEC Subsurface Stormwater Management Chambers, please contact CULTEC, Inc. at 1-800-428-5832.



**CULTEC**  
Chamber of Choice™

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**APPENDIX I**

**CONTRACTOR AND SUBCONTRACTOR  
CERTIFICATIONS**

## CERTIFICATION STATEMENT

“I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.”

**Contractor:**

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Company Phone Number: \_\_\_\_\_

Site Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Specific SWPPP Responsibilities:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date of Certification: \_\_\_\_\_

Name and Title of Trained Contractor for SWPPP  
Implementation: \_\_\_\_\_

\_\_\_\_\_

## CERTIFICATION STATEMENT

“I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.”

### **Sub-Contractor:**

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Company Phone Number: \_\_\_\_\_

Site Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Specific SWPPP Responsibilities:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date of Certification: \_\_\_\_\_

Name and Title of Trained Contractor for SWPPP  
Implementation: \_\_\_\_\_

\_\_\_\_\_

## **APPENDIX J**

### **QUALIFIED PROFESSIONAL'S CERTIFICATION**



## **QUALIFIED PROFESSIONAL’S CERTIFICATION**

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

Name (Print):\_\_\_\_\_

Title:\_\_\_\_\_

Date:\_\_\_\_\_

Company Name:\_\_\_\_\_

Company Address:\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Company Phone Number:\_\_\_\_\_

Company Email:\_\_\_\_\_

Signature:\_\_\_\_\_

**APPENDIX K**

**OWNER / OPERATOR CERTIFICATION**

## CERTIFICATION STATEMENT

“ 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 also certify under penalty of law that that this document and the corresponding documents were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Further, I am acknowledging that this SWPPP has been developed and will be implemented as the first element of construction and agree to comply with all the terms and conditions of the general permit for which the NOI is being submitted.”

Name (Print): \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Company Phone Number: \_\_\_\_\_

Company Email: \_\_\_\_\_

Signature: \_\_\_\_\_

**APPENDIX L**

**POST DEVELOPMENT MAINTENANCE AND  
INSPECTION CHECKLIST**

## Infiltration Trench Operation, Maintenance, and Management Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
<b>1. Debris Cleanout (Monthly)</b>		
Trench surface clear of debris		
Inflow pipes clear of debris		
Overflow spillway clear of debris		
Inlet area clear of debris		
<b>2. Sediment Traps or Forebays (Annual)</b>		
Obviously trapping sediment		
Greater than 50% of storage volume remaining		
<b>3. Dewatering (Monthly)</b>		
Trench dewaterers between storms		
<b>4. Sediment Cleanout of Trench (Annual)</b>		
No evidence of sedimentation in trench		
Sediment accumulation doesn't yet require cleanout		
<b>5. Inlets (Annual)</b>		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Good condition		
No evidence of erosion		
<b>6. Outlet/Overflow Spillway (Annual)</b>		
Good condition, no need for repair		
No evidence of erosion		
<b>7. Aggregate Repairs (Annual)</b>		
Surface of aggregate clean		
Top layer of stone does not need replacement		
Trench does not need rehabilitation		

**Comments:**


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**Actions to be Taken:**


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## Open Channel Operation, Maintenance, and Management Inspection Checklist

Project:  
Location:  
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
<b>1. Debris Cleanout (Monthly)</b>		
Contributing areas clean of debris		
<b>2. Check Dams or Energy Dissipators (Annual, After Major Storms)</b>		
No evidence of flow going around structures		
No evidence of erosion at downstream toe		
Soil permeability		
Groundwater / bedrock		
<b>3. Vegetation (Monthly)</b>		
Mowing done when needed		
Minimum mowing depth not exceeded		
No evidence of erosion		
Fertilized per specification		
<b>4. Dewatering (Monthly)</b>		
Dewaters between storms		

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
<b>5. Sediment deposition      (Annual)</b>		
Clean of sediment		
<b>6. Outlet/Overflow Spillway    (Annual)</b>		
Good condition, no need for repairs		
No evidence of erosion		

**Comments:**

**Actions to be Taken:**



**APPENDIX M**

**CONSTRUCTION INSPECTION REPORT**

## II. CONSTRUCTION DURATION INSPECTIONS

### a. Directions:

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

Required Elements:

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

**SITE PLAN/SKETCH**

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**Inspector (print name)**

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**Date of Inspection**

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**Qualified Professional (print name)**

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**Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

**Maintaining Water Quality****Yes No NA**

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

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

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

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

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

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

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

**2. Level Spreader****Yes No NA**

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

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

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

**Runoff Control Practices (continued)**

**4. Stone Check Dam**

**Yes No NA**

- ☐ ☐ ☐ Is channel stable? (flow is not eroding soil underneath or around the structure).  
☐ ☐ ☐ Check is in good condition (rocks in place and no permanent pools behind the structure).  
☐ ☐ ☐ Has accumulated sediment been removed?.

**5. Rock Outlet Protection**

**Yes No NA**

- ☐ ☐ ☐ Installed per plan.  
☐ ☐ ☐ Installed concurrently with pipe installation.

**Soil Stabilization**

**1. Topsoil and Spoil Stockpiles**

**Yes No NA**

- ☐ ☐ ☐ Stockpiles are stabilized with vegetation and/or mulch.  
☐ ☐ ☐ Sediment control is installed at the toe of the slope.

**2. Revegetation**

**Yes No NA**

- ☐ ☐ ☐ Temporary seedings and mulch have been applied to idle areas.  
☐ ☐ ☐ 4 inches minimum of topsoil has been applied under permanent seedings

**Sediment Control Practices**

**1. Stabilized Construction Entrance**

**Yes No NA**

- ☐ ☐ ☐ Stone is clean enough to effectively remove mud from vehicles.  
☐ ☐ ☐ Installed per standards and specifications?  
☐ ☐ ☐ Does all traffic use the stabilized entrance to enter and leave site?  
☐ ☐ ☐ Is adequate drainage provided to prevent ponding at entrance?

**2. Silt Fence**

**Yes No NA**

- ☐ ☐ ☐ Installed on Contour, 10 feet from toe of slope (not across conveyance channels).  
☐ ☐ ☐ Joints constructed by wrapping the two ends together for continuous support.  
☐ ☐ ☐ Fabric buried 6 inches minimum.  
☐ ☐ ☐ Posts are stable, fabric is tight and without rips or frayed areas.  
 Sediment accumulation is \_\_\_\_% of design capacity.

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

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

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

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

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

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

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.

Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

## CONSTRUCTION DURATION INSPECTIONS

**b. Modifications to the SWPPP (To be completed as described below)**

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
  - a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
  - b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

**Modification & Reason:**This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

### III. Monthly Summary of Site Inspection Activities

<b>Name of Permitted Facility:</b>	<b>Today's Date:</b>	<b>Reporting Month:</b>
<b>Location:</b>	<b>Permit Identification #:</b>	
<b>Name and Telephone Number of Site Inspector:</b>		

[illegible]

**Owner/Operator Certification:**

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

Signature of Permittee or Duly Authorized Representative

Name of Permittee or Duly Authorized Representative

Date \_\_\_\_\_

Duly authorized representatives must have written authorization, submitted to DEC, to sign any permit documents.



**APPENDIX N**  
**NOTICE OF TERMINATION**

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

\*(NOTE: Submit completed form to address above)\*

**NOTICE OF TERMINATION** for Storm Water Discharges Authorized  
under the SPDES General Permit for Construction Activity

**Please indicate your permit identification number:** NYR \_\_\_\_ \_

**I. Owner or Operator Information**

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person:

4a. Telephone:

4b. Contact Person E-Mail:

**II. Project Site Information**

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

**III. Reason for Termination**

9a. ☐ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP. \*Date final stabilization completed (month/year): \_\_\_\_\_

9b. ☐ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR \_\_\_\_ \_

(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. ☐ Other (Explain on Page 2)

**IV. Final Site Information:**

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? ☐ yes ☐ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed? ☐ yes ☐ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

\_\_\_\_\_

**NOTICE OF TERMINATION for Storm Water Discharges Authorized under the  
SPDES General Permit for Construction Activity - continued**

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit?    ☐ yes    ☐ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

- ☐ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.
- ☐ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).
- ☐ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.
- ☐ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? \_\_\_\_\_  
(acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4?    ☐ yes  
☐ no  
(If Yes, complete section VI - "MS4 Acceptance" statement)

**V. Additional Information/Explanation:**  
(Use this section to answer questions 9c. and 10b., if applicable)

**VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative** (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:

Title/Position:

Signature:

Date:

**NOTICE OF TERMINATION** for Storm Water Discharges Authorized under the  
SPDES General Permit for Construction Activity - continued

**VII. Qualified Inspector Certification - Final Stabilization:**

I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:

Title/Position:

Signature:

Date:

**VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):**

I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:

Title/Position:

Signature:

Date:

**IX. Owner or Operator Certification**

I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:

Title/Position:

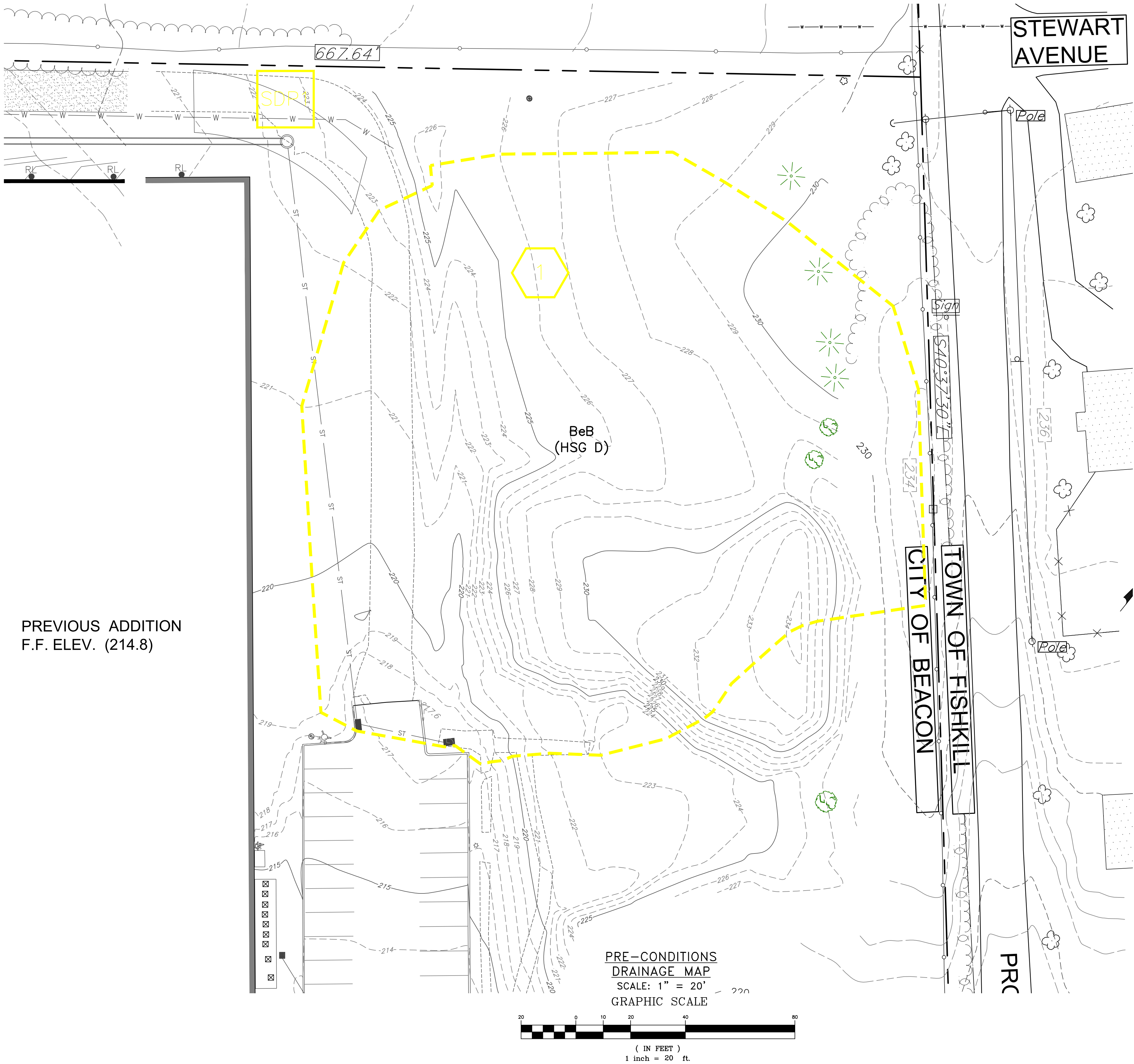
Signature:

Date:

(NYS DEC Notice of Termination - January 2015)

**APPENDIX O**

**DRAINAGE MAPS**



PRE-DRAINAGE CONDITIONS  
SUBCATCMNT 1

TOTAL AREA = 40,860 SQFT

GRASS D = 33,986 SQFT  
WOODS D = 2,968 SQFT  
GRAVEL D = 3,561 SQFT  
IMPERVIOUS = 345 SQFT

TIME OF CONCENTRATION, T<sub>c</sub>:

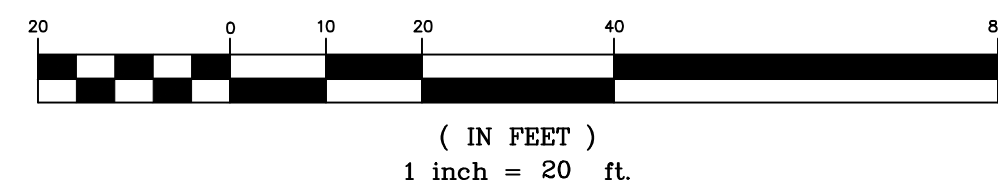
DIRECT ENTRY = 6 MINUTES

LEGEND:

- SOIL TAG: BeB (HSG D)
- DRAINAGE BOUNDARY: [Yellow dashed line]
- SUBCATCHMENT ID: [Yellow hexagon with 1]
- DESIGN POINT: [Yellow square with SDR1]

PREVIOUS ADDITION  
F.F. ELEV. (214.8)

PRE-CONDITIONS  
DRAINAGE MAP  
SCALE: 1" = 20'  
GRAPHIC SCALE



DRAWN BY: AG				CHECKED BY: DGK			
REVISIONS:				REVISIONS:			
NO.	DATE	DESCRIPTION	BY	NO.	DATE	DESCRIPTION	BY
1	3/26/19	NO CHANGES MADE THIS SHEET	AG				

Dig Safely.  
New York  
800-962-7962  
www.digsafelynewyork.org  
Call Before You Dig  
Wait The Required Time  
Confirm Utility Response  
Respect the Marks  
Dig With Care

HUDSON  
LAND DESIGN  
HUDSON LAND DESIGN  
PROFESSIONAL ENGINEERING P.C.  
174 MAIN ST., BEACON, NEW YORK 12508  
13 CHAMBERS ST., NEWBURGH, NEW YORK 12550  
PH: 845-440-6926  
F: 845-440-6637

PRE-CONDITIONS DRAINAGE MAP  
511 FISHKILL AVENUE

FISHKILL AVENUE (ROUTE 52)  
CITY OF BEACON  
DUTCHESS COUNTY, NEW YORK  
TAX ID: 6055-04-580285

JOB #: 2018:041  
DATE: 12/26/2018  
SCALE: 1" = 20'  
TITLE: DM-1  
SHEET: 1 OF 2



