STORMWATER MANAGEMENT PLAN

Prepared for

MGM Design & Construction Group, LLC.
5 Hawkes Avenue
Town of Ossining
Westchester County, NY

Prepared by:

Site Design Consultants
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CPESC No. 2670
CPSWQ No. 0073

September 20, 2019

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5 Hawkes Avenue
Town of Ossining
Westchester County, NY

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1.0 Project Description

The subject property is located at 5 Hawkes Ave. in the Town of Ossining, Westchester County, New York (See Figure 1.1 Location Map and Figure 1.2 Vicinity Map). It is bound on the North and South sides by residential properties, on the West side by the Dale Brook, and it is bound by and has frontage along Hawkes avenue on the east side of the site. The project site is comprised of a single tax parcel with an overall parcel size of 2.15 acres. The parcel Tax Map Designation is 2-4-26. It is Zoned R-20, One-Family Residential. There is currently a single family residence on the site.

The site has an existing 2 story building single family residence. The building is serviced by a driveway which provide access to Hawkes Ave. There are also the remains of several small structures scattered across the site. All of the existing buildings and structures will be fully removed as part of the new proposal. The existing building is on the high ground located at the front of the property. The area around the building slopes down towards the back of the property to the Dale Brook. These areas are either lawn/landscape or pavement. The area adjacent to the stream and along the northern border is wetland.

The proposed development will be to remove the existing building and structures on the site and construct two new residential buildings. Additional driveways will be built to accommodate the new residents. The project will be built in one phase. The phase will include the demolition of the existing building and the development of Lot 1 and Lot 2. The total disturbance for this project is 0.940 acres. A detailed construction sequence has been provided in Appendix D.

A comprehensive Stormwater Management Plan is proposed for the project. The Plan will address water quality issues as well as flood impacts adjoining and downstream from the project. Green infrastructure practices will be incorporated into the project to reduce water quality impacts. These will mainly consist of Infiltration. Any increase in runoff volume will be managed by subsurface infiltration system to be constructed as part of the overall stormwater management system. The Stormwater Management Plan will be prepared in accordance with the State and local standards.

As required by the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-15-002, Part IIIA.8, an historic resource screening determination was conducted. A separate Cultural Assessment has been prepared for the project, and is combined in the DEIS.

The following Report and Plans describe, in detail, the design and implementation of the Stormwater Management Plan.

2.0 Stormwater Regulatory Requirements

2.1 Stormwater Impacts

Urban stormwater impacts relate to significant changes to stormwater quantity and quality as a result of land development. "Urban Development has a profound influence on the quality of New York's waters."[1] This proposed development will

[1] New York State Stormwater Management Design Manual, January 2015, Page 2-1.

change the runoff characteristics of this site altering the quantity and quality of the surface stormwater. The impacts of this must be mitigated by managing the stormwater prior to discharge. This would be accomplished by the capture and treatment of surface runoff prior to discharge.

Development of a site alters the hydrology therefore changing the characteristics of the surface and groundwater discharge of runoff. Changing the surface conditions alters a site's natural ability to store, treat, or infiltrate runoff. The change also allows for the discharge of potentially damaging pollutants and sediments to adjoining water bodies. This can occur during the construction phase, and long-term after development. During the construction phase, graded, destabilized, areas are subject to erosion which can cause the displacement of sediment. After development, changes in the surface conditions, such as impervious surfaces, roofs and pavement, or lawn surfaces can generate pollutants which would be collected and discharged through runoff. Some of the pollutants of concern are: Total Suspended Solids (TSS); Biological Oxygen Demand (BOD); Total Phosphorus (TP); and Total Nitrogen (TN), as well as oil or grease, and chloride.

The most common sources of these pollutants from developed sites are atmospheric deposition, fertilizers, pesticides, and leaked discharges from vehicle. These pollutants would collect on these impervious surfaces and quickly wash off during even the smallest storm event.

In the planning and design of the development, stormwater will be managed to minimize potential impacts. A Stormwater Management and Pollution Prevention Plan will be prepared. This Plan will deal with all aspects of the stormwater management programs such as identifying potential pollutant sources, design of temporary and permanent features, implementation, and maintenance.

2.2 Regulatory Obligation

2.2.1 USEPA/NYSDEC

The Federal Government's Clean Water Act (CWA), Section 402 states "Stormwater discharges from certain construction activities are unlawful unless they are authorized by a National Pollutant Discharge Elimination System ("NPDES") permit or by a state permit program." New York State is a NPDES delegated State. The necessary permitting is administered through the State Pollutant Discharge Elimination System (SPDES) under the General Permit, GP-0-15-002, for Stormwater Discharges from Construction Activity. The Permit requires that any development meeting the disturbance thresholds listed in Tables 1 and 2 of Appendix B of the General Permit must prepare a SWPPP. Activities listed in Table 1 require preparation of only an Erosion and Sediment Control Plan. Those listed in Table 2 would additionally require post-construction stormwater management practices. This project disturbs more than one acre and therefore does require an E&SC and a SWPPP.

The proposed disturbance for this project is less than one acre. As such, a Notice of Intent does not need to be filed in accordance with the NYSDEC GP 0-15-002. At a minimum, an Erosion and Sediment Control Plan must be prepared. The project is located in the Upper Hudson River Basin. This basin is not listed as a

TMDL Watershed or discharging to an impaired water body. However, the proposed development is something other than single family residences or agricultural property. Therefore, a full SWPPP must be prepared which includes water quality and quantity control components.

The Plan identifies the potential sources of pollution, and a design prepared and implemented to reduce pollutant loadings. This project will be required to prepare the following to be in compliance:

- Notice of Intent registered with the NYS DEC;
- MS4 SWPPP Acceptance Form signed by an authorized representative of the Municipality;
- Prepare an Erosion and Sediment Control Plan;
- Design and implement a stormwater quality treatment system to capture and treat the stormwater runoff volume generated by the 90% rainfall event.
- Design and implement a stormwater management system to capture and attenuate all storm events up to the 100-year storm.

2.2.2 Local Municipality

In addition, this project requires approval under Chapter 168, Stormwater Management and Erosion and Sediment Control, of the Town of Ossining Code. The Code requires compliance with the NYS DEC GP-0-15-002

The technical standards providing guidance in the preparation of the E&SC and SWPPP are the latest revisions of the following:

- "New York Standards & Specifications for Erosion and Sediment Control" (NYSSESC) published by the Empire State Chapter of the Soil and Water Conservation Society; and;
- "New York State Stormwater Management Design Manual" prepared by the Center of Watershed Protection, for the NYS DEC;
- Town of Ossining - Town Code Chapter 168 Stormwater Management and Erosion and Sediment Control;

3.0 Reducing Pollutant Impacts

3.1 Sources of Impact

For this project, the potential for contamination of stormwater occurs both during construction and after the completion of development. The goal to achieve reduced impacts involves containment and treatment of the various pollutants.

The project will require temporary sediment and erosion control measures. The greatest source of pollutants during these phases is the potential of soil erosion. The nature of the construction plan is to have exposed soils which can erode and potentially discharge to sensitive areas. During construction, existing vegetation is removed exposing soils. Also, stockpiling of soils takes place. These conditions if not stabilized, are subject to erosion during rainfall events and wind conditions. Sediment discharged to a wetland can destroy vegetation and habitat affecting the function of the wetland. This degradation potential can be irreversible and eliminate its function in the ecosystem. Increases in turbidity to open water bodies such as streams, ponds, etc., are an additional environmental impact.

The implementation of proper erosion control measures and sediment containment along with a planned construction sequence can minimize or eliminate these potential impacts. The selection and implementation of erosion and sediment practices are described in a later section of this Report.

The post-development state of this project not only will yield a potential for sediment discharges or Total Suspended Solids (TSS), but also other pollutants which can impact the adjacent water bodies. The contaminants of highest concern are Total Phosphorus (TP), Total Nitrogen (TN), and Biochemical Oxygen Demand (BOD). Modification of the surface conditions of the site, specifically increasing the impervious nature of the ground cover, increases the concentration and potential discharge of these pollutants. The development of the site reduces native vegetative cover, and therefore affects the land's natural ability to store, treat or infiltrate runoff. This includes impervious surfaces, such as roads, buildings, and also landscaped areas, specifically lawns. These increases in imperviousness allow for greater concentrations or pollutants to collect and be carried off by runoff. Some of the pollutants are deposited by atmospheric conditions. However, other sources are applied or discharged to the surface of the site. The landscape areas are subject to fertilizers, weed control, and pesticide products. This too is a large potential for pollutants which if discharged untreated could have long term impacts. A full listing of the potential pollutants which can be considered in stormwater can be found in Table 2.1 of the New York State Stormwater Management Design Manual (NYS SMDM).

The concentrations are collected in stormwater runoff and rapidly discharge to the adjacent water bodies if not treated properly. The pollutants are collected and conveyed during the initial part of the storm event or the 90% rainfall. This is 90% of the average annual stormwater runoff volume. For this part of the State it is equivalent to approximately 1.4 inches. This is also commonly referred to as the "first flush." The requirement of the NYSDEC SPDES General Permit GP-0-15-002 requires that this volume of runoff is to be collected and treated by the means described in the NYS SMDM. The method to be used is the unified stormwater sizing criteria in which a water quality volume is determined and a practice is selected which best fits the criteria provided. This is described further in Section 6.0.

3.2 Stormwater Management During Construction

The Erosion and Sediment Control Plan will be implemented during all phases of construction until the completion of the project. This will minimize or eliminate the potential short-term adverse impacts which may occur during construction. After completion, the erosion and sediment control will become a maintenance plan to insure that permanent erosion and sediment controls continue to function and prevent the transport of sediments.

The Erosion and Sediment Control Plan includes the Sequence of Construction and designed measures to be installed, operated and maintained during all aspects of construction. The appropriate measures were selected and detailed in plan for implementation by the site contractor. The main objective of the plan is to prevent erosion from occurring by stabilization of the construction site where possible. Sediment controls are to be used as a containment system to allow the removal of sediment from runoff to the greatest extent possible before leaving the work site. Control methods and standards utilized are provided in the NYSSESC.

Potential sources of destabilization of the site have been determined so that proper measures will be used. The locations and methods designed for erosion and sediment control measures change as the construction sequence progresses. The priority is to stabilize disturbed areas subject to erosion and use containment and / or filtering practices where sediment may concentrate. Some of the practices and methods that will be used for this project are:

- Minimization of open disturbance by use of stabilizers such as seed, mulch, and erosion blankets, stone, etc. Areas not subject to construction traffic for extended periods will be temporarily stabilized.
- The work areas will be contained. Down grade perimeters will be lined with barriers such as silt fence, diversions, berms, etc.
- Where possible, clean stormwater will be diverted away or around the work site to reduce the amount of runoff requiring treatment.
- Sediment traps will be constructed where heavy concentrations of runoff may accumulate.
- Dust control measures will be maintained on-site such as water trucks.
- Runoff will be prevented from gaining erosive velocities on long slopes. This can be achieved with seed and mulch, erosion control blankets, curb dams and multiple rows of silt fence.
- Existing drainage structures will be protected from sediment-laden runoff.
- Regular weekly inspections and reports (see Appendix K for report form) to be filed with the Operator and Town.

Additional methods of practices may be employed dependent on the situation. The NYSSESC consists of NYS DEC accepted and recommended practices. The design requirements of temporary and permanent erosion and sediment control practices of this Manual have been followed.

Prior to completion of the project, all permanent structural features will be cleaned, restored, and re-vegetated as necessary. The erosion and sediment control phase of the project is complete when all work is done and all areas are stabilized. The post-construction Stormwater Management Inspection and Maintenance Agreement (Schedule "B" in Appendix L) will describe the long term inspection schedule, periodic maintenance requirements, and the responsible party.

3.3 Stormwater Management Post-Construction

The post-construction design of the project must be included in the Stormwater Pollution Prevention and Stormwater Management Plans to minimize or eliminate potential long-term adverse impacts which might be caused by surface runoff from the site. This will deal with the management of the stormwater upon completion and operation of the site. The plan will be an analysis of all potential impacts due to stormwater and the means of protecting adjoining water bodies.

The management plan begins with conceptual designs of the collection and conveyance system and the proposed treatment practices. The treatment practices are subject to different parameters and must be designed to best fit the site including green infrastructure planning. Some of the limitations that may be encountered include soil types and properties, depth to groundwater or bedrock, distance to structures, and maintenance. A list of acceptable practices can be found in Chapters 3, 5, and 10 of the NYS Stormwater Design Manual (SMDM). Chapter 3 states "The Practices on this list are selected based on the following criteria:

1. Can capture and treat the full water quality volume (WQV)
2. Are capable of 80% TSS removal and 40% TP removal
3. Have acceptable longevity in the field
4. Have a pre-treatment mechanism."

Green Infrastructure Practices include:

I. Preservation of Natural Resources
II. Reduction of Impervious Cover
III. Runoff Reduction Techniques

The five broad groups of standard stormwater management practices are:

I. Stormwater Ponds
II. Stormwater Wetlands
III. Infiltration Practices
IV. Filtering Practices
V. Open-channel Practices

These practices "are presumed to meet water quality requirements set forth in this manual if designed in accordance with the sizing criteria presented in Chapter 4 and constructed in accordance with the performance criteria in Chapter 6."[2]

Green Infrastructure - Runoff Reduction

Chapter 3 of the NYS DEC introduces a planning process for site development which has "increased emphasis on a holistic approach" to urban stormwater runoff management. This is to be done by reducing pollutant-laden runoff by the use of green infrastructure which promotes replication of pre-development hydrology. This is done by designing selected practices which will allow for infiltration, ground water recharge, reuse, recycling and evaporation/evapotranspiration of surface runoff Water Quality Volumes from developed areas.

The implementation of this planning process is defined in a five step approach as follows:

1. Preservation of features and reduction of impervious surfaces.
2. Determination of the project's Water Quality Volume.
3. Incorporating green infrastructure and standard stormwater management practices that provide a Runoff Reduction Volume Capacity.

[2] Pg. 3-7 NYS Stormwater Management Design Manual, January 2015.

4. Use of standard stormwater management practices to treat Water Quality Volume not addressed by green infrastructure.
5. Design of storage facility for volume and peak rate volumes.

This methodology is provided in more detail in Chapter 3 of the SMDM as well as the Flow Chart at the end of Chapter 3 (see Figure 3.1).

This process is required for new and redevelopment projects. Chapter 4 Section 4.3 requires the calculation of Runoff Reduction Volume (RRv) and that 100% of post-development Water Quality Volume should be treated on-site using green infrastructure or standard SMP's. If this goal cannot be met, at a minimum, a specific reduction factor(s) based on the hydrologic soil group (HSG) can be applied but justification must be provided as to why the pre-construction condition cannot be met.

Redevelopment

This proposed development meets the Application Criteria for a redevelopment project as defined in Chapter 9 of the SMDM and site-specific constraints prevent the proper sizing and installation of any of the standard management practices listed above, therefore, alternative sizing and stormwater management controls may be used. Section 9.3.1 Application Criteria states that to make such determination, the following criteria must be met:

1. An already impervious area is reconstructed, and;
2. There is inadequate space for controlling stormwater runoff from the reconstructed area, or;
3. The physical constraints of the site do not allow meeting the required elements of the standards practices.

Acceptable alternative stormwater practices include:

I. Rain Gardens
II. Cisterns
III. Green Roofs
IV. Stormwater Planters
V. Permeable Paving (including modular block)
VI. Select proprietary Products (Hydrodynamic Practices, etc.)

After the preliminary selection of treatment practices, the water quality volume size will be determined.

The treatment methods could be a single practice or a combination of practices. The previously described controlling factors will initially eliminate some treatment methods. The remaining practices will be selected based on feasible locations, functionability, maintenance factors, and cost. An additional factor is to try and select practices which will not only provide an environmental benefit, but also aesthetic value.

4.0 Site Characteristics

4.1 Soils

On-site soils were classified by using the USDA Natural Resources Conservation Service (NRCS) Websoil survey for Westchester County, NY, see Figure 4.1 - Soil Map.

The predominant soil types for this project are Charlton Loam, Paxton Fine Sandy Loam, and Charlton/Chatfield Complex. These soils are well to excessively well-drained. The Hydrologic Soil Group (HSG) classification of these soils are "B, C, and D". The erosion hazard level for these soils are slight to moderate. These soil properties are essential in the design and proper construction management of the site. Independent soil tests were also performed confirming these soils. Figure 4.1.1-USDA Natural Resources Conservation Service Web Soil Survey.

- Charlton Loam, ChC - Hydrologic Soil Group B - fine sandy loam, sandy loam, gravelly loam, well-drained soils - slight to moderate erosion hazard;
- Charlton / Chatfield, CrC - Hydrologic Soil Group B - moderate to very deep, well to excessively well-drained sandy loam soils; moderate erosion hazard; deep water table and depth to bedrock.
- Fluvaquents, Ff - Hydrologic Soil Group D - fine sandy loam, frequently flooded.

4.2 Hydrology

This proposed development will change the runoff characteristics of this site altering the quantity and quality of the surface stormwater discharge. The impacts of this must be mitigated by managing the stormwater prior to discharge. This would be accomplished by the capture and treatment of surface runoff prior to discharge.

The site as it currently exists has no form of stormwater management to control surface runoff water quality levels or flood potential. In general, the surface runoff from the project site currently flows towards the back of the site. This stream runs off site. For analyzing the current surface runoff conditions, the site was analyzed as one drainage area. Surface runoff flows overland to the stream in a westerly direction. The runoff then continues offsite which has been selected as the Design Line. The specifics of the analysis input for these areas are provided in Section 5 of this Report.

Under the proposed condition runoff will be collected and controlled. This will be done by directing surface runoff points toward drains, catch basins, and infiltration areas. Under the developed condition there continues to be one design line being analyzed. DA 1, has been divided into three drainage areas to determine the impacts of surface runoff.

Drainage Area 1 boundary will be redefined. Most of the remaining area will remain unaltered and in its natural state. This section of the site is for the most part to the rear adjacent to the stream. It will include a small areas around the proposed residences that will be directed towards the rear of the property. Drainage area 1 will flow directly to Design Line 1.

Drainage Areas 2 and 3 will include the proposed impervious areas generated by the newly developed lots 1 & 2 respectively. This will include the proposed residences and their driveways. Runoff will be captured by catch basins and roof drains and be directed into the proposed subsurface infiltration chambers for each lot where it will be treated and detained. Excess runoff will bypass to a grass swale which will flow into the Dale brook at the rear of the property.

The increase in impervious area from the project will certainly create the potential for increased pollutant runoff and runoff volume peak rates. The analysis demonstrates how runoff will be captured treated and attenuated to prevent any downstream impacts.

In the planning, design and construction of the development, stormwater will be managed to minimize or eliminate potential off-site impacts. The proper implementation of temporary sediment and erosion control measures are used to achieve this goal. An Erosion and Sediment Control Plan has been established and will be implemented during all phases of construction until the completion of the project. The Erosion and Sediment Control Plan incorporates the sequence of construction and designed measures to be installed, operated and maintained during all aspects of each phase. The erosion and sediment controls are designed in accordance with the NYS Standards and Specifications for Erosion and Sediment Control.

5.0 Hydrologic Analysis

The method used to compute project runoff was the Soil Conservation Service TR-55. The basis for the analysis was the Type III, 24-hour storm, for the 1-year, 2-year, 10-year, 25-year, and 100-year storm event. The rainfall depth for the respective storm events are 2.8, 3.3, 5.0, 6.4, and 9.0. The runoff coefficient "CN" and Time of Concentration for existing and post-development conditions were computed using Standard TR-55 criteria.

5.1 Pre-Development Condition

Currently the site is developed with a building, open lawn and landscaping, access drives, and parking lots. The remainder of the site consists of steep wooded areas. For the hydrologic analysis the site was broken into two drainage areas. The contributing watersheds are shown on Figure 5.1 - Pre-Development Watershed Map.

The Drainage Basin sizes, curve numbers and travel times used in the analysis are summarized in the Table below:

Pre-Development Conditions Watershed Analysis Variables

Drainage Basin	Area (acres)	Curve Number CN	Travel Time, Tc (hrs)
DA-1	2.29	71	0.083

5.2 Post-Development Condition

Under the proposed development, the project will see the construction of three new residences, new driveways, and a private road. This will increase the overall development footprint for the site which in turn will result in an increased impervious area. A hydrologic analysis has been done where to determine the expected runoff depth for each storm event. The design Line is at the stream that runs through the site. The exact location of the design line is shown on Figures 5.1 and 5.2, the Pre and Post-developed Watershed Maps. This analysis performed is to determine the increase in runoff volume in comparison to the pre-development volumes. The results provide the basis for the sizing of the attenuation practices as necessary to provide no increase in peak surface runoff discharge. For this project, the infiltration units were sized to accommodate the 100-year storm event. The contributing watersheds are shown on Figure 5.2 - Post-Development Watershed Map.

The hydrologic analysis assumes that full soil restoration as required in Chapter 5 (Table 5.3) of SMDM will be implemented. The areas of soil restoration will be shown on the Erosion and Sediment Control Plan (E&SC Plan) if required (See Figure 5.3).

The volume of runoff generated from the watersheds analyzed is being detained in various practices, infiltrated into the ground, and captured for irrigation uses before being directed into existing off-site catch basins which are part of the Town of Ossining's drainage system.

The Drainage Basin sizes, curve numbers and travel times used in the analysis are summarized in the Table below:

Post-Development Conditions Watershed Analysis Variables

Drainage Basin	Area (acres)	Curve Number CN	Travel Time, Tc (hrs)
DA-1	2.054	69	0.083
DA-2	0.096	95	0.083
DA-3	0.134	95	0.083

6.0 Unified Stormwater Sizing Criteria

6.1 Methodology

To satisfy the requirements of the NYS DEC General Permit and the Town of Ossining, a combination of Green Infrastructure Techniques and standard practices have been selected. These practices meet stormwater quality as well as attenuation goals. The guidelines and practices used in selecting and the sizing analyses are found in Chapters 4, 5, and 6 of the NYS DEC Stormwater Management Design Manual.

6.2 Water Quality Volume (WQv)

The Treatment volumes are determined as prescribed by the standard methods as outlined in the NYS DEC SMDM. This Water Quality Volume WQv requirement is normally based on the 90% rainfall event. This equates to 90% of the average rainfall for the specific region.

The 90%, 24-hour runoff volume required to be captured and treated has been further defined as the runoff volume from the contributing drainage areas for the proposed project. The volume proposed to be captured will be that volume generated by a 90%, 24-hour storm or greater. With the design provided, this entire volume will be captured and retained for an extended period of 24-hours for pollutants to settle out of the contained runoff. Excess stormwater above the water quality volume will be diverted to subsurface storage for the larger storm events. The volumes to be treated have been calculated as shown in the following table.

Summary of Treatment Volume Required

Drainage Area	Practice	Tributary Drainage Area (ac)	Impervious (Ai) (ac)	WQv Based on 90% Rainfall Event	Min Required Runoff Reduction Volume RRV (cf)
DA-2	Infiltration Chambers	0.096	0.087	423	0.004
DA-3	Infiltration Chambers	0.134	0.125	606	0.006

Water Quality Volume Provided Summary

Drainage Area	Total WQv Runoff Reduction Volume Provided	Remaining WQv to be treated with standard practices	Standard Practice WQv Total Provided	Percent Treated
2	432 cf	0 cf	0 cf	100%
3	619 cf	0 cf	0 cf	100%

With the design provided, this entire volume will be captured and treated to meet runoff reduction water quality goals. Excess stormwater above the water quality volume will be released at a controlled rate providing attenuation of larger storm events.

6.3 Runoff Reduction (RRv)

Green infrastructure design as part of the planning process enables the reduction of runoff from a project. These practices in turn reduce the requirements of water quality treatment and flood protection. The selection of green infrastructure practices is developed using a five-step process detailed in Section 3 of the SMDM. A flow chart of this process is included as Figure 3.1 of this Report. The selection and justification of green practices can be found in Appendix G of this Report. Design of the practices can be found in Appendix H of this Report.

6.4 Stream Channel Protection Volume Requirements (CPv)

This requirement is for the protection of stream channels from receiving erosive velocities. This is not required for this project since the discharge of runoff is to a hardened channel.

6.5 Overbank Flood Control (Qp)

The purpose of the sizing criteria for overbank flood control is to avoid an increase in the frequency and magnitude of out-of-bank flooding that may be the result of development. These are flow events where channel capacity is exceeded and spill over to flood plains. To meet the criteria the proposed stormwater management system for the project must attenuate the 10-year, 24-hour storm event to pre-development peak discharge rate. Detailed criteria can be found in Section 4.5 of the SMDM.

6.6 Extreme Flood Control Criteria (Qf)

The purpose of the extreme flood analysis is to prevent flood damage from large storm events by maintaining the pre-development 100-year flood plain boundaries and protecting the integrity of stormwater management practices. The basis of the analysis is to maintain pre-development peak rates of runoff for the 100-year, 24-hour storm event with proper stormwater management. Detailed criteria can be found in Section 4.6 of the SMDM.

A summary of peak discharge rates at the design line for the pre and post-developed storm events analyzed for each drainage basin is summarized in the tables below:

Design Line:

Storm Event (year)	Pre-Developed Peak Flow (cfs)	Post-Developed Peak Flow (cfs)	Net Change of Peak Flow (cfs)	Percent Reduction
1	1.40	1.05	-0.35	-25.0%
2	2.14	1.67	-0.47	-22.0%
10	5.04	4.17	-0.87	-17.3%
25	7.70	6.49	-1.21	-15.7%
100	12.88	11.08	-1.80	-14.0%

As can be seen by the results, peak discharge rates are decreased for all scenarios.

7.0 Stormwater Management Practices Selection, Justification and Design

The stormwater management practices selection process detailed in Chapters 3 and 7 of the NYS Stormwater Management Design Manual was followed to help select the practices chosen. These Chapters provide a series of matrices which allows logical selection of treatment practices based on several factors. The factors are as follows:

1. Land Use - Urban;
2. Physical Feasibility - location, slope, drainage area, groundwater table;
3. Watershed / Regional Factors - near Hudson River;
4. Stormwater Management Capability - can meet all requirements;

5. Community and Environmental Factors - meets all requirements.

The matrices are provided in Appendix G of this Report. The matrices have been commented on or redacted to show elimination criteria through this stepped approach and eventual possible alternatives for treatment.

Under the proposed development most of the surface runoff from the impervious surfaces will be collected and conveyed to a stormwater management system which will provide pollutant reduction and the potential for increases in peak flow. This includes runoff from roof, driveway, parking, patios and walks as well as landscaped surfaces. The proposed development will contain a series of practices which will meet the standards set forth by the New York State Department of Environmental Conservation under the General Permit No. 00-15-002. These practices will include both green infrastructure and standard practices. Some of the stormwater practices proposed to be used include Rain Gardens, Porous/Pervious Pavements, Rainwater Harvesting to supply irrigation water, and Infiltration. The implementation of these systems will reduce pollutant loads and peak runoff to acceptable levels.

Thermal impacts are not a major concern on this project. Surface water flows will travel mostly into drain inlets which will carry them to their treatment system. The most likely location where a rise in the water temperature might occur is while the runoff flows across the proposed impervious surfaces. This however, will be mitigated by the proposed subsurface infiltration and detention systems which will allow the water to cool before it is discharged. Therefore, the stormwater collection and management will not contribute to the heating of stormwater where it will have a downstream thermal impact.

Infiltration - Stormtech SC-160L (I-3) NYS DEC SMDM:

Stormwater Infiltration Practices capture and temporarily store stormwater. The stormwater is then infiltrated into the existing soil strata over an extended period of time allowing recharge into the groundwater. Stormwater Infiltration Practices capture and temporarily retain stormwater runoff. The stormwater is then infiltrated into the existing soil strata over an extended period of time allowing recharge into the groundwater. These systems will consist of Stormtech SC-160L pre-manufactured HDPE chambers. The chambers are installed on a gravel bed and also backfilled with gravel. The entry point to the system will be into a vertical "Nyoplast" manhole access structure. The structure will have a manhole-type cover and ladder for easy access for maintenance.

Required Elements:

Pre-Treatment Volume	
Required	Provided
If Fc for underlying soils is less than 2.0 in/hr minimum pre-treatment volume of 25% is required.	N/A
If Fc for underlying soil greater than	N/A

2.0 in/hour, minimum pretreatment volume of 50% is required	
If Fc for underlying soil greater than 5.0 in/hour,100% of WQv must be pretreated	Pretreatment provided in Isolator Row
Exit velocities from pretreatment volume shall be non-erosive (3.5 to 5.0 fps) during the 2-year storm event	Exit velocities are not a concern since there are no significant surface discharges.

Treatment Volume	
Required	Provided
Infiltration practice designed to exfiltrate entire WQv through floor of practice (side walls not included in sizing);	All criteria have been met. The subsurface infiltration system has been designed to exfiltrate the entire WQv and has been sized based solely on the surface area of the bottom.
Installation shall carefully follow the construction sequence.	All criteria have been met. The surface infiltration system has been designed to exfiltrate the entire WQv and has been sized based solely on the surface area of the bottom.
The surface area of the infiltration practice shall be sized based on Ap = Vw / ndt Ap = surface area (SF) Vw = Water Quality Volume (cf) n = porosity (one used since open cavity) dt = depth of practice	All criteria have been met. The surface infiltration system has been designed to exfiltrate the entire WQv and has been sized based solely on the surface area of the bottom.

Landscaping:

Does not apply.

Maintenance	
Required	Provided
Infiltration practice shall never serve as a temporary sediment trap during construction.	This Erosion and Sediment Control Plan includes separate locations for temporary sediment traps which do not coincide with the practice locations.
An observation well shall be	The subsurface stormwater management system will have access manholes.

installed in every practice and shall have lockable cap.	
Direct access shall be provided to the practice for maintenance and rehabilitation.	Direct access and observation will be served by a manhole cover.

See Routing Calculations in Appendix F and H for sizing calculations.

The selection of the treatment practice was based on evaluating the site to determine what would best fit the conditions providing maximum benefits. The goal was to select practices which would meet treatment and attenuation standards and minimize the disturbance footprint. The selection of Stormwater Practices was based on the surface and subsurface conditions of the site. In addition, the site design concept is to create a natural and environmentally sensitive setting.

In General:

- Controls should be inspected periodically for the first few months after construction and on a semi-annual basis thereafter. They should also be inspected after major storm events (greater than 0.5 inches).
- All stormwater controls shall be inspected and cleaned of any debris or sediment.
- Any erosion shall be repaired and stabilized with seeding and mulch or stone.

Please note that additional notes regarding maintenance activities are contained on the project Construction Drawings and should be adhered to during and after construction.

The selection and justification of green practices can be found in Appendix G of this Report. The design of the practices can be found in Appendix H of this Report.

8.0 Erosion and Sediment Control

Erosion and sediment control practices were selected and designed in accordance with the NYSSESC. The practices proposed for this project are described below. Standard details and specifications are included in Appendix J as well as on the Construction Plans. Initial locations of each practice are shown on the Plans as construction progresses it may become necessary to repair, replace or relocate these practices as conditions warrant.

Stabilized Construction Entrance:

This has been specified for the entrance of the driveway. The installation will occur at the beginning of the project as described in the Suggested Construction Sequence. It will be maintained so as to prevent the tracking of sediment off-site.

Silt / Sediment Fence and Haybales:

Silt fence and haybales have been specified to control and contain sediment from leaving areas under disturbance to undisturbed areas. The fence shall be installed as best as possible following the contours and will be spaced in accordance with the NYSSESC. The fence will be inspected daily, repaired, and sediment removed as necessary.

Soil Stockpile:

Areas are provided for temporary stockpiling of delivered soil material for the construction. These areas will be contained with sediment fence to prevent the movement of sediment. The stockpiles, if not active for more than seven (7) days, will be seeded and mulched. The stockpile areas were placed to best suit the proposed construction activity. The stockpile will be installed as described in the Construction Sequence.

Temporary and Permanent Vegetative Cover:

This stabilization measure may be temporary and in other cases permanent vegetative cover is used. The vegetative cover specifications are based on the NYSSESC Manual. On the Constructions Plans are notes, locations, and specifications as to the vegetative cover requirements. In the notes, there are specific situations and time constraints related to stabilization of disturbed areas. The specifications give seed and fertilizer mixes as well as placement. Any disturbed area expected to remain exposed for more than seven (7) days shall receive temporary vegetative cover.

Storm Drain Inlet Protection:

The inlet protection is specified to provide a permeable barrier around drainage inlets to reduce sediment content in runoff before entering the storm drain system.

Erosion Blankets:

Erosion blankets and seeding shall be used for the stabilization of slopes 3:1 or greater or as otherwise specified. The blankets shall be installed as per the Plans and Details, and the manufacturer's specifications. They shall be stapled or staked in place as per the manufacturer's specifications. The blankets may be installed at locations other than those shown on the Plans as directed by the Town Engineer, Project Engineer, or other persons inspecting the site under the direction of the aforementioned.

Soil Restoration:

Soil restoration is a required practice for construction projects where soil compaction occurs to soils which will be permanently vegetated. This compaction is typically a result of heavy vehicle traffic, cutting or filling, and areas which may receive heavy surcharges. This becomes more pronounced in soils with greater fines content specifically when wet. These actions can change soil properties which affect its ability to drain or absorb surface water and will also affect the survivability of vegetation. In order to maintain the integrity of the stormwater management plan these areas must receive soil restoration. See Figure 8.1 taken from the NYSSMDM for requirements.

This project has soils which fall in the hydrologic soil group HSG "B." Therefore, for most instances, soil restorations are not required for the development areas subject to permanent vegetation. Soil restoration can be done by tilling or aerating the soil to a depth of 12-inches. In heavy traffic areas, 3-inches of compost shall be placed over the compacted areas prior to the tilling. After the restoration, a 3/8" metal bar should be able to be hand pushed into the soil. Areas within the drip-line of trees should not be tilled.

Other Controls:

Waste Disposal:

Solid, sanitary and toxic waste must be disposed of in a proper manner in accordance with applicable local, state and federal regulations. It is prohibited to burn, bury or pour out onto ground or into the storm sewers any solvents, paints, stains, gasoline, diesel fuel, used motor oil, hydraulic fluid, anti-freeze, cement curing compounds, or other toxic or hazardous wastes. The Contractor shall be responsible for disposal of all waste off site.

Concrete Truck Washout:

Wash out of cement trucks should occur in a designated diked area where the washings can be collected and disposed of properly when they harden.

Dust Control:

Generation of dust shall be minimized by limiting the extent of exposed soils and re-establishing vegetative cover in these areas as soon as possible. Additional and/or temporary methods to minimize dust may include wetting, mulching, spray adhesives, stone covering and wind barriers.

Stabilization:

The Contractor shall initiate stabilization measures as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than seven (7) days after the construction activity in that portion of the site has temporarily or permanently ceased. This requirement does not apply in the following instance:

Where the initiation of stabilization measures by the 7th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable.

All areas not designated as buildings, roads, driveways, parking lots, walks, or aprons shall be established as lawn or vegetative areas. Permanent planting and vegetation shall be provided per approved the landscaping plan.

9.0 Construction Sequence

A key objective of the SWPPP is to reduce erosion and sedimentation potentials for the project. As a means to accomplish this, a suggested construction sequence was developed to assist the developer with incorporating, into the project, various controls designed to reduce such potentials. The sequence considers the performance of development activities in a phased approach, in conjunction with the installation, construction and monitoring of erosion and sedimentation control devices prior to and during construction.

Appendix D contains the project specific Suggested Construction Sequence. Essentially, the sequence has been broken down into various activities designed to ensure that certain erosion/sedimentation controls are in place, prior to and during construction, in recognition of site development.

Prior to any construction activities, the Owner, Engineer and any Contactors to perform land-disturbing activities shall meet to review this SWPPP to insure a thorough understanding of its contents and overall intent. Certifications to this effect shall be signed by the Owner and Contractor. Certifications are provided on the Construction Plans and in Appendix C.

The Responsible Party during and after Construction is as follows:

MGM Design & Construction Group, LLC
317 Elmwood Ave
Hawthorne, NY 10532
914-774-3804

10.0 Inspection and Reporting

Unless notified by the NYSDEC, the Owner or Operator shall have a qualified inspector conduct site inspections in accordance with the Permit requirements; for a site with on-going soil disturbance activities, a qualified inspector shall conduct a site inspection at least once every seven (7) calendar days. If a project has received prior written approval by the NYSDEC for the disturbance of greater than five (5) acres of soils at any one time, the inspection frequency shall be increased to a minimum of two (2) per seven (7) calendar day period separated by two (2) calendar days for as long as the five (5) acre threshold is exceeded. The qualified inspector, as defined in SPDES General Permit guidelines, shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

1. Date and time of inspection.
2. Name and title of person(s) performing inspection.
3. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of inspection.
4. 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.

5. 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.

6. Identification of all erosion and sediment control practices that need repair or maintenance.

7. Identification of all erosion and sediment control practice that were not installed properly or are not functioning as designed and need to be reinstalled or replaced.

8. 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.

9. 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.

10. 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 practices.
11. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing correction actions. 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.

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 action within one business day of this notification and shall complete the corrective actions in a reasonable time frame. All inspection reports shall be signed by the qualified inspector. A sample inspection report is included in Appendix K.

The Owner or Operator shall maintain a record of all inspection reports in a site log book until all disturbed areas have achieved final stabilization and the N.O.T. has been submitted to the DEC. The site log book shall be maintained on site and be made available to the permitting authority upon request.

Prior to filing of the Notice of Termination or the end of permit term, the Owner or Operator shall have the qualified professional perform a final site inspection. The qualified professional shall be provided with a certified final asbuilt survey. The survey shall locate and provide detailed information for the permanent stormwater facilities. The information provided shall include and not be limited to the following: rim and invert elevations of all structures, outlets, weirs, etc.; pipe material and sizes; basin dimensions, elevations and topography; and any other pertinent information specific to the stormwater practice constructed.

Upon final review of the asbuilt survey and completed site improvements, 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 controls (such as silt fencing) not needed for long-term erosion control have been removed.

The qualified professional shall then complete the Notice of Termination (NOT) to be signed by the Owner. The NOT with the required supporting documentation shall be submitted to the MS4 for signature of approval which will then be forwarded to the NYS DEC.

11.0 Installation and Maintenance of Stormwater Management Practices

11.1 During Construction

The Contractor shall be responsible for the installation and maintenance of all temporary erosion control measures. The Contractor shall also be responsible for the installation of permanent control measures. The Operator shall be responsible for the maintenance of all permanent control measures.

All temporary erosion control measures installed on the project site shall be observed and maintained to ensure that they are operating as intended as follows:

1. Temporary measures will be inspected by the trained Contractor daily. Any necessary repairs, replacements, or upgrades will be made immediately.

2. Accumulated sediments will be removed as required to keep the measures functional. In the case of silt fencing and haybales (if applicable), remove deposits where accumulations reach half the height of the fence or bale. In the case of sediment basins, remove deposits whenever their capacity has been reduced by fifty percent (50%) from the design capacity.

3. All erosion of the silt fence will be repaired immediately with compacted backfill materials.

4. Disturbed areas, stockpile areas, areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system or downstream.

5. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

6. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site sediment tracking.

7. The permanent storm drainage system shall be inspected and cleaned of all sediment prior to completion of project.

11.2 <u>After Construction</u>

The long-term operation and maintenance of the stormwater management system will be the responsibility of the Owner. A legally binding document will be signed detailing the responsible parties and required actions.

A sample of the Stormwater Management Inspection and Maintenance Agreement is included, as "Schedule B" in Appendix L.

The following is the proposed Inspection and Maintenance Schedule:

Control to be Inspected	Inspection Frequency	Maintenance Threshold Criteria	Maintenance Procedure
Drain Inlets	Quarterly	3"+ accumulated sediment	Remove debris and sediment annually.
Subsurface Infiltration	Bi-annually	Debris, leaves and Sediment at 5%	Remove debris and sediment

<u>Recommended Maintenance Access:</u>

<u>Pre-Treatment Unit</u>

Access chamber through manhole cover. Pump down permanent water volume. Vacuum sediment.

<u>Subsurface Infiltration</u>

Access through manhole cover. Vacuum sediment and debris.

<u>Drain Inlets:</u>

Access through grate structure and remove debris and sediment with hand tools or vacuum truck.

<u>In General:</u>

- Controls should be inspected periodically for the first few months after construction and on a semi-annual basis thereafter. They should also be inspected after major storm events (greater than 0.5 inches).
- All stormwater controls shall be inspected and cleaned of any debris or sediment.
- Any erosion shall be repaired and stabilized with seeding and mulch or stone.

- Maintenance and access shall comply with all local, State and Federal safety codes and guidelines.

Please note that additional notes regarding maintenance activities are contained on the project Construction Drawings and should be adhered to during and after construction.

12.0 Owner / Contractor Responsibilities

12.1 Owner / Operator Certification Statement

Fred Torillo is the Owner/Operator of the project for the purpose of this Permit (see Appendix A). The Owner must sign a copy of the Owner's Certification Statement before construction commences (see Appendix C).

12.2 Contractor Certification Statement

The Owner is responsible for ensuring all Contractors and Subcontractors associated with site work construction activities identified within this SWPPP agree to implement applicable provisions of the SWPPP and sign a copy of the Contractor Certification Statement (see Appendix C) before construction commences.

In addition, the Owner/Operator is responsible to make sure that all Contractors and Subcontractors shall identify at least one person representing the Company at the site will be responsible for implementation of the SWPPP. This person will be known as the Trained Contractor and will have the required 4-hour Certification. This Certification is available through the NYS DEC. The listing of courses can be found at the NYS DEC Website.

12.3 Retention of Records

The Owner shall retain a copy of the most current SWPPP at the construction site from the date construction is initiated at the site until the date of construction at the site is completed and the N.O.T. has been filed.

Once work is completed, the Owner shall submit to the NYSDEC a Notice of Termination (see Appendix A).

The Owner shall retain copies of the N.O.I, N.O.T., Acknowledgement Letter, MS4 SWPPP Acceptance Form, SWPPP and all reports required by the General Permit for a period of five (5) years from the date that the site achieves final stabilization unless the NYSDEC specifies another time period in writing.

13.0 Conclusion

The Stormwater Management Plan has been established for this project in accordance with the requirements of NYS DEC GP-0-15-002 and the Town Code of Ossining. This plan will effectively control stormwater generated by this project during and after construction. The management of the stormwater is based on controlling increases in peak runoff as well as water quality. The design of the water quality component not only will treat runoff due to the project, but also that which is currently not treated. Overall it would improve even the existing conditions.

The final design of the project will detail the proposed practices and will establish the method with which they will be constructed. The detail will include layout, grading, plantings, outlet structures, and any other component as required for the design based on the Erosion and Sediment Control established in this Report. These will be part of the project Construction Drawings. The Sequence of Construction and required maintenance will also be set forth as part of the final construction plan. The full Construction Plan shall be considered part of the Stormwater Management Plan or Stormwater Pollution Prevention Plan.

The effectiveness of the stormwater practices selected in design will be insured by implementing a maintenance plan. The maintenance plan details specific activities, safeguards and provisions to be monitored and performed by specified frequencies. By adhering to the maintenance plan, optimum performance of the stormwater practices can be expected.

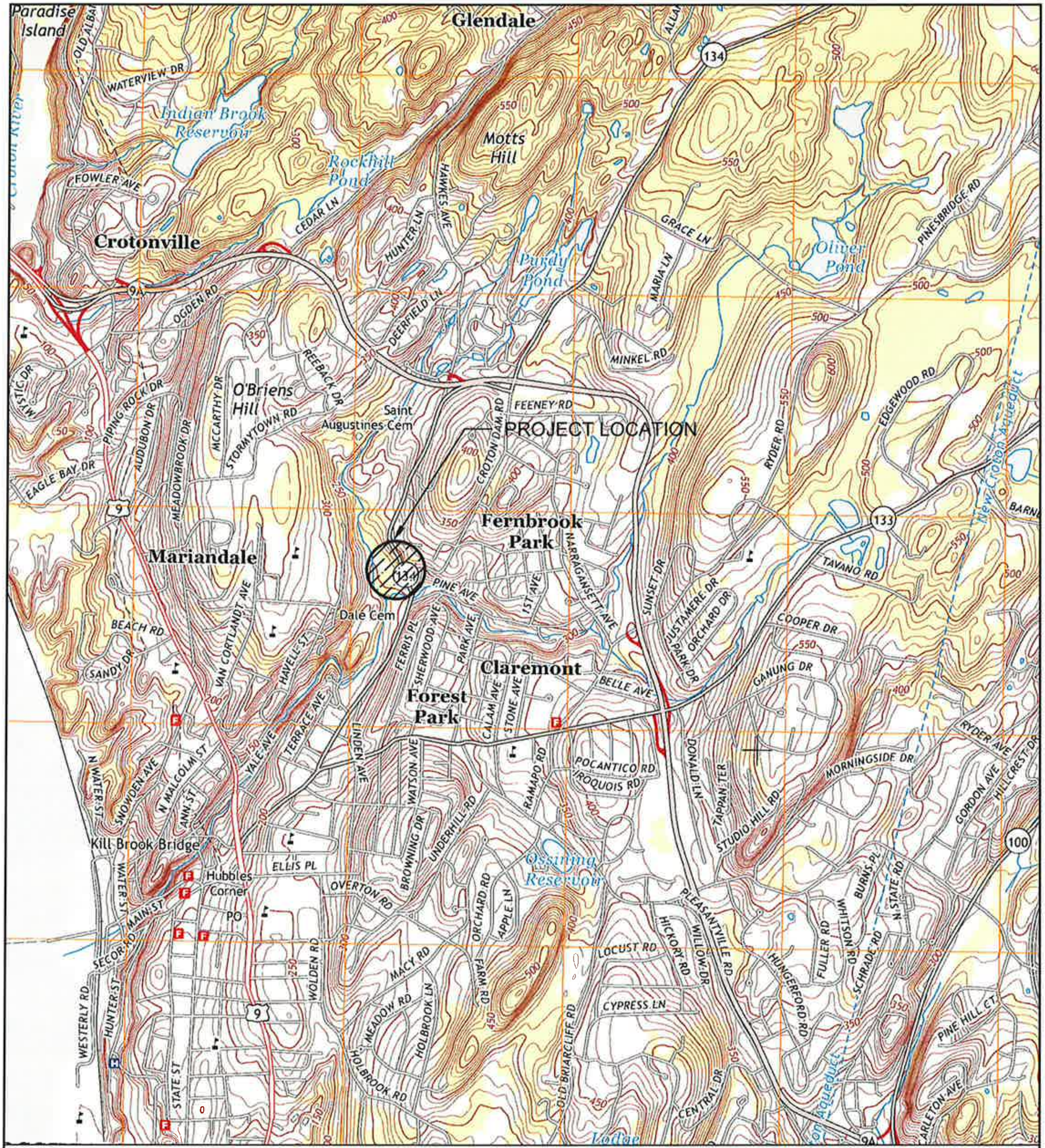
Based on the results of the analysis and recommended maintenance practices for the collection and treatment system, the proposed stormwater control designs will provide maximum control efficiency, high effectiveness for removal of pollutants of concern, and the best attainable post-development pollutant loading scenario.

In conclusion, the Stormwater Management Plan will not create negative downstream impacts as a result of this project.

Joseph C. Riina, P.E

September 2019

FIGURES



NOTE:

1. Map Source: USGS 7.5 Minute Series Topographis Quadrangle Map(1:2,000 scale) for Mohegan Lake, Westchester County, New York

FIG. 1.1 LOCATION MAP

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Civil Engineers • Land Planners

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www.sitedesignconsultants.com

NOT TO SCALE
DATE:3/23/18

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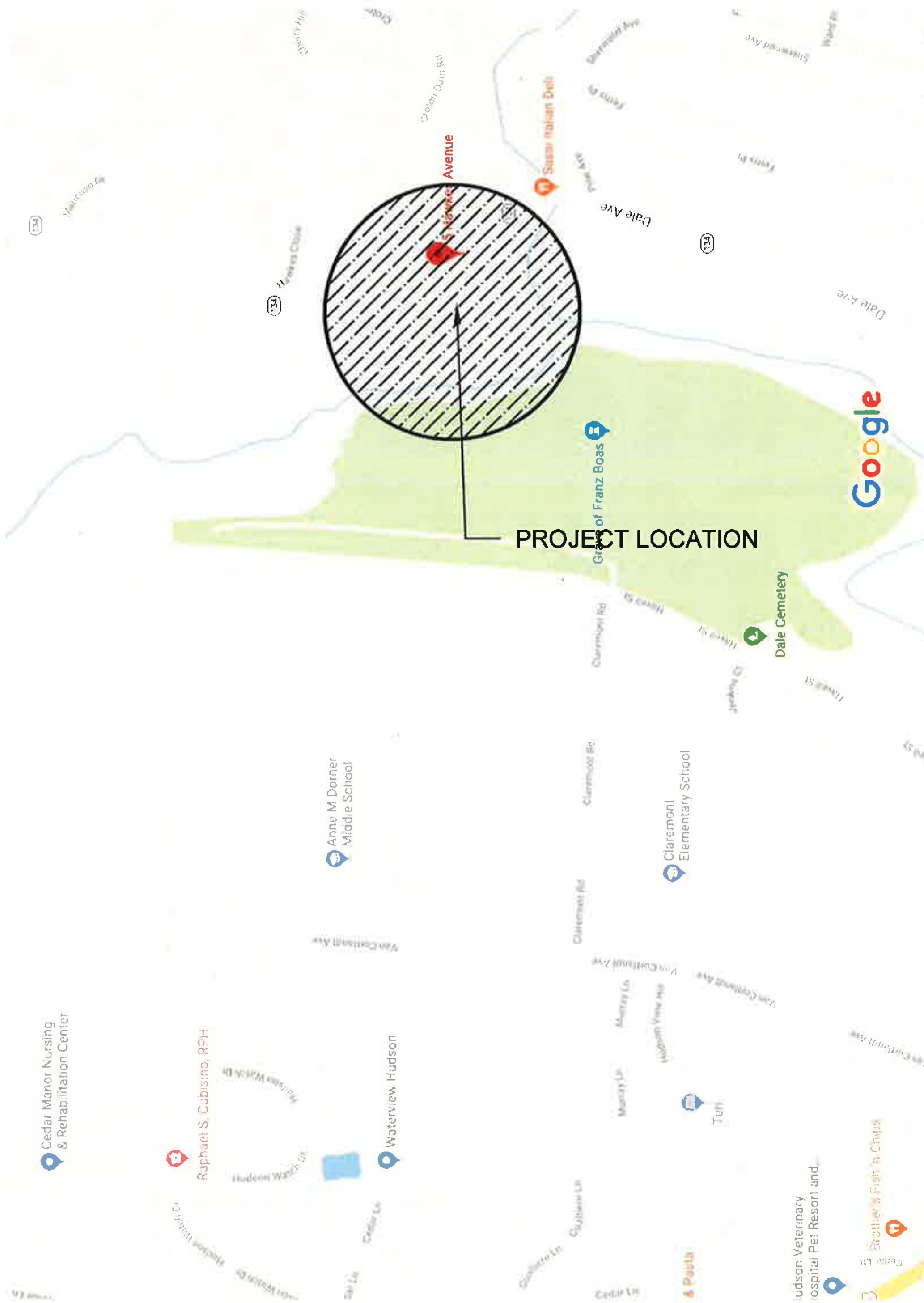

NOTE:

1. Map Source: Google Maps Image

FIG. 1.2 VICINITY MAP

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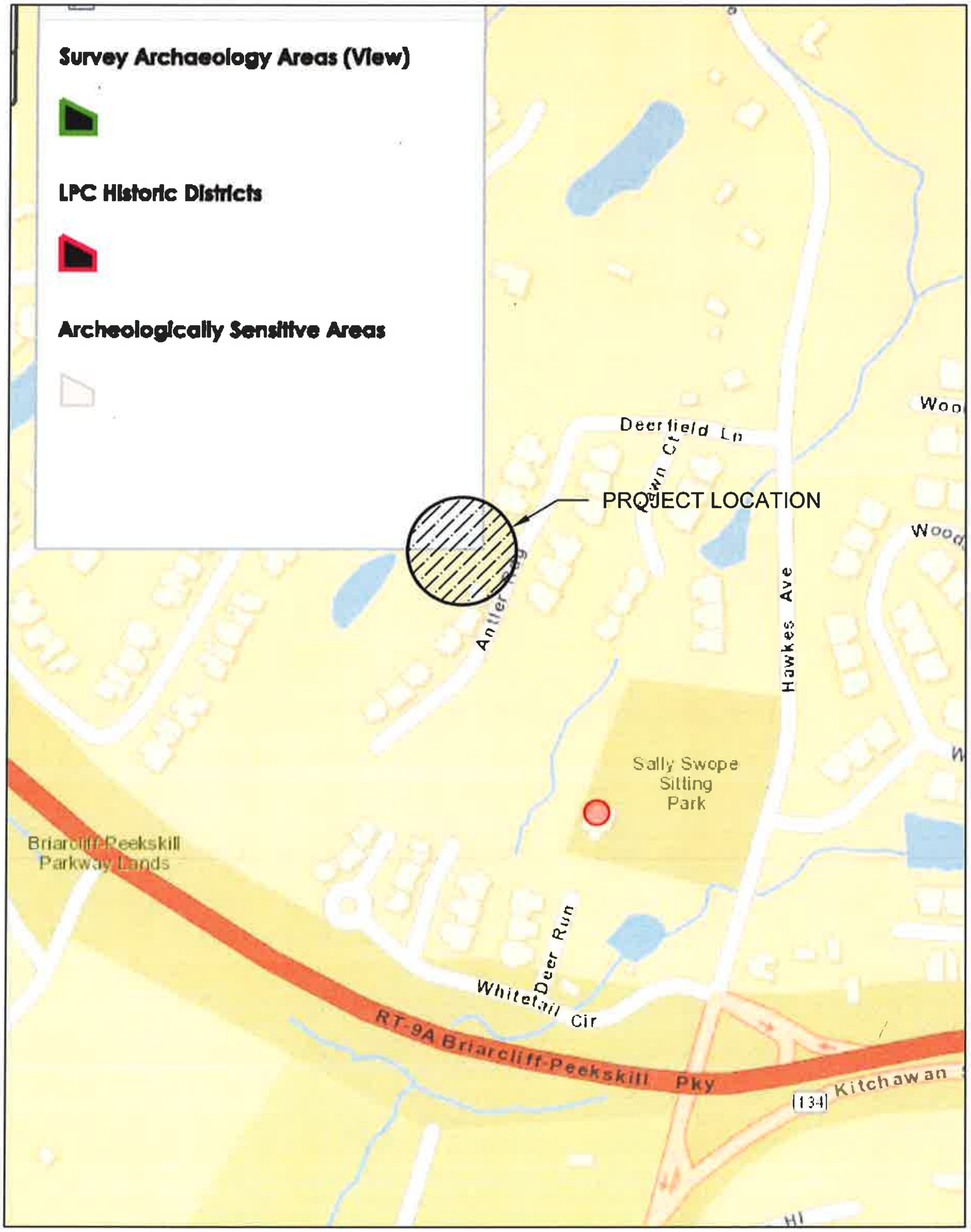

NOTE:
1. Map Source: NYS Historic Preservation Office, GIS Public House

FIG. 1.3 NYS OPRHP HISTORIC RESOURCE MAP

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Table 3.1 Green Infrastructure Planning General Categories and Specific Practices		
Group	**Practice**	**Description**
Preservation of Natural Resources	Preservation of Undisturbed Areas	Delineate and place into permanent conservation easement undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain.
	Preservation of Buffers	Define, delineate and place in permanent conservation easement naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands.
	Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.
	Locating Development in Less Sensitive Areas	Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the least impact.
	Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.
	Soil Restoration	Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of practices such as downspout disconnections, grass channels, filter strips, and tree clusters.
Reduction of Impervious Cover	Roadway Reduction	Minimize roadway widths and lengths to reduce site impervious area
	Sidewalk Reduction	Minimize sidewalk lengths and widths to reduce site impervious area
	Driveway Reduction	Minimize driveway lengths and widths to reduce site impervious area
	Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.
	Building Footprint Reduction	Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.
	Parking Reduction	Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, minimizing stall dimensions, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.

NOTE:

1. Source: NYS DEC Stormwater Design Manual - August 2010

FIG. 3.1 STORMWATER SITE PLANNING AND

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NOTE:
1. Map Source: USDA National Resources Conservation Service, National Cooperative Soil Survey, Web Soil Survey Map.

FIG. 4.1.1 SOIL MAP

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Hydrologic Soil Group—Westchester County, New York

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

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

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

Date(s) aerial images were photographed: Jul 21, 2014—Aug 27, 2014

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.

NOTE:
1. Map Source: USDA National Resources Conservation Service, National Cooperative Soil Survey, Web Soil Survey Map

FIG. 4.1.2 SOIL MAP

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Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ChE	Charlton loam, 25 to 35 percent slopes	B	0.9	35.9%
CrC	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	0.6	23.0%
Ff	Fluvaquents-Udifluvents complex, frequently flooded	A/D	1.0	41.0%
RhB	Riverhead loam, 3 to 8 percent slopes	A	0.0	0.1%
Totals for Area of Interest			2.5	100.0%

NOTE:
1. Map Source: USDA National Resources Conservation Service, National Cooperative Soil Survey, Web Soil Survey Map

FIG. 4.1.3 SOIL MAP

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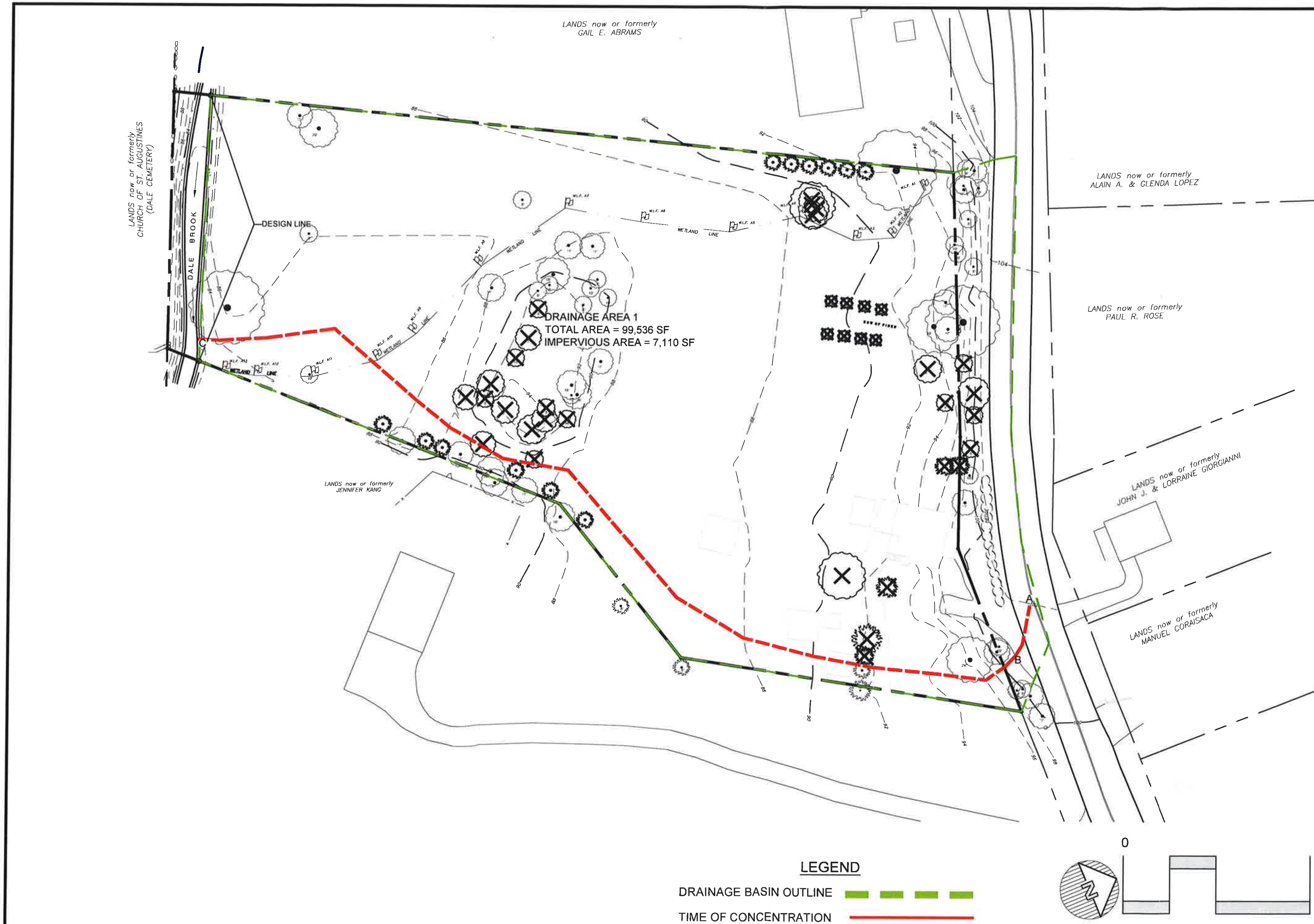

FIG. 5.1 PRE DEVELOPED WATERSHED

PREPARED FOR

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Westchester County, NY

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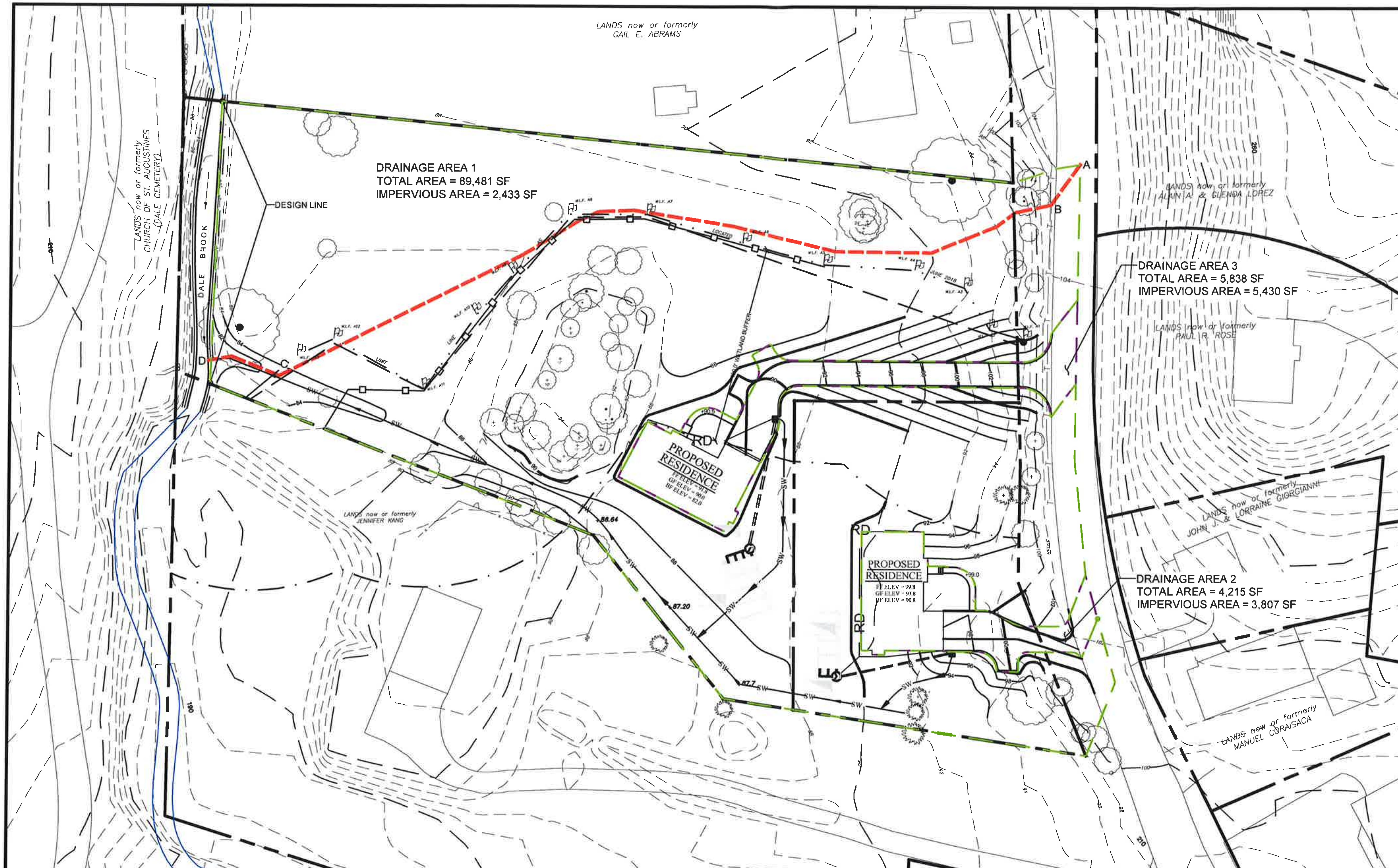

LEGEND

DRAINAGE BASIN OUTLINE

TIME OF CONCENTRATION

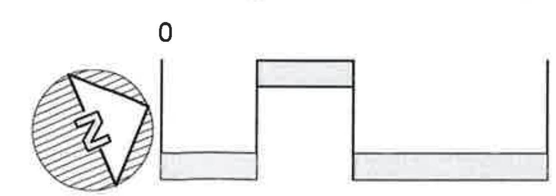

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FIG. 5.2 POST DEVELOPED WATERSHED

PREPARED FOR

MGM DESIGN & CONSTRUCTION GROUP, LLC.

Town Of Ossining

Westchester County, NY

Table 5.3 Soil Restoration Requirements			
Type of Soil Disturbance	**Soil Restoration Requirement**		**Comments/Examples**
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not required		Clearing and grubbing
Areas where topsoil is stripped only - no change in grade	HSG A &B	HSG C&D	Protect area from any ongoing construction activities.
	apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Areas of cut or fill	HSG A &B	HSG C & D	
	Aerate and apply 6 inches of topsoil	Apply full Soil Restoration **	
Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (de-compaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area
Redevelopment projects	Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.		

*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.
** Per "Deep Ripping and De-compaction, DEC 2008".

FIG. 8.1 SOIL RESTORATION REQUIREMENTS

MGM DESIGN & CONSTRUCTION GROUP, LLC.

Town Of Ossining Westchester County, NY

Site Design Consultants
Civil Engineers • Land Planners
251 F Underhill Avenue Yorktown Heights, NY 10598
(914) 962-4488 - Fax (914) 962-7386
www.sitedesignconsultants.com

NOT TO SCALE
DATE:3/23/18

APPENDIX A

List of Required Approvals and Applications:

Town of Ossining Site Plan Approval - approval pending

Town of Ossining Building Permit - approval pending

New York State Department of Environmental Conservation General Permit GP-0-15-002 "Notice of Intent"

New York State Department of Environmental Conservation SWPPP MS4 Acceptance Form

New York State Department of Environmental Conservation "Notice of Termination"

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:	MGM Design & Construction Group, LLC.
2. Contact Person:	Greg McWilliams
3. Street Address:	317 Elmwood Ave
4. City/State/Zip:	Hawthorne, NY 10532
II. Project Site Information	
5. Project/Site Name:	Hawkes Glen Subdivision
6. Street Address:	5 Hawkes Ave
7. City/State/Zip:	Ossining, NY 10562
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

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

APPENDIX B

Regulatory Ordinances:

NYS DEC General Permit No. GP-0-15-002

Local Ordinance

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2015 Expiration Date: January 28, 2020

John J. Ferguson
Chief Permit Administrator

Authorized Signature 1 / 12 / 15
Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York's *State Pollutant Discharge Elimination System ("SPDES")* is a NPDES-approved program with permits issued in accordance with the *Environmental Conservation Law ("ECL").*

This general permit ("permit") is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation ("the Department") regional office (see Appendix G).They are also available on the Department's website at:
http://www.dec.ny.gov/

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity.* Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a point source and therefore, pursuant to Article 17-0505 of the ECL, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. They cannot wait until there is an actual *discharge* from the construction site to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES
FROM CONSTRUCTION ACTIVITIES

Part I. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit 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* 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;

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* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

Discharges authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available._

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the Stormwater Pollution Prevention Plan ("SWPPP") the reason(s) for the deviation or alternative design and provide information

which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

(i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharges*;

(ii) Control stormwater *discharge*s to *minimize* channel and streambank erosion and scour in the immediate vicinity of the *discharge* points;

(iii) *Minimize* the amount of soil exposed during *construction activity*;

(iv) *Minimize* the disturbance of *steep slopes*;

(v) *Minimize* sediment *discharge*s from the site;

(vi) Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

(vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted; and

(viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, 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. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from dewatering activities, including *discharges* from dewatering of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharges*.** The following *discharges* are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

   a. ***Sizing Criteria* for *New Development***

      (i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

      (ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible*.

      In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or

(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or

(2) A downstream analysis reveals that overbank control is not required.

b. ***Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed**

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

c. ***Sizing Criteria*** **for** ***Redevelopment Activity***

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or

(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or

(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or

(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) Overbank Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

d. ***Sizing Criteria* for Combination of *Redevelopment Activity* and *New Development***

Construction projects that include both *New Development* and *Redevelopment Activity* shall provide post-construction stormwater management controls that meet the *sizing criteria* calculated as an aggregate of the *Sizing Criteria* in Part I.C.2.a. or b. of this permit for the *New Development* portion of the project and Part I.C.2.c of this permit for *Redevelopment Activity* portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s from *construction activities.*

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater *discharges* may be authorized by this permit: *discharge*s from firefighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated *groundwater* or spring water; uncontaminated *discharge*s from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who *discharge* as noted in this paragraph, and with the exception of flows from firefighting activities, these *discharge*s must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit
All of the following are **not** authorized by this permit:

1. *Discharges* after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharges* that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an endangered or threatened species unless the *owner or operator* has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.C.2 of this permit.

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharges* from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb one or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture ("USDA") Soil Survey for the County where the disturbance will occur.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharges* from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb two or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the USDA Soil Survey for the County where the disturbance will occur.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.C.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the construction site within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the construction site within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:
      (i) No Affect
      (ii) No Adverse Affect

(Part I.F.8.c.iii)

(iii) Executed Memorandum of Agreement, or

d. Documentation that:
   (i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharges* from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

Part II. OBTAINING PERMIT COVERAGE

A. Notice of Intent (NOI) Submittal

1. An *owner or operator* of a *construction activity* that is <u>not</u> subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the Department in order to be authorized to *discharge* under this permit. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address.

   NOTICE OF INTENT
   NYS DEC, Bureau of Water Permits
   625 Broadway, 4th Floor
   Albany, New York 12233-3505

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the "MS4 SWPPP Acceptance" form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI.

   The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the address in Part II.A.1.

The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4.*

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

B. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied <u>all</u> of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621) have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

   c. the final SWPPP has been prepared, and

   d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.B.2 above

will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

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

(i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

(ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has not been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

(iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

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

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. The Department may suspend or deny an *owner's or operator's* coverage

under this permit if the Department determines that the SWPPP does not meet the permit requirements. In accordance with statute, regulation, and the terms and conditions of this permit, the Department may deny coverage under this permit and require submittal of an application for an individual SPDES permit based on a review of the NOI or other information pursuant to Part II.

5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.B. of this permit.

C. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-15-002), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, and all documentation necessary to demonstrate eligibility with this permit at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land use control MS4*, the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). 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 in accordance with Part IV.C. of this permit 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 temporarily or permanently ceased, 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. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005.

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.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

5. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the *regulated, traditional land use control MS4* in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice

D. Permit Coverage for Discharges Authorized Under GP-0-10-001

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-10-001), an *owner or operator* of *a construction activity* with coverage under GP-0-10-001, as of the effective date of GP-0-15-002, shall be authorized to *discharge* in accordance with GP-0-15-002, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-15-002.

E. Change of *Owner or Operator*

2. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.A.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP:

   a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

   b. whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the *discharge* of *pollutants*; and

   c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority.

5. The Department may notify the *owner or operator* at any time that the

SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.C.4. of this permit.

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

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

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

   In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

   a. Background information about the scope of the project, including the location, type and size of project;

   b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

   c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

   d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the construction site; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

   b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

   c. A Stormwater Modeling and Analysis Report that includes:

      (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

      (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

      (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

      (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

(v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> 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.

C. Qualified Inspector Inspection Requirements

(Part IV.C)

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, with the exception of:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

   b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

   c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

   d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

   a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

   b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites 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 DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites 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* <u>and</u> 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 DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* <u>and</u> all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed 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 address in Part II.A.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of *discharge* from the construction site.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

   a. Date and time of inspection;

   b. Name and title of person(s) performing inspection;

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

   d. 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;

   e. 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;

   f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

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

   h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

i. 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;

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

k. Identification and status of all corrective actions that were required by previous inspection; and

l. 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.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit 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.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.C.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.A.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; <u>and</u> all areas of disturbance have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

   b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; <u>and</u> all areas disturbed as of the project shutdown date have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> 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;

   c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.E. of this permit.

   d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

   a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

   b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

   c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism 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,

   d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.A.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

   a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

      (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any *discharge*r authorized by a general permit to apply for an individual SPDES permit, it shall notify the *discharge*r in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to

discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a construction site which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with *construction activity* covered by this permit, the *owner or operator* of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A

Definitions

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for "*Construction Activity(ies)*" also.

***Construction Activity*(ies) -** means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a construction site by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a construction site to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or point source.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State
or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term "plan" in "larger common plan of development or sale" is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters,

ditches, man-made
channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

New Development – means any land disturbance that does meet the definition of Redevelopment Activity included in this appendix.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York..

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Stream bank restoration projects (does not include the placement of spoil material),
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that makes the transition between the road shoulder and the ditch or embankment,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or embankment,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), Overbank Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture ("USDA") Soil Survey for the County where the disturbance will occur.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part

621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B

Required SWPPP Components by Project Type

Table 1

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres: • Single family home <u>not</u> located in one of the watersheds listed in Appendix C or <u>not</u> *directly discharging* to one of the 303(d) segments listed in Appendix E • Single family residential subdivisions with 25% or less impervious cover at total site build-out and <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E • Construction of a barn or other agricultural building, silo, stock yard or pen.
The following construction activities that involve soil disturbances of one (1) or more acres of land: • Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains • Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects • Bike paths and trails • Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project • Slope stabilization projects • Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics • Spoil areas that will be covered with vegetation • Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions • Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* <u>and</u> do not *alter hydrology from pre to post development* conditions • Demolition project where vegetation will be established and no redevelopment is planned • Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover* • Structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State”, excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area
The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land: • All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area,* excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional, includes hospitals, prisons, schools and colleges
- Industrial facilities, includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's and water treatment plants
- Office complexes
- Sports complexes
- Racetracks, includes racetracks with earthen (dirt) surface
- Road construction or reconstruction
- Parking lot construction or reconstruction
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project , wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River - Figure 1
- Onondaga Lake Watershed - Figure 2
- Greenwood Lake Watershed -Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

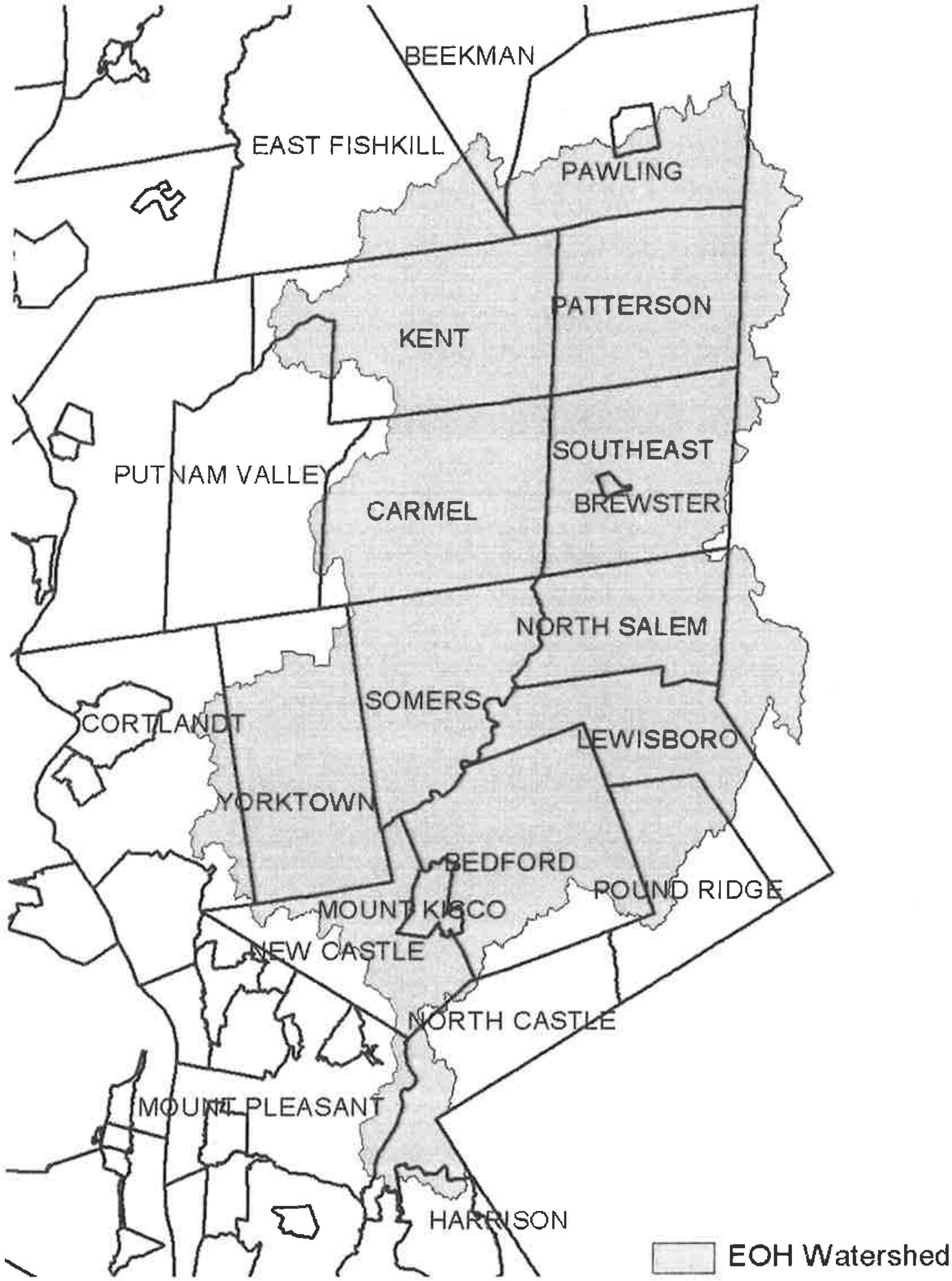


Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

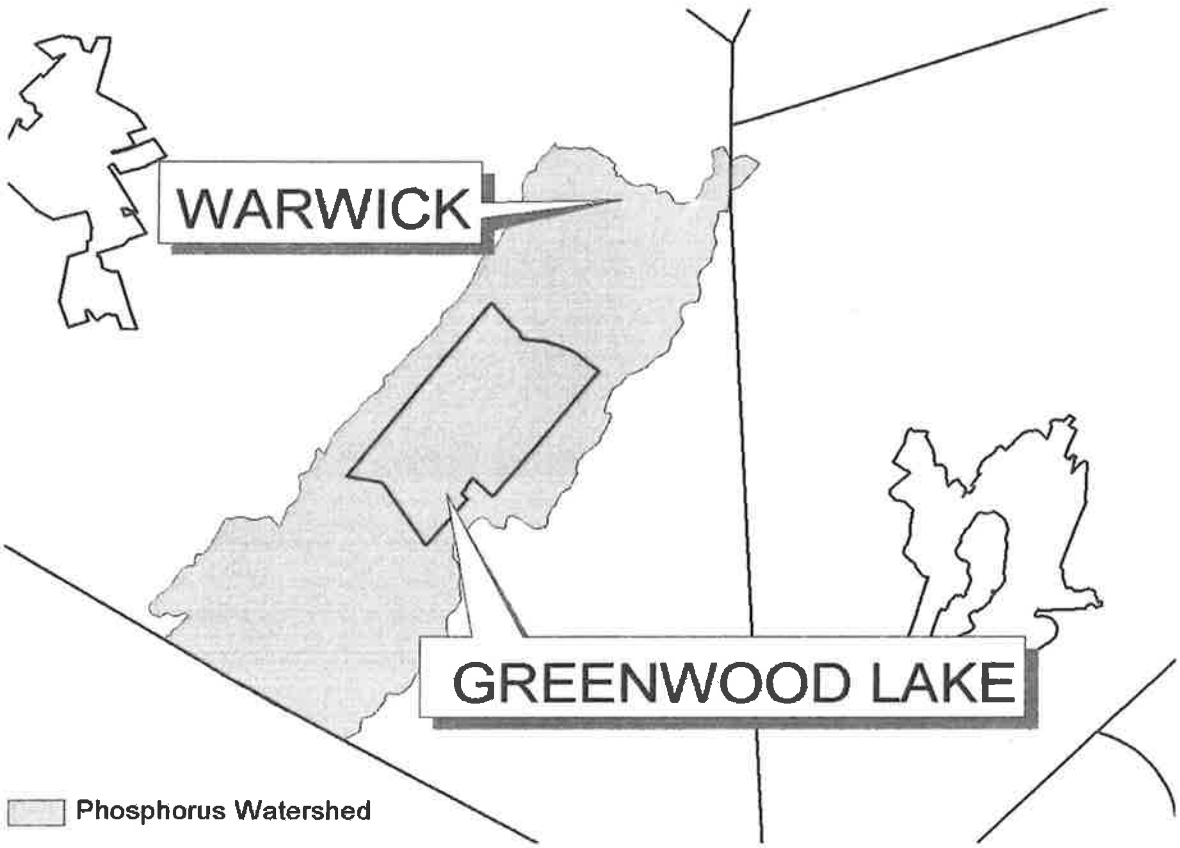


Figure 4 - Oscawana Lake Watershed

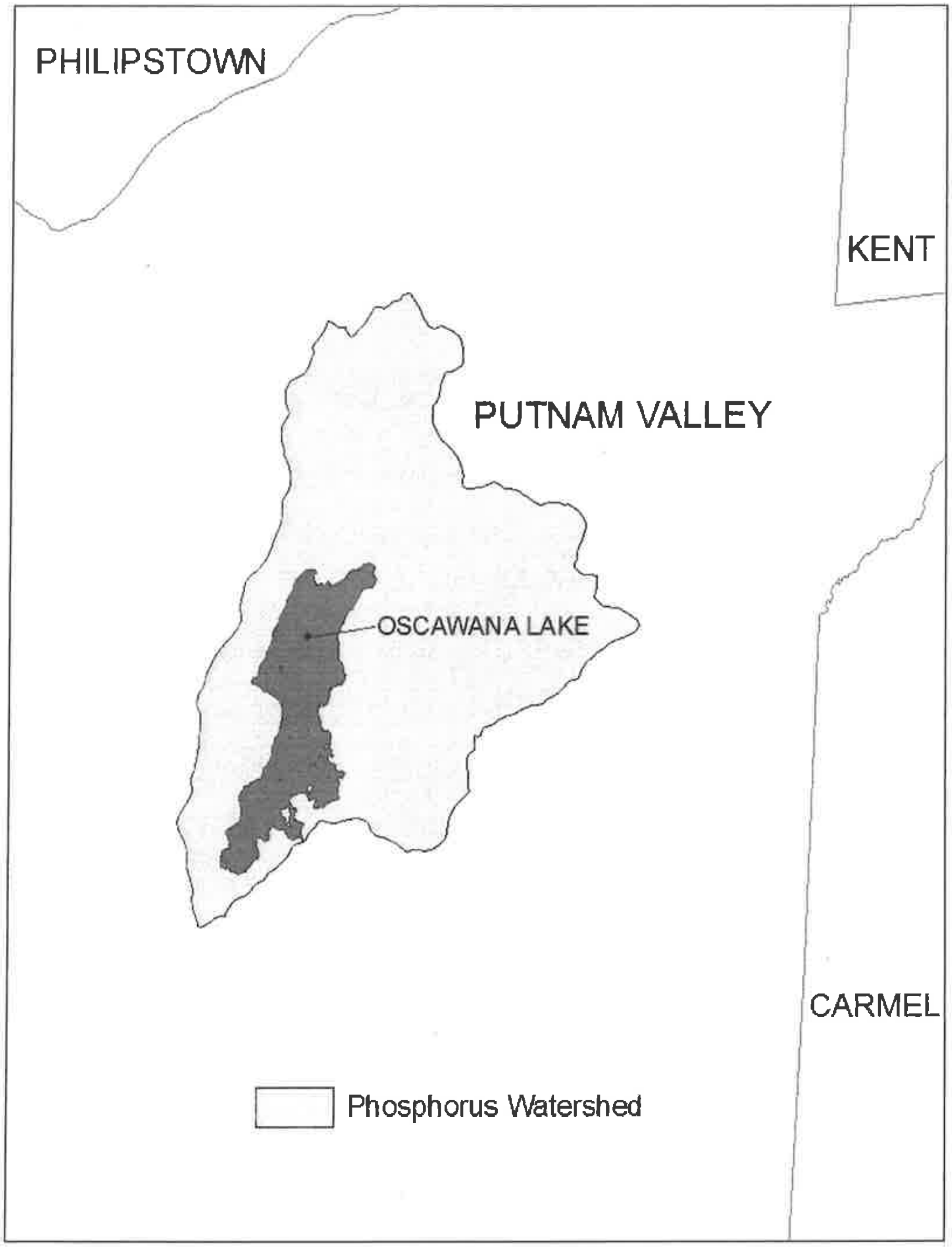
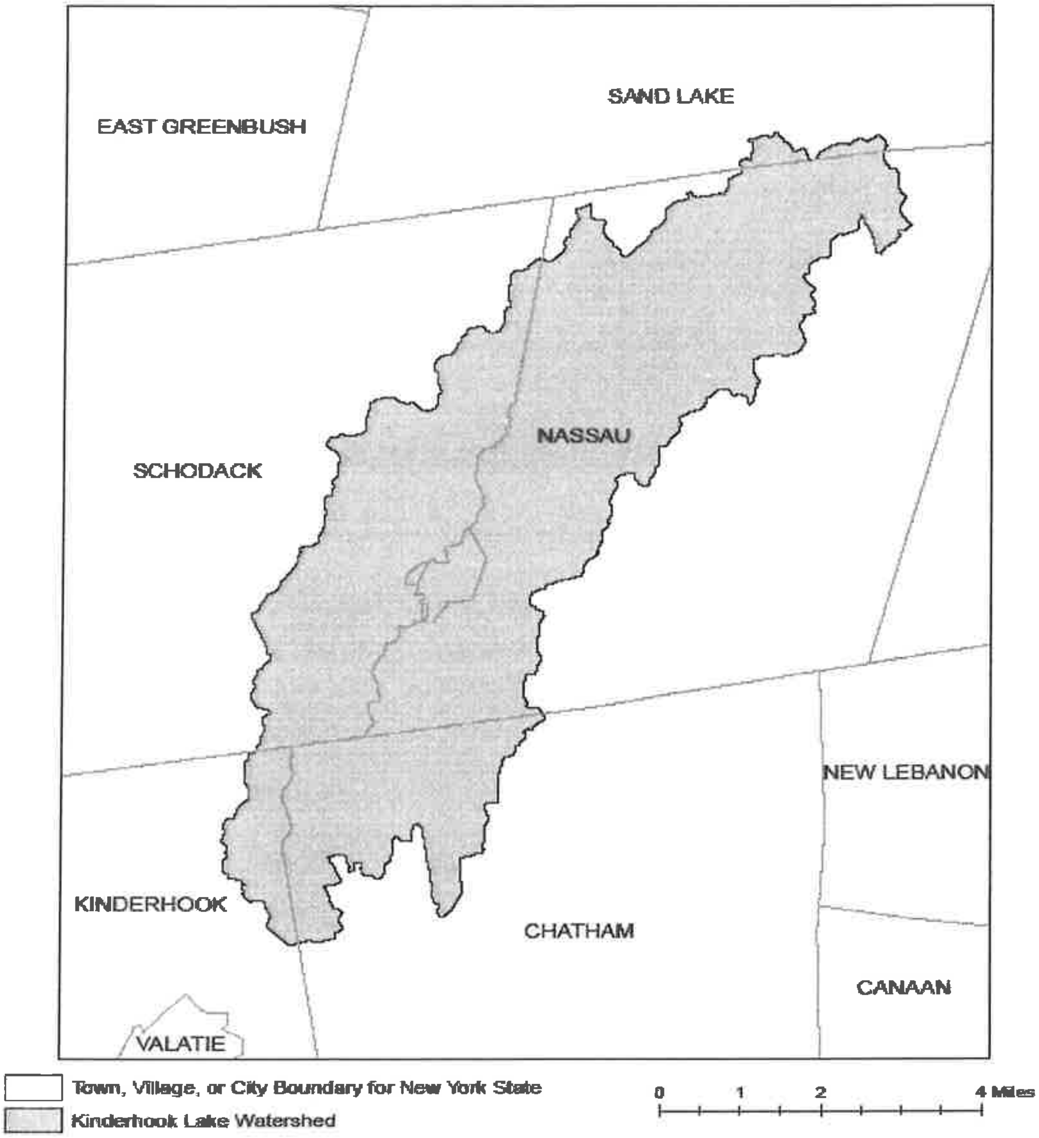


Figure 5: Kinderhook Lake Watershed



APPENDIX D

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River - See Figure 1 in Appendix C

APPENDIX E

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY	WATERBODY	COUNTY	WATERBODY
Albany	Ann Lee (Shakers) Pond, Stump Pond	Greene	Sleepy Hollow Lake
Albany	Basic Creek Reservoir	Herkimer	Steele Creek tribs
Allegheny	Amity Lake, Saunders Pond	Kings	Hendrix Creek
Bronx	Van Cortlandt Lake	Lewis	Mill Creek/South Branch and tribs
Broome	Whitney Point Lake/Reservoir	Livingston	Conesus Lake
Broome	Fly Pond, Deer Lake	Livingston	Jaycox Creek and tribs
Broome	Minor Tribs to Lower Susquehanna (north)	Livingston	Mill Creek and minor tribs
		Livingston	Bradner Creek and tribs
Cattaraugus	Allegheny River/Reservoir	Livingston	Christie Creek and tribs
Cattaraugus	Case Lake	Monroe	Lake Ontario Shoreline, Western
Cattaraugus	Linlyco/Club Pond	Monroe	Mill Creek/Blue Pond Outlet and tribs
Cayuga	Duck Lake	Monroe	Rochester Embayment - East
Chautauqua	Chautauqua Lake, North	Monroe	Rochester Embayment - West
Chautauqua	Chautauqua Lake, South	Monroe	Unnamed Trib to Honeoye Creek
Chautauqua	Bear Lake	Monroe	Genesee River, Lower, Main Stem
Chautauqua	Chadakoin River and tribs	Monroe	Genesee River, Middle, Main Stem
Chautauqua	Lower Cassadaga Lake	Monroe	Black Creek, Lower, and minor tribs
Chautauqua	Middle Cassadaga Lake	Monroe	Buck Pond
Chautauqua	Findley Lake	Monroe	Long Pond
Clinton	Great Chazy River, Lower, Main Stem	Monroe	Cranberry Pond
Columbia	Kinderhook Lake	Monroe	Mill Creek and tribs
Columbia	Robinson Pond	Monroe	Shipbuilders Creek and tribs
Dutchess	Hillside Lake	Monroe	Minor tribs to Irondequoit Bay
Dutchess	Wappinger Lakes	Monroe	Thomas Creek/White Brook and tribs
Dutchess	Fall Kill and tribs	Nassau	Glen Cove Creek, Lower, and tribs
Erie	Green Lake	Nassau	LI Tribs (fresh) to East Bay
Erie	Scajaquada Creek, Lower, and tribs	Nassau	East Meadow Brook, Upper, and tribs
Erie	Scajaquada Creek, Middle, and tribs	Nassau	Hempstead Bay
Erie	Scajaquada Creek, Upper, and tribs	Nassau	Hempstead Lake
Erie	Rush Creek and tribs	Nassau	Grant Park Pond
Erie	Ellicott Creek, Lower, and tribs	Nassau	Beaver Lake
Erie	Beeman Creek and tribs	Nassau	Camaans Pond
Erie	Murder Creek, Lower, and tribs	Nassau	Halls Pond
Erie	South Branch Smoke Cr, Lower, and tribs	Nassau	LI Tidal Tribs to Hempstead Bay
		Nassau	Massapequa Creek and tribs
Erie	Little Sister Creek, Lower, and tribs	Nassau	Reynolds Channel, east
Essex	Lake George (primary county: Warren)	Nassau	Reynolds Channel, west
Genesee	Black Creek, Upper, and minor tribs	Nassau	Silver Lake, Lofts Pond
Genesee	Tonawanda Creek, Middle, Main Stem	Nassau	Woodmere Channel
Genesee	Oak Orchard Creek, Upper, and tribs	Niagara	Hyde Park Lake
Genesee	Bowen Brook and tribs	Niagara	Lake Ontario Shoreline, Western
Genesee	Bigelow Creek and tribs	Niagara	Bergholtz Creek and tribs
Genesee	Black Creek, Middle, and minor tribs	Oneida	Ballou, Nail Creeks
Genesee	LeRoy Reservoir	Onondaga	Ley Creek and tribs
Greene	Schoharie Reservoir	Onondaga	Onondaga Creek, Lower and tribs

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity, cont'd.

COUNTY	WATERBODY	COUNTY	WATERBODY
Onondaga	Onondaga Creek, Middle and tribs	Suffolk	Great South Bay, West
Onondaga	Onondaga Creek, Upp, and minor tribs	Suffolk	Mill and Seven Ponds
Onondaga	Harbor Brook, Lower, and tribs	Suffolk	Moriches Bay, East
Onondaga	Ninemile Creek, Lower, and tribs	Suffolk	Moriches Bay, West
Onondaga	Minor tribs to Onondaga Lake	Suffolk	Quantuck Bay
Onondaga	Onondaga Creek, Lower, and tribs	Suffolk	Shinnecock Bay (and Inlet)
Ontario	Honeoye Lake	Sullivan	Bodine, Montgomery Lakes
Ontario	Hemlock Lake Outlet and minor tribs	Sullivan	Davies Lake
Ontario	Great Brook and minor tribs	Sullivan	Pleasure Lake
Orange	Monhagen Brook and tribs	Sullivan	Swan Lake
Orange	Orange Lake	Tompkins	Cayuga Lake, Southern End
Orleans	Lake Ontario Shoreline, Western	Tompkins	Owasco Inlet, Upper, and tribs
Oswego	Pleasant Lake	Ulster	Ashokan Reservoir
Oswego	Lake Neatahwanta	Ulster	Esopus Creek, Upper, and minor tribs
Putnam	Oscawana Lake		
Putnam	Palmer Lake	Ulster	Esopus Creek, Lower, Main Stem
Putnam	Lake Carmel	Ulster	Esopus Creek, Middle, and minor tribs
Queens	Jamaica Bay, Eastern, and tribs (Queens)		
Queens	Bergen Basin	Warren	Lake George
Queens	Shellbank Basin	Warren	Tribs to L.George, Village of L George
Rensselaer	Nassau Lake		
Rensselaer	Snyders Lake	Warren	Huddle/Finkle Brooks and tribs
Richmond	Grasmere, Arbutus and Wolfes Lakes	Warren	Indian Brook and tribs
Rockland	Congers Lake, Swartout Lake	Warren	Hague Brook and tribs
Rockland	Rockland Lake	Washington	Tribs to L.George, East Shr Lk George
Saratoga	Ballston Lake		
Saratoga	Round Lake	Washington	Cossayuna Lake
Saratoga	Dwaas Kill and tribs	Washington	Wood Cr/Champlain Canal, minor tribs
Saratoga	Tribs to Lake Lonely		
Saratoga	Lake Lonely	Wayne	Port Bay
Schenectady	Collins Lake	Wayne	Marbletown Creek and tribs
Schenectady	Duane Lake	Westchester	Lake Katonah
Schenectady	Mariaville Lake	Westchester	Lake Mohegan
Schoharie	Engleville Pond	Westchester	Lake Shenorock
Schoharie	Summit Lake	Westchester	Reservoir No.1 (Lake Isle)
Schuyler	Cayuta Lake	Westchester	Saw Mill River, Middle, and tribs
St. Lawrence	Fish Creek and minor tribs	Westchester	Silver Lake
St. Lawrence	Black Lake Outlet/Black Lake	Westchester	Teatown Lake
Steuben	Lake Salubria	Westchester	Truesdale Lake
Steuben	Smith Pond	Westchester	Wallace Pond
Suffolk	Millers Pond	Westchester	Peach Lake
Suffolk	Mattituck (Marratooka) Pond	Westchester	Mamaroneck River, Lower
Suffolk	Tidal tribs to West Moriches Bay	Westchester	Mamaroneck River, Upp, and tribs
Suffolk	Canaan Lake	Westchester	Sheldrake River and tribs
Suffolk	Lake Ronkonkoma	Westchester	Blind Brook, Lower
Suffolk	Beaverdam Creek and tribs	Westchester	Blind Brook, Upper, and tribs
Suffolk	Big/Little Fresh Ponds	Westchester	Lake Lincolndale
Suffolk	Fresh Pond	Westchester	Lake Meahaugh
Suffolk	Great South Bay, East	Wyoming	Java Lake
Suffolk	Great South Bay, Middle	Wyoming	Silver Lake

Note: The list above identifies those waters from the final New York State "2014 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated January 2015, that are impaired by silt, sediment or nutrients.

APPENDIX F

LIST OF NYS DEC REGIONAL OFFICES

Region	COVERING THE FOLLOWING COUNTIES:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS	DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1150 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, PO BOX 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD WARRENSBURG, NY 12885-1172 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROAD AVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVE. BUFFALO, NY 14203-2999 TEL. (716) 851-7070

Chapter 168. Stormwater Management and Erosion and Sediment Control

[HISTORY: Adopted by the Town Board of the Town of Ossining 7-11-2006 by L.L. No. 5-2006. Amendments noted where applicable.]

GENERAL REFERENCES

Building construction — See Ch. **63**.
Environmental quality review — See Ch. **85**.
Excavations — See Ch. **87**.
Filling and grading — See Ch. **92**.
Flood damage prevention — See Ch. **102**.
Freshwater wetlands, watercourses and water body protection — See Ch. **105**.
Sewers — See Ch. **160**.
Steep slope protection — See Ch. **167**.
Streams and watercourses — See Ch. **169**.
Subdivision of land — See Ch. **176**.
Zoning — See Ch. **200**.

Article I. General Provisions

§ 168-1. Title.

This chapter shall be known and cited as the "Stormwater Management and Erosion and Sediment Control Law of the Town of Ossining."

§ 168-2. Definitions.

A. Unless specifically defined below, words and phrases used in this chapter shall be interpreted to have common English usage, to give effect to the purpose set forth in § **168-3** and to provide reasonable application of this chapter.

B. As used in this chapter, the following terms shall have the meanings indicated:

AGRICULTURAL ACTIVITY
The activity of an active farm, including grazing and watering livestock, irrigating crops, harvesting crops, using land for growing agricultural products, and cutting timber for sale, but shall not include the operation of a dude ranch or similar operation or the construction of new structures associated with agricultural activities.

APPLICANT
A property owner or agent of a property owner who has filed an application for a land development activity.

BUILDING
Any structure, either temporary or permanent, having walls and a roof, designed for the shelter of any person, animal, or property, and occupying more than 100 square feet of area.

CHANNEL
A natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

CLEARING

Any activity that removes the vegetative surface cover.

DEDICATION

The deliberate appropriation of property by its owner for general public use.

DEPARTMENT

The New York State Department of Environmental Conservation.

DESIGN MANUAL

The New York State Stormwater Management Design Manual, most recent version, including applicable updates, that serves as the official guide for stormwater management principles, methods and practices.

DEVELOPER

A person who undertakes land development activities.

EROSION CONTROL MANUAL

The most recent version of the New York Standards and Specifications for Erosion and Sediment Control manual, commonly known as the "Blue Book."

FACILITY OWNER

A person who owns stormwater control facilities as defined herein.

GRADING

Excavation or fill of material, including the resulting conditions thereof.

IMPERVIOUS COVER

Those surfaces, improvements and structures that cannot effectively infiltrate rainfall, snowmelt and water (e.g., building rooftops, pavement, sidewalks, driveways, etc.).

INDUSTRIAL STORMWATER PERMIT

A State Pollutant Discharge Elimination System permit issued to a commercial industry or group of industries which regulates the pollutant levels associated with industrial stormwater discharges or specifies on-site pollution control strategies.

INFILTRATION

The process of percolating stormwater into the subsoil.

LAND DEVELOPMENT ACTIVITY

Construction activity, including clearing, grading, excavating, soil disturbance or placement of fill, that results in land disturbance of equal to or greater than one acre, or activities disturbing less than one acre of total land area that is part of a larger common plan of development or sale, even though multiple separate and distinct land development activities may take place at different times on different schedules.

LANDOWNER

The legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land.

MAINTENANCE AGREEMENT

A legally recorded document which acts as a property deed restriction and which provides for long-term maintenance of stormwater management practices.

NONPOINT SOURCE POLLUTION

Pollution from any source other than from any discernible, confined, and discrete conveyances and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

PERSON

Any person, firm, partnership, association, corporation, company, organization or other legal entity of any kind, including public agencies and municipal corporations.

PHASING

Clearing a parcel of land in distinct pieces or parts, with the stabilization of each piece completed before the clearing of the next.

POLLUTANT OF CONCERN

Sediment or a water quality measurement that addresses sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the land development activity.

PROJECT

Land development activity.

RECHARGE

The replenishment of underground water reserves.

SEDIMENT CONTROL

Measures that prevent eroded sediment from leaving the site.

SILVICULTURAL

Of or relating to the management and care of forests.

SPDES GENERAL PERMIT FOR CONSTRUCTION ACTIVITIES GP-02-01

A permit under the New York State Pollutant Discharge Elimination System (SPDES) issued to developers of construction activities to regulate disturbance of one or more acres of land.

SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM MUNICIPAL SEPARATE STORMWATER SEWER SYSTEMS GP-02-02

A permit under the New York State Pollutant Discharge Elimination System (SPDES) issued to municipalities to regulate discharges from municipal separate storm sewers for compliance with EPA-established water quality standards and/or to specify stormwater control standards.

STABILIZATION

The use of practices that prevent exposed soil from eroding.

STOP-WORK ORDER

An order issued by the duly authorized municipal authority which requires that all land development activity and other construction activity on a site be stopped.

STORMWATER

Rainwater, surface runoff, snowmelt and drainage.

STORMWATER HOTSPOT

A land use or activity that generates higher concentrations of hydrocarbons, trace metals or toxicants than are found in typical stormwater runoff, based on monitoring studies.

STORMWATER MANAGEMENT

The use of structural or nonstructural practices that are designed to reduce stormwater runoff and mitigate its adverse impacts on property, natural resources and the environment.

STORMWATER MANAGEMENT FACILITY

One or a series of stormwater management practices installed, stabilized and operating for the purpose of controlling stormwater runoff.

STORMWATER MANAGEMENT OFFICER

An employee, officer or duly authorized representative designated by the municipality to accept and review stormwater pollution prevention plans, forward the plans to the applicable municipal board and inspect stormwater management practices upon implementation.

STORMWATER MANAGEMENT PRACTICES (SMPs)

Measures, either structural or nonstructural, that are determined to be the most effective, practical means of preventing flood damage and preventing or reducing point source or nonpoint source pollution inputs to stormwater runoff and water bodies.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A plan for controlling stormwater runoff and pollutants from a site during and after construction activities.

STORMWATER RUNOFF

Flow on the surface of the ground, resulting from precipitation.

SURFACE WATERS OF THE STATE OF NEW YORK

Lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic Ocean within the territorial seas of the State of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction. Storm sewers and waste treatment systems, including treatment ponds or lagoons that also meet the criteria of this definition, are not waters of the state. This exclusion applies only to man-made bodies of water that neither were originally created in waters of the state (such as a disposal area in wetlands) nor resulted from impoundment of waters of the state.

WATERCOURSE

A permanent or intermittent stream or other body of water, either natural or man-made, which gathers or carries surface water.

WATERWAY

A channel that directs surface runoff to a watercourse or to the public storm drain.

WETLAND

An area as defined in §**105-2B** of this Code.

§ 168-3. Findings of fact.

It is hereby determined that:

A. Land development activities and associated increases in site impervious cover often alter the hydrologic response of local watersheds and increase stormwater runoff rates and volumes, flooding, stream channel erosion, or sediment transport and deposition.

B. This stormwater runoff contributes to increased quantities of water-borne pollutants, including siltation of aquatic habitat for fish and other desirable species.

C. Clearing, grading, excavating, soil disturbance or placement of fill during construction tends to increase soil erosion and add to the loss of native vegetation necessary for terrestrial and aquatic habitat.

D. Improper design, maintenance and construction of stormwater management practices can increase the velocity of stormwater runoff, thereby increasing streambank erosion and sedimentation.

E. Impervious surfaces allow less water to percolate into the soil, thereby decreasing groundwater recharge and stream baseflow.

F. Substantial economic losses can result from these adverse impacts on the waters of the municipality.

G. Stormwater runoff, soil erosion and nonpoint source pollution can be controlled and minimized through the regulation of stormwater runoff from land development activities.

H. The regulation of stormwater runoff discharges from land development activities in order to control and minimize increases in stormwater runoff rates and volumes, soil erosion, stream channel erosion, and nonpoint source pollution associated with stormwater runoff is in the public interest and will minimize threats to public health and safety.

I. Regulation of land development activities by means of performance standards governing stormwater management and site design will produce development compatible with the natural functions of a particular site or an entire watershed and thereby mitigate the adverse effects of erosion and sedimentation from development.

§ 168-4. Purpose.

The purpose of this chapter is to establish minimum stormwater management requirements and controls to protect and safeguard the general health, safety, and welfare of the public residing within this jurisdiction and to address the findings of fact in § **168-3** hereof. This chapter seeks to meet this purpose by achieving the following objectives:

A. Meet the requirements of minimum measures 4 and 5 of the SPDES general permit for stormwater discharges from municipal separate stormwater sewer systems (MS4 SPDES No. NYR20A370), Permit No. GP-02-02, or as amended or revised.

B. Require land development activities to conform to the substantive requirements of the NYS Department of Environmental Conservation State Pollutant Discharge Elimination System (SPDES) general permit for construction activities GP-02-01, or as amended or revised.

C. Minimize increases in the rate of stormwater runoff from land development activities in order to reduce flooding, siltation, increases in stream temperature, and streambank erosion and maintain the integrity of stream channels.

D. Minimize increases in pollution caused by stormwater runoff from land development activities which would otherwise degrade local water quality.

E. Minimize the total annual volume of stormwater runoff that flows from any specific site during and following development to the maximum extent practicable.

F. Reduce stormwater runoff rates and volumes, soil erosion and nonpoint source pollution, wherever possible, through stormwater management practices, and ensure that these management practices are properly maintained and eliminate threats to public safety.

§ 168-5. Statutory authority.

In accordance with Article 10 of the Municipal Home Rule Law of the State of New York, the Town Board has the authority to enact local laws and amend local laws for the purpose of promoting the health, safety or general welfare of the Town and for the protection and enhancement of its physical environment. The Town Board may include in any such local law provisions for the appointment of any municipal officer, employees, or independent contractor to effectuate, administer and enforce such chapter.

§ 168-6. Applicability; Stormwater Management Officer; review of land development activities.

A. This chapter shall be applicable to all land development activities as defined in § **168-2** of this chapter.

B. The municipality shall designate a Stormwater Management Officer, who shall accept and review all stormwater pollution prevention plans and forward such plans to the applicable municipal board. The Stormwater Management Officer may:

(1) Review the plans;

(2) Upon approval by the Town Board, engage the services of a registered professional engineer to review the plans, specifications and related documents at a cost not to exceed a fee schedule established by said governing board; or

(3) Accept the certification of a licensed professional that the plans conform to the requirements of this chapter.

C. All land development activities subject to review and approval by the Planning Board shall be reviewed subject to the standards contained in this chapter.

D. All land development activities not subject to review as stated in § **168-6C** shall be required to submit a stormwater pollution prevention plan (SWPPP) to the Stormwater Management Officer, who shall approve the SWPPP if it complies with the requirements of this chapter.

§ 168-7. Exemptions.

The following activities may be exempt from review under this chapter:

A. Agricultural activity as defined in this chapter.

B. Silvicultural activity, except that landing areas and log haul roads are subject to this chapter.

C. Routine maintenance activities that disturb less than five acres and are performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility.

D. Repairs to any stormwater management practice or facility deemed necessary by the Stormwater Management Officer.

E. Any part of a subdivision if a plat for the subdivision has been approved by the Town on or before the effective date of this chapter.

F. Land development activities for which a building permit has been approved on or before the effective date of this chapter.

G. Cemetery graves.

H. Installation of fence, sign, telephone, and electric poles and other kinds of posts or poles.

I. Emergency activity immediately necessary to protect life, property or natural resources.

J. Activities of an individual engaging in home gardening by growing flowers, vegetables and other plants primarily for use by that person and his or her family.

K. Landscaping and horticultural activities in connection with an existing noncommercial structure.

Article II. Principles and General Requirements

§ 168-8. Stormwater pollution prevention plans.

A. Stormwater pollution prevention plan requirement. No application for approval of a land development activity shall be reviewed until the appropriate board has received a stormwater pollution prevention plan (SWPPP) prepared in accordance with the specifications in this chapter.

B. Contents of stormwater pollution prevention plans.

(1) All SWPPPs shall provide the following background information and erosion and sediment controls:

(a) Background information about the scope of the project, including location, type and size of the project.

(b) A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); wetlands and drainage patterns that could be affected by the construction activity; existing and final slopes; locations of off-site material, waste, borrow or equipment storage areas; and location(s) of the stormwater discharges(s). The site map shall be at a scale no smaller than one inch equals 50 feet (e.g., one inch equals 500 feet is smaller than one inch equals 100 feet).

(c) A description of the soil(s) present at the site.

(d) A construction phasing plan describing the intended sequence of construction activities, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance. Consistent with the New York Standards and Specifications for Erosion and Sediment Control (Erosion Control Manual), not more than five acres shall be disturbed at any one time unless pursuant to an approved SWPPP. The Town may opt to reduce the amount of land that may be exposed at any one time.

(e) A description of the pollution prevention measures that will be used to control construction materials, chemicals and debris from becoming a pollutant source in stormwater runoff.

(f) A description of construction and waste materials expected to be stored on site, with updates as appropriate, and a description of controls to reduce pollutants from these materials, including storage practices to minimize exposure of the materials, to stormwater, and spill prevention and response.

(g) Temporary and permanent structural and vegetative measures to be used for soil stabilization, runoff control and sediment control for each stage of the project, from initial land clearing and grubbing to project closeout.

(h) A site map/construction drawing(s) specifying the location(s), size(s) and length(s) of each erosion and sediment control practice.

(i) Dimensions, material specifications and installation details for all erosion and sediment control practices, including the siting and sizing of any temporary sediment basins.

(j) Temporary practices that will be converted to permanent control measures.

(k) An implementation schedule for staging temporary erosion and sediment control practices, including the timing of initial placement and duration that each practice will remain in place until the site is stabilized.

(l) A maintenance schedule to ensure continuous and effective operation of the erosion and sediment control practice.

(m) The name(s) of the receiving water(s) and NYSDEC classification(s), if applicable.

(n) A delineation of SWPPP implementation responsibilities for each part of the site.

(o) A description of structural practices designed to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable.

(p) Any existing data that describes the stormwater runoff at the site.

(2) Land development activities as defined in § **168-2** of this chapter and meeting Conditions A, B or C below shall also include water quantity and water quality controls (postconstruction stormwater runoff controls) as set forth in § **168-8B(3)** below as applicable:

(a) Condition A: Stormwater runoff from land development activities discharging a pollutant of concern to either an impaired water identified on the Department's 303(d) list of impaired waters or a total-maximum-daily-load (TMDL)-designated watershed for which pollutants in stormwater have been identified as a source of the impairment.

(b) Condition B: Stormwater runoff from land development activities disturbing five or more acres.

(c) Condition C: Stormwater runoff from land development activity disturbing between one and five acres of land during the course of the project, exclusive of the construction of one single-family residence and construction activities at agricultural properties.

(3) SWPPP requirements for Conditions A, B and C:

(a) All information in § **168-8B(1)** of this chapter.

(b) A description of each postconstruction stormwater management practice.

(c) A site map/construction drawing(s) showing the specific location(s) and size(s) of each postconstruction stormwater management practice.

(d) A hydrologic and hydraulic analysis for all structural components of the stormwater management system for the applicable design storms.

(e) A comparison of postdevelopment stormwater runoff conditions with predevelopment conditions.

(f) Dimensions, material specifications and installation details for each postconstruction stormwater management practice.

(g) A maintenance schedule to ensure continuous and effective operation of each postconstruction stormwater management practice.

(h) Maintenance easements to ensure access to all stormwater management practices at the site for the purpose of inspection and repair. Easements shall be recorded on the plan and shall remain in effect with transfer of title to the property.

(i) An inspection and maintenance agreement binding on all subsequent landowners served by the on-site stormwater management measures in accordance with § **168-10** of this chapter.

(4) Plan certification. The SWPPP shall be prepared by a landscape architect, certified professional or professional engineer and must be signed by the professional preparing the plan, who shall certify that the design of all stormwater management practices meets the requirements in this chapter.

(5) Other environmental permits. The applicant shall assure that all other applicable environmental permits have been or will be acquired for the land development activity prior to approval of the final stormwater design plan.

(6) Contractor certification.

(a) Each contractor and subcontractor identified in the SWPPP and/or any successor or substitute contractor or subcontractor who will be involved in soil disturbance and/or stormwater management practice installation shall sign and date a copy of the following certification statement before undertaking any land development activity: "I certify under penalty of law that I understand and agree to comply with the terms and conditions of the stormwater pollution prevention plan. I also understand that it is unlawful for any person to cause or contribute to a violation of water quality standards." Copies of these statements shall be delivered to the duly authorized municipal authority.

(b) The certification must include the name and title of the person providing the signature, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made. The certification statement(s) shall become part of the SWPPP for the land development activity.

(7) A copy of the SWPPP shall be retained at the site of the land development activity during construction from the date of initiation of construction activities to the date of final stabilization.

§ 168-9. Performance and design criteria.

All land development activities shall be subject to the following performance and design criteria:

A. Official guides. For the purpose of this chapter, the following documents shall serve as the official guides and specifications for stormwater management; stormwater management practices that are designed and constructed in accordance with these technical documents shall be presumed to meet the standards imposed by this chapter:

(1) The New York State Stormwater Management Design Manual (New York State Department of Environmental Conservation, most current version or its successor, hereafter referred to as the Design Manual). See Schedule A of this chapter for stormwater management practices acceptable for water quality.[1]

[1] *Editor's Note: A copy of Schedule A is available in the Supervisor's office.*

(2) New York Standards and Specifications for Erosion and Sediment Control (Empire State Chapter of the Soil and Water Conservation Society, 2004, most current version or its successor, hereafter referred to as the Erosion Control Manual). A copy of the manual is on file in the office of the Stormwater Management Officer.

B. Technical standards. All development proposals disturbing less than one acre of land are subject to the same requirements specified in the manuals in Subsections **A(1)** and **(2)** above for land development activities disturbing between one and five acres of land. Such requirements shall include but not be limited to the following:

(1) Grading, erosion control practices, sediment control practices, and waterway crossings shall meet the design criteria set forth in the most recent version of the Erosion Control Manual.

(2) Clearing, except that necessary to establish sediment control devices, shall not begin until all erosion and sediment control devices have been installed and have been stabilized.

(3) Erosion control requirements shall include stabilization measures applied as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. This requirement does not apply in the following instances:

(a) Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable.

(b) Where construction activity on a portion of the site is temporarily ceased and earth-disturbing activities will be resumed within 21 days, temporary stabilization measures need not be initiated on that portion of the site.

(4) If seeding or other vegetative erosion control method does not germinate within two weeks, the Stormwater Management Officer may require the site to be reseeded or a nonvegetative option employed.

(5) Special techniques that meet the design criteria outlined in the Erosion Control Manual for steep slopes and/or drainageways shall be used. Soil stockpiles must be stabilized. At the close of the construction season, the entire site must be stabilized using a heavy mulch layer or another method that does not require seed germination to control erosion (if seed germination will not occur due to climate limitations).

(6) Techniques shall be employed to prevent the blowing of dust or sediment from the site.

(7) Techniques that divert upland runoff past disturbed slopes shall be employed. Sediment control requirements shall include settling basins, sediment traps or tanks, and perimeter controls.

(8) Settling basins that are designed for adaptation to long-term stormwater management require approval by the Stormwater Management Officer.

(9) If a wet watercourse will be crossed regularly during construction, a temporary stream crossing practice approved by the Stormwater Management Officer will be installed. Stabilization of the watercourse channel and banks before,

during and after any in-channel work will be completed.

(10) Stabilization adequate to prevent erosion located at the outlets of all pipes, paved channels and on-site stormwater conveyance channels shall be designed according to the criteria outlined in the Erosion Control Manual.

(11) Construction site access requirements shall include a temporary access road provided at all access points to ensure that sediment is not tracked onto public streets by construction vehicles or washed into storm drains or watercourses.

C. Water quality standards. Any land development activity shall not cause an increase in turbidity that will result in substantial visible contrast to natural conditions in surface waters of the State of New York.

§ 168-10. Maintenance and repair of stormwater facilities.

A. Maintenance during construction.

(1) The applicant or developer of the land development activity shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the applicant or developer to achieve compliance with the conditions of this chapter. Sediment shall be removed from sediment traps or sediment ponds whenever their design capacity has been reduced by 50%.

(2) The applicant or developer or his or her representative shall be on site at all times when construction or grading activity takes place and shall inspect and document the effectiveness of all erosion and sediment control practices. Inspection reports shall be completed every seven days and within 24 hours of any storm event producing 0.5 inches of precipitation or more. The reports shall be delivered to the Stormwater Management Officer and also copied to the site log book.

B. Maintenance easement(s). Prior to the issuance of any approval that has a stormwater management facility as one of the requirements, the applicant or developer must execute a maintenance easement agreement that shall be binding on all subsequent landowners served by the stormwater management facility. The easement shall provide for access to the facility at reasonable times for periodic inspection by the Town to ensure that the facility is maintained in proper working condition to meet design standards and any other provisions established by this chapter. The easement shall be recorded by the grantor in the office of the County Clerk after approval by the Counsel for the Town.

C. Maintenance after construction. The owner or operator of permanent stormwater management practices installed in accordance with this chapter shall operate and maintain the stormwater management practices to achieve the goals of this chapter. Proper operation and maintenance also includes, as a minimum, the following:

(1) A preventive/corrective maintenance program for all critical facilities and systems of treatment and control (or related appurtenances) that are installed or used by the owner or operator to achieve the goals of this chapter.

(2) Written procedures for operation and maintenance and training new maintenance personnel.

(3) Discharges from the SMPs shall not exceed design criteria or cause or contribute to water quality standard violations in accordance with § **168-9C**.

D. Maintenance agreements. The Town shall approve a formal maintenance agreement for stormwater management facilities binding on all subsequent landowners and recorded in the office of the County Clerk as a deed restriction on the property prior to final plan approval. The maintenance agreement shall be consistent with the terms and conditions of Schedule B of this chapter entitled "Sample Stormwater Control Facility Maintenance Agreement."[1] The Town, in lieu of a maintenance agreement, at its sole discretion, may accept dedication of any existing or future stormwater management facility, provided that such facility meets all the requirements of this chapter and includes adequate and perpetual access and sufficient area, by easement or otherwise, for inspection and regular maintenance.

[1] *Editor's Note: A copy of Schedule B is available in the Supervisor's office.*

Article III. Administration and Enforcement

§ 168-11. Construction inspection.

A. Stormwater management practice inspections. The Town Stormwater Management Officer is responsible for conducting inspections of stormwater management practices (SMPs). All applicants are required to submit as built plans for any stormwater management practices located on site after final construction is completed. The plan must show the final design specifications for all stormwater management facilities and must be certified by a professional engineer.

B. Inspection of stormwater facilities after project completion. Inspection programs shall be established on any reasonable basis, including but not limited to routine inspections; random inspections; inspections based upon complaints or other notice of possible violations; inspection of drainage basins or areas identified as higher-than-typical sources of sediment or other contaminants or pollutants; inspections of businesses or industries of a type associated with higher-than-usual discharges of contaminants or pollutants or with discharges of a type that are more likely than the typical discharge to cause violations of state or federal water or sediment quality standards or the SPDES stormwater permit; and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to, reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in drainage control facilities; and evaluating the condition of drainage control facilities and other stormwater management practices.

C. Submission of reports. The Town of Ossining Stormwater Management Officer may require monitoring and reporting from entities subject to this chapter as are necessary to determine compliance with this chapter.

D. Right of entry for inspection. When any new stormwater management facility is installed on private property or when any new connection is made between private property and the public stormwater system, the landowner shall grant to the Town the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection as specified in § **168-11B**.

§ 168-12. Performance guarantee.

A. Construction completion guarantee. In order to ensure the full and faithful completion of all land development activities related to compliance with all conditions set forth by the Town in its approval of the stormwater pollution prevention plan, the Town may require the applicant or developer to provide, prior to construction, a performance bond, cash escrow, or irrevocable letter of credit from an appropriate financial or surety institution which guarantees satisfactory completion of the project and names the Town as the beneficiary. The security shall be in an amount to be determined by the Town based on submission of final design plans, with reference to actual construction and landscaping costs. The performance guarantee shall remain in force until the surety is released from liability by the Town, provided that such period shall not be less than one year from the date of final acceptance or such other certification that the facility(ies) have been constructed in accordance with the approved plans and specifications and that a one-year inspection has been conducted and the facilities have been found to be acceptable to the Town. Per annum interest on cash escrow deposits shall be reinvested in the account until the surety is released from liability.

B. Maintenance guarantee. Where stormwater management and erosion and sediment control facilities are to be operated and maintained by the developer or by a corporation that owns or manages a commercial or industrial facility, the developer, prior to construction, may be required to provide the Town with an irrevocable letter of credit from an approved financial institution or surety to ensure proper operation and maintenance of all stormwater management and erosion control facilities both during and after construction and until the facilities are removed from operation. If the developer or landowner fails to properly operate and maintain stormwater management and erosion and sediment control facilities, the Town may draw upon the account to cover the costs of proper operation and maintenance, including engineering and inspection costs.

C. Recordkeeping. Entities subject to this chapter shall maintain records demonstrating compliance with this chapter.

§ 168-13. Enforcement; penalties for offenses.

A. Notice of violation. When the Town determines that a land development activity is not being carried out in accordance with the requirements of this chapter, it may issue a written notice of violation to the landowner. The notice of violation shall contain:

(1) The name and address of the landowner, developer or applicant;

(2) The address, when available, or a description of the building, structure or land upon which the violation is occurring;

(3) A statement specifying the nature of the violation;

(4) A description of the remedial measures necessary to bring the land development activity into compliance with this chapter and a time schedule for the completion of such remedial action;

(5) A statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed;

(6) A statement that the determination of violation may be appealed to the municipality by filing a written notice of appeal within 15 days of service of notice of violation.

B. Stop-work orders. The Town may issue a stop-work order for violations of this law. Persons receiving a stop-work order shall be required to halt all land development activities and other construction activities on the site, except those activities that address the violations leading to the stop-work order. The stop-work order shall be in effect until the Town confirms that the land development activity is in compliance and the violation has been satisfactorily addressed. Failure to address a stop-work order in a timely manner may result in civil, criminal, or monetary penalties in accordance with the enforcement measures authorized in this chapter.

C. Injunction. Any land development activity that is commenced or is conducted contrary to this chapter may be restrained by injunction or otherwise abated in a manner provided by this chapter.

D. Penalties for offenses. Any person who violates the provisions of this chapter shall be guilty of a violation punishable by a fine not less than $500 nor more than $1,000 or imprisonment for a period not to exceed six months, or both, for conviction of a first offense; for conviction of a second offense, both of which were committed within a period of five years, punishable by a fine not less than $1,000 nor more than $1,500 or imprisonment for a period not to exceed six months, or both; and upon conviction for a third or subsequent offense, all of which were committed within a period of five years, punishable by a fine not less than $1,500 nor more than $2,000 or imprisonment for a period not to exceed six months, or both. However, for the purposes of conferring jurisdiction upon courts and judicial officers generally, violations of this chapter shall be deemed misdemeanors, and for such purpose only, all provisions of law relating to misdemeanors shall apply to such violations. Each week's continued violation shall constitute a separate additional violation.

E. Restoration of lands and mitigation of damage. In addition to any penalty provided herein or by law, any person in violation of this chapter may be required to restore land to its undisturbed condition and/or mitigate on-site and off-site damage from stormwater runoff, sediment or pollutants resulting from the violator's activities. In the event that restoration is not undertaken within a reasonable time after notice, the Town may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

F. Withholding of certificate of occupancy. If any building or land development activity is installed or conducted in violation of this chapter, the Stormwater Management Officer may prevent the occupancy of said building or land.

§ 168-14. Fees for services.

Any person undertaking land development activities regulated by this chapter shall pay the cost of services incurred by the Town for the review of SWPPPs, inspections, or SMP maintenance performed by the Town or performed by a third party for the Town. The Town may establish escrow accounts for this purpose prior to authorizing the performance of said services.

APPENDIX C

Owner/Operator Certification

Contractor Certification

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. 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 ______________________________

E-mail ______________________________

Signature ______________________________

Name of Trained Individual ______________________________

CONTRACTOR CERTIFICATION

Contractor Certification Statement - All contractors and subcontractors identified in a SWPPP in accordance with Part III.E.1 (SPDES General Permit for Stormwater Runoff from Construction Activity, GP-0-15-002, January 2015) of this permit shall sign a copy of the following certification statement before undertaking any construction activity at the site identified in the SWPPP:

"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 O*wner or Operator* must comply with the terms and conditions 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."

Individual Contractor:

Name and Title (please print) ______________________________

Signature of Contractor ______________________________

Name of Trained Individual ______________________________

Company / Contracting Firm:

Name of Company ______________________________

Address of Company ______________________________

Telephone Number / Cell Number______________________________

Site Information:

Address of Site ______________________________

____

Today's Date: ______________________________

APPENDIX D

Construction Sequence

Recommended Sequence of Construction

Use of erosion and sediment control structures and practices are important for maintaining site stability under runoff and during daily construction activities. The Construction Sequence should be staged with erosion and sediment controls, as follows, with all controls in place and implemented prior to respective infrastructure construction. As construction proceeds, the controls should be monitored, maintained and replaced as needed. Additional controls may be required as needed to address unforeseen situations.

Refer to The Construction Drawings for all plans and details which relate to the Construction Sequence. This Sequence should be followed in conjunction with all Plans, Notes, and the Stormwater Pollution Prevention Plan. Prior to the commencement of work, the Owner and General Contractor shall read and understand the Sequence for Construction. The Sequence shall be discussed at the time of the Pre-construction Meeting.

During construction of the project, the Contractor is responsible to coordinate all required inspections with various agencies and the Project Engineer.

General Sequence: **The general sequence applies to the start of all work of the project. The requirements in such shall be applied as appropriate and shall be assumed in place prior to the start of the work outlined in the sequence for each phase.**

1. Prior to the beginning of any site work the major features of the construction must be field staked by a licensed surveyor. These include the building, driveways, limits of disturbance, utility lines, and stormwater practices.

2. Prior to the start of the project, an on-site pre-construction meeting will be held. this will be attended by the project owner, the operator responsible for complying with the approved construction drawings including the erosion and sediment control (E&SC) plan and details, the design engineer, the engineer responsible for E&SC monitoring during construction, and town representatives from the engineering department and code enforcement.

3. Cut and clear trees within the phase limits as necessary for the areas to be disturbed. Install tree protective measure at marked locations on E&SC plan.

4. Install all temporary erosion control measures as shown on the erosion and sediment control plan for the project's immediate disturbance areas. This shall include, but not limited to silt fence, stabilized construction entrances, construction fence, etc. This sequence must be followed to insure proper implementation of the erosion and sediment control plan (E&SC) and stormwater pollution prevention plan (SWPPP).

5. Timbered trees and woodchips shall be temporarily stored in the stockpile and/or staging area if necessary, before being removed off-site. woodchips may be used for mulch to stabilize disturbed areas. Woodchip mulch shall be applied at a minimum rate of 500 lbs. per 1000 sf (2" thick minimum).

6. Remove existing vegetative cover, cut and clear trees, grub, remove stumps and other surface features in the limit of construction only. Any disturbance that results from tree clearing and grubbing shall be immediately stabilized with woodchips

mulch, hydro-mulch, or straw and seed. Timbered trees, wood chips, and stumps shall be removed off-site unless otherwise directed. as stated woodchips may be stockpiled for use as stabilizing ground cover. Demolish and/or remove existing features, i.e.: building, fence, concrete slab, asphalt etc., and dispose of or stockpile as required by the owner. All construction debris shall be properly disposed of in accordance with all federal, state, and local requirements.

7. Once the tree removal operation is complete strip the topsoil within the work boundary and place excavated topsoil within the identified stockpile locations. Any soils so deemed by the design or monitoring engineer shall be stockpiled for future use as landscaped area topsoil. Contractor shall take every precaution feasible to reduce the amount of disturbed/exposed soils during construction.

8. Any disturbed area that will not be further disturbed within seven (7) days shall be immediately stabilized with woodchips, hydro-mulch, or straw and seed.

9. Begin rough grading of driveways within work limits and adjacent areas. slopes in excess of 3h:1v shall not be left exposed and must be stabilized.

10. Cut material shall first be moved to the fill locations required to complete the access drive and staging area and bring the area up to final grades. Blasted rock that is not suitable to remain on site shall be hauled away and properly disposed of.

11. Stake-out the location of utilities and utility structures within this phase. Begin installation of infiltration chambers.

12. When the subsurface units are installed, the upstream drainage structure shall be blocked so as to not allow sediment laden water from reaching the subsurface chambers.

13. Backfill as installation is complete and stabilize the area. If trenches are to be left open, place excavated material on the up-slope sides of the trench and protect and stabilize if it is to remain open for an extended period of seven (7) days or more.

14. Upon completion of the subsurface chambers, begin installation of proposed bypass and outlet structures. install storm sewer piping, catch basins and manholes, working downstream to upstream. During the installation of catch basins, install inlet protection and water bar as per E&SC plan to assure that sediment laden water will not enter the storm system. Once the final grade above the system is achieved, put into place the final topsoil cover, seed mix, and erosion control blanket, or hydro-mulch. Refer to the landscape plan for the seed mix requirements.

15. Proceed with the construction of the buildings. This includes the building structure itself and rough grades. At any point during this begin installation of the utilities including the water and sewer connections, drainage and power utilities.

16. Begin rough grading the building pads for the buildings. All compaction requirements shall be met within the fill sections. (This work shall include the commencement of the retaining walls around the proposed building construction.) Upon completion of the grading, temporary seed or hydro-mulch the embankment and install erosion control blankets as shown on the plans along the northern

perimeter of the fill section. During building and site construction, maintain and re-establish as required, erosion control and stabilization measures as required by the site plan and details. Areas which are to remain undisturbed for more than seven (7) days shall be stabilized with temporary seeding or mulch.

17. A licensed surveyor must define the building locations.

18. Install or check condition of all temporary erosion control measures as shown on the erosion and sediment control plan.

19. Begin preparation of the building site and excavation of the building foundation. Areas in which final grade is achieved shall be immediately stabilized with permanent vegetative cover. Permanent slopes of 3:1 or greater shall receive erosion blankets.

20. Begin construction of the foundation. upon completion and after proper curing time is achieved, backfill the foundation and bring site to rough grade. areas which are to remain undisturbed for more than seven (7) days shall be stabilized with temporary seeding or mulch.

21. Stake out and install curbing as per plan. Once curbing is completed around catch basins, re-install inlet protection within catch basins. As curbing is complete, backfill with topsoil. Areas that are filled with topsoil are to be raked, seeded, and hay mulched.

22. Upon completion of the majority of the infrastructure, install pavement binder course to the thickness and elevation as per the construction plans.

23. As work is at the completion stage install final asphalt surface.

24. Install hardscape such as patios, walks steps etc., and final vegetation including sod and landscaping. Refer to landscape plans for location and identification of ground cover and plantings. Clear site of debris and all unwanted materials. Disposal shall be in accordance with all federal, state, and local requirements.

25. During the final phase of building construction, finish grade, topsoil, rake, and seed all areas as required. Where required or recommended, hydro-mulch or install erosion control blankets.

26. Upon completion of this phase, the contractor shall be required to stabilize disturbed soils in the event the disturbed area will remain not worked for greater than seven (7) days, at the direction of the engineer of record or permitting entity inspector, and when significant precipitation is in the immediate forecast. All disturbed areas shall be temporarily stabilized with hydro-mulch or where appropriate woodchips. It is recommended that any grading that is at the finish stage will receive no further disturbance and that permanent stabilization such as topsoil, seed, mulching or blankets as per the plan be installed.

Final site stabilization and completion of new construction:

27. Upon completion of all work, the site shall be inspected by the supervising engineer and town inspector to determine completion of all work and permanent stabilization of the site.

28. Any areas deemed incomplete or not properly stabilized shall be done so to the satisfaction to the supervising engineer and town inspector.

29. Once the site is deemed adequately stable the temporary erosion and sediment control measures can be removed. At that time if deemed appropriate drainage structures upstream from the subsurface stormwater management systems shall be cleaned of sediment and debris. They can then be unblocked to allow for flow of collected surface runoff.

Contact information during and after construction:

MGM Design & Construction Group, LLC
317 Elmwood Ave
Hawthorne, NY 10532
914-774-3804

APPENDIX E

Soil Testing

TEST PIT DATA REQUIRED TO BE SUBMITTED WITH APPLICATION

DESCRIPTION OF SOILS ENCOUNTERED IN TEST HOLES

DEPTH	HOLE NO. 1	DEPTH	HOLE NO. 2	DEPTH	HOLE NO. 3	DEPTH	HOLE NO. 4
G.L.	Topsoil	G.L.	Topsoil	G.L.	6" Topsoil	G.L.	6" Topsoil
6"		6"		6"		6"	
12"		12"		12"		12"	
18"		18"		18"		18"	
24"		24"		20"		24"	
30"		30"		30"		28"	
36"		36"		36"	Brown sand with trace fines, some gravel and cobbles seeps at 60", water at 6'	36"	Brown sand with trace fines, some gravel and cobbles, water at 4'
42"	Brown sand with trace fines, some gravel and cobbles seeps at 6', water at 7'	42"	Dark Brown sand with trace fines, some gravel and cobbles water at 7'	40"		42"	
48"		48"		48"		48"	
54"		54"		54"		54"	
60"		60"		60"		60"	
66"		66"		66"		66"	
72"		72"		72"		72"	
78"		78"		78"		78"	
84"		84"		84"		84"	
90"		90"		90"		90"	
96"	Total Depth = 7'	96"	Total Depth = 7'	96"	Total Depth = 6'	96"	Total Depth = 4'

INDICATE LEVEL AT WHICH GROUND WATER IS ENCOUNTERED varies

INDICATE LEVEL FOR WHICH WATER LEVEL RISES AFTER BEING ENCOUNTERED varies

TESTS MADE BY Thomas Kerrigan, witnessed by Dan Ciarcia DATE 9/17/2019

Sketch:

SITE DESIGN CONSULTANTS - FIELD INSPECTION REPORT

Job# 05-05 5 Hawkes Ave
Date 9/20/19 Day 1:45 PM

Owner Location 5 Hawkes Ave Ossining, NY

General Observations

Who was Present: Eric Lister

Weather 69° F - Sunny & Windy Weather Previous 68° F - Sunny

Lot # Approx. Temp. ~ 63 ° F

HOLE #		CLOCK TIME			INFILTRATION			
Hole Number	Run No.			Elapse Time Min.	Depth to Water From Ground Surface		Water Level in Inches	
		Start	Stop		Start Inches	Stop Inches	Drop in Inches	Soil Rate in./hr drop
1	1	1:51 PM	1:52 PM	1	7	31	24	1440 in/hr
	2	1:52 PM	1:53 PM	1	7	31	24	1440 in/hr
	3	1:53 PM	1:54 PM	1	7	31	24	1440 in/hr
	4	1:54 PM	1:55 PM	1	7	31	24	1440 in/hr
	5						Average =	1440 in/hr
2	1	1:47 PM	1:52 PM	5	6	30	24	288 in/hr
2	2	1:52 PM	1:57 PM	5	6	30	24	288 in/hr
	3	1:57 PM	2:02 PM	5	6	30	24	288 in/hr
	4	2:02 PM	2:07 PM	5	6	30	24	288 in/hr
	5						Average =	288 in/hr
3	1	1:54 PM	1:55 PM	1	6	30	24	1440 in/hr
3	2	1:55 PM	1:56 PM	1	6	30	24	1440 in/hr
	3	1:58 PM	1:59 PM	1	6	30	24	1440 in/hr
	4	1:59 PM	2:00 PM	1	6	30	24	1440 in/hr
	5						Average =	1440 in/hr

Notes:

1) Tests to be repeated at same depth until approximately equal soil rates are obtained at each percolation test hole. All data to be submitted for review.

2) Depth measurements to be made from top of hole.

SITE DESIGN CONSULTANTS - FIELD INSPECTION REPORT

Job# 05-05 5 Hawkes Ave

Date 9/20/19 Day 1:45 PM

Owner Location 5 Hawkes Ave Ossining, NY

General Observations

Who was Present: Eric Lister

Weather 69° F - Sunny & Windy Weather Previous 68° F - Sunny

Lot # Approx. Temp. ~ 63 ° F

HOLE #		CLOCK TIME			INFILTRATION			
Hole Number	Run No.			Elapse Time Min.	Depth to Water From Ground Surface		Water Level in Inches	
		Start	Stop		Start Inches	Stop Inches	Drop in Inches	Soil Rate in./hr drop
4	1	1:45 PM	1:46 PM	1	0	24	24	1440 in/hr
4	2	2:00 PM	2:01 PM	1	0	24	24	1440 in/hr
	3	2:01 PM	2:02 PM	1	0	24	24	1440 in/hr
	4	2:02 PM	2:03 PM	1	0	24	24	1440 in/hr
	5						Average =	1440 in/hr
	3							
	4							
	5						Average =	00 in/hr
	1							
	2							
	3							
	4							
	5						Average =	00 in/hr

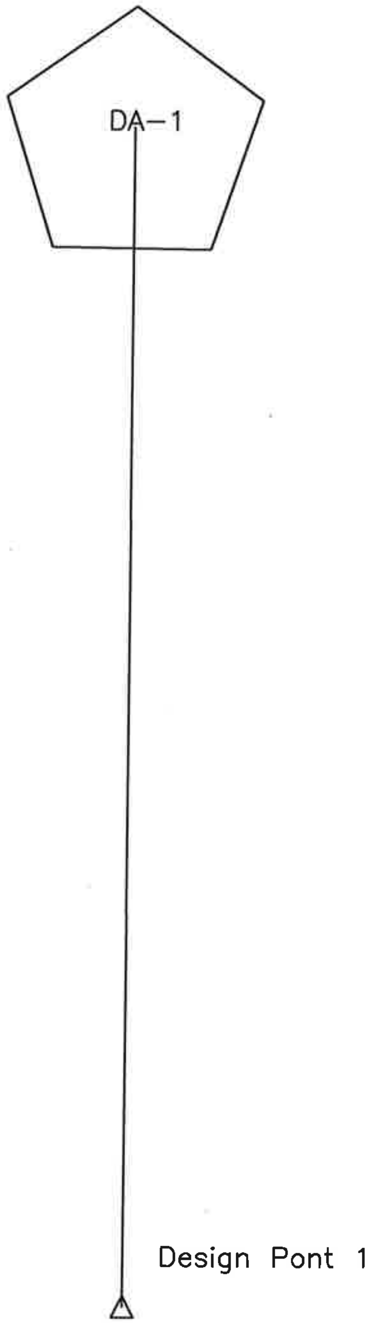
Notes:

1) Tests to be repeated at same depth until approximately equal soil rates are obtained at each percolation test hole. All data to be submitted for review.

2) Depth measurements to be made from top of hole.

APPENDIX F

Hydrologic Analysis



NOTE:
1. Source: NYS DEC Stormwater Design Manual - August 2010

FIG. 5.3 PRE DEVELOPED SCHEMATIC

MGM DESIGN & CONSTRUCTION GROUP, LLC.

Town Of Ossining

Westchester County, NY

Site Design Consultants

Civil Engineers • Land Planners

251 F Underhill Avenue Yorktown Heights, NY 10598
(914) 962-4488 - Fax (914) 962-7386
www.sitedesignconsultants.com

NOT TO SCALE
DATE:3/23/18

Pre Developed

Project Summary

Title	5 Hawkes Ave
Engineer	Joseph Riina
Company	Site Design Consultants
Date	3/12/2018

Notes

Table of Contents

Pre Developed

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
DA-1	Pre-Development 1 year	1	0.123	12.100	1.40
DA-1	Pre-Development 2 year	2	0.179	12.100	2.14
DA-1	Pre-Development 10 year	10	0.403	12.100	5.04
DA-1	Pre-Development 25 year	25	0.615	12.100	7.70
DA-1	Pre-Development 100 year	100	1.041	12.100	12.88

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
DL-1	Pre-Development 1 year	1	0.123	12.100	1.40
DL-1	Pre-Development 2 year	2	0.179	12.100	2.14
DL-1	Pre-Development 10 year	10	0.403	12.100	5.04
DL-1	Pre-Development 25 year	25	0.615	12.100	7.70
DL-1	Pre-Development 100 year	100	1.041	12.100	12.88

Pre Developed

Subsection: Time-Depth Curve — Return Event: 1 years
Label: Westchester County 1-100 2015 — Storm Event: 1 Year

Time-Depth Curve: 1 Year	
Label	1 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.0	0.0	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.1	0.1	0.1
4.500	0.1	0.1	0.1	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.2	0.2
6.500	0.2	0.2	0.2	0.2	0.2
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.3	0.3	0.3
8.000	0.3	0.3	0.3	0.3	0.4
8.500	0.4	0.4	0.4	0.4	0.4
9.000	0.4	0.4	0.4	0.4	0.5
9.500	0.5	0.5	0.5	0.5	0.5
10.000	0.5	0.5	0.6	0.6	0.6
10.500	0.6	0.6	0.6	0.7	0.7
11.000	0.7	0.7	0.7	0.8	0.8
11.500	0.8	0.9	1.0	1.0	1.2
12.000	1.4	1.6	1.8	1.8	1.9
12.500	2.0	2.0	2.0	2.1	2.1
13.000	2.1	2.1	2.1	2.2	2.2
13.500	2.2	2.2	2.2	2.2	2.3
14.000	2.3	2.3	2.3	2.3	2.3
14.500	2.3	2.3	2.4	2.4	2.4
15.000	2.4	2.4	2.4	2.4	2.4
15.500	2.4	2.4	2.5	2.5	2.5
16.000	2.5	2.5	2.5	2.5	2.5
16.500	2.5	2.5	2.5	2.5	2.5

Pre Developed

Subsection: Time-Depth Curve — Return Event: 1 years
Label: Westchester County 1-100 2015 — Storm Event: 1 Year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	2.5	2.6	2.6	2.6	2.6
17.500	2.6	2.6	2.6	2.6	2.6
18.000	2.6	2.6	2.6	2.6	2.6
18.500	2.6	2.6	2.6	2.6	2.6
19.000	2.6	2.6	2.6	2.7	2.7
19.500	2.7	2.7	2.7	2.7	2.7
20.000	2.7	2.7	2.7	2.7	2.7
20.500	2.7	2.7	2.7	2.7	2.7
21.000	2.7	2.7	2.7	2.7	2.7
21.500	2.7	2.7	2.7	2.7	2.7
22.000	2.7	2.7	2.8	2.8	2.8
22.500	2.8	2.8	2.8	2.8	2.8
23.000	2.8	2.8	2.8	2.8	2.8
23.500	2.8	2.8	2.8	2.8	2.8
24.000	2.8	(N/A)	(N/A)	(N/A)	(N/A)

Pre Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015

Return Event: 10 years
Storm Event: 10 Year

Time-Depth Curve: 10 Year	
Label	10 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.2	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.3	0.3	0.3	0.4
6.000	0.4	0.4	0.4	0.4	0.4
6.500	0.4	0.4	0.4	0.4	0.4
7.000	0.5	0.5	0.5	0.5	0.5
7.500	0.5	0.5	0.5	0.5	0.6
8.000	0.6	0.6	0.6	0.6	0.6
8.500	0.6	0.7	0.7	0.7	0.7
9.000	0.7	0.7	0.8	0.8	0.8
9.500	0.8	0.9	0.9	0.9	0.9
10.000	0.9	1.0	1.0	1.0	1.1
10.500	1.1	1.1	1.1	1.2	1.2
11.000	1.2	1.3	1.3	1.4	1.4
11.500	1.5	1.6	1.7	1.9	2.1
12.000	2.5	2.9	3.1	3.3	3.4
12.500	3.5	3.6	3.6	3.7	3.7
13.000	3.7	3.8	3.8	3.9	3.9
13.500	3.9	3.9	4.0	4.0	4.0
14.000	4.1	4.1	4.1	4.1	4.1
14.500	4.2	4.2	4.2	4.2	4.3
15.000	4.3	4.3	4.3	4.3	4.3
15.500	4.4	4.4	4.4	4.4	4.4
16.000	4.4	4.4	4.5	4.5	4.5
16.500	4.5	4.5	4.5	4.5	4.5

Pre Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015

Return Event: 10 years
Storm Event: 10 Year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	4.5	4.6	4.6	4.6	4.6
17.500	4.6	4.6	4.6	4.6	4.6
18.000	4.6	4.6	4.7	4.7	4.7
18.500	4.7	4.7	4.7	4.7	4.7
19.000	4.7	4.7	4.7	4.7	4.7
19.500	4.8	4.8	4.8	4.8	4.8
20.000	4.8	4.8	4.8	4.8	4.8
20.500	4.8	4.8	4.8	4.8	4.8
21.000	4.8	4.9	4.9	4.9	4.9
21.500	4.9	4.9	4.9	4.9	4.9
22.000	4.9	4.9	4.9	4.9	4.9
22.500	4.9	4.9	4.9	4.9	4.9
23.000	5.0	5.0	5.0	5.0	5.0
23.500	5.0	5.0	5.0	5.0	5.0
24.000	5.0	(N/A)	(N/A)	(N/A)	(N/A)

Pre Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015

Return Event: 100 years
Storm Event: 100 Year

Time-Depth Curve: 100 Year	
Label	100 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.1	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.2	0.2	0.2
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.3	0.3
3.000	0.3	0.3	0.3	0.3	0.3
3.500	0.3	0.3	0.4	0.4	0.4
4.000	0.4	0.4	0.4	0.4	0.4
4.500	0.4	0.5	0.5	0.5	0.5
5.000	0.5	0.5	0.5	0.6	0.6
5.500	0.6	0.6	0.6	0.6	0.6
6.000	0.6	0.7	0.7	0.7	0.7
6.500	0.7	0.7	0.8	0.8	0.8
7.000	0.8	0.8	0.9	0.9	0.9
7.500	0.9	0.9	1.0	1.0	1.0
8.000	1.0	1.0	1.1	1.1	1.1
8.500	1.2	1.2	1.2	1.2	1.3
9.000	1.3	1.3	1.4	1.4	1.5
9.500	1.5	1.5	1.6	1.6	1.7
10.000	1.7	1.7	1.8	1.8	1.9
10.500	1.9	2.0	2.1	2.1	2.2
11.000	2.2	2.3	2.4	2.5	2.6
11.500	2.7	2.8	3.1	3.4	3.7
12.000	4.5	5.3	5.6	5.9	6.2
12.500	6.3	6.4	6.5	6.6	6.7
13.000	6.7	6.8	6.9	6.9	7.0
13.500	7.1	7.1	7.2	7.2	7.3
14.000	7.3	7.3	7.4	7.4	7.5
14.500	7.5	7.5	7.6	7.6	7.7
15.000	7.7	7.7	7.8	7.8	7.8
15.500	7.8	7.9	7.9	7.9	8.0
16.000	8.0	8.0	8.0	8.0	8.1
16.500	8.1	8.1	8.1	8.1	8.2

Pre Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015

Return Event: 100 years
Storm Event: 100 Year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	8.2	8.2	8.2	8.2	8.3
17.500	8.3	8.3	8.3	8.3	8.3
18.000	8.4	8.4	8.4	8.4	8.4
18.500	8.4	8.4	8.4	8.5	8.5
19.000	8.5	8.5	8.5	8.5	8.5
19.500	8.6	8.6	8.6	8.6	8.6
20.000	8.6	8.6	8.6	8.6	8.7
20.500	8.7	8.7	8.7	8.7	8.7
21.000	8.7	8.7	8.7	8.8	8.8
21.500	8.8	8.8	8.8	8.8	8.8
22.000	8.8	8.8	8.8	8.9	8.9
22.500	8.9	8.9	8.9	8.9	8.9
23.000	8.9	8.9	8.9	8.9	9.0
23.500	9.0	9.0	9.0	9.0	9.0
24.000	9.0	(N/A)	(N/A)	(N/A)	(N/A)

Pre Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015

Return Event: 2 years
Storm Event: 2 Year

Time-Depth Curve: 2 Year	
Label	2 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	2 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.2	0.2	0.2
4.500	0.2	0.2	0.2	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.3	0.3
6.500	0.3	0.3	0.3	0.3	0.3
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.4	0.4	0.4
8.000	0.4	0.4	0.4	0.4	0.4
8.500	0.4	0.4	0.4	0.5	0.5
9.000	0.5	0.5	0.5	0.5	0.5
9.500	0.5	0.6	0.6	0.6	0.6
10.000	0.6	0.6	0.7	0.7	0.7
10.500	0.7	0.7	0.8	0.8	0.8
11.000	0.8	0.9	0.9	0.9	0.9
11.500	1.0	1.0	1.1	1.2	1.4
12.000	1.6	1.9	2.1	2.2	2.3
12.500	2.3	2.4	2.4	2.4	2.4
13.000	2.5	2.5	2.5	2.5	2.6
13.500	2.6	2.6	2.6	2.6	2.7
14.000	2.7	2.7	2.7	2.7	2.7
14.500	2.8	2.8	2.8	2.8	2.8
15.000	2.8	2.8	2.8	2.9	2.9
15.500	2.9	2.9	2.9	2.9	2.9
16.000	2.9	2.9	2.9	2.9	3.0
16.500	3.0	3.0	3.0	3.0	3.0

Pre Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015

Return Event: 2 years
Storm Event: 2 Year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	3.0	3.0	3.0	3.0	3.0
17.500	3.0	3.0	3.0	3.1	3.1
18.000	3.1	3.1	3.1	3.1	3.1
18.500	3.1	3.1	3.1	3.1	3.1
19.000	3.1	3.1	3.1	3.1	3.1
19.500	3.1	3.1	3.1	3.1	3.2
20.000	3.2	3.2	3.2	3.2	3.2
20.500	3.2	3.2	3.2	3.2	3.2
21.000	3.2	3.2	3.2	3.2	3.2
21.500	3.2	3.2	3.2	3.2	3.2
22.000	3.2	3.2	3.2	3.2	3.3
22.500	3.3	3.3	3.3	3.3	3.3
23.000	3.3	3.3	3.3	3.3	3.3
23.500	3.3	3.3	3.3	3.3	3.3
24.000	3.3	(N/A)	(N/A)	(N/A)	(N/A)

Pre Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015

Return Event: 25 years
Storm Event: 25 Year

Time-Depth Curve: 25 Year	
Label	25 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.3	0.3	0.3
4.000	0.3	0.3	0.3	0.3	0.3
4.500	0.3	0.3	0.3	0.3	0.4
5.000	0.4	0.4	0.4	0.4	0.4
5.500	0.4	0.4	0.4	0.4	0.5
6.000	0.5	0.5	0.5	0.5	0.5
6.500	0.5	0.5	0.5	0.6	0.6
7.000	0.6	0.6	0.6	0.6	0.6
7.500	0.7	0.7	0.7	0.7	0.7
8.000	0.7	0.7	0.8	0.8	0.8
8.500	0.8	0.8	0.9	0.9	0.9
9.000	0.9	1.0	1.0	1.0	1.0
9.500	1.1	1.1	1.1	1.1	1.2
10.000	1.2	1.2	1.3	1.3	1.3
10.500	1.4	1.4	1.5	1.5	1.6
11.000	1.6	1.6	1.7	1.8	1.8
11.500	1.9	2.0	2.2	2.4	2.7
12.000	3.2	3.7	4.0	4.2	4.4
12.500	4.5	4.6	4.6	4.7	4.8
13.000	4.8	4.8	4.9	4.9	5.0
13.500	5.0	5.1	5.1	5.1	5.2
14.000	5.2	5.2	5.3	5.3	5.3
14.500	5.3	5.4	5.4	5.4	5.4
15.000	5.5	5.5	5.5	5.5	5.6
15.500	5.6	5.6	5.6	5.6	5.7
16.000	5.7	5.7	5.7	5.7	5.7
16.500	5.7	5.8	5.8	5.8	5.8

Pre Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015

Return Event: 25 years
Storm Event: 25 Year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	5.8	5.8	5.8	5.9	5.9
17.500	5.9	5.9	5.9	5.9	5.9
18.000	5.9	5.9	6.0	6.0	6.0
18.500	6.0	6.0	6.0	6.0	6.0
19.000	6.0	6.0	6.1	6.1	6.1
19.500	6.1	6.1	6.1	6.1	6.1
20.000	6.1	6.1	6.1	6.1	6.2
20.500	6.2	6.2	6.2	6.2	6.2
21.000	6.2	6.2	6.2	6.2	6.2
21.500	6.2	6.2	6.3	6.3	6.3
22.000	6.3	6.3	6.3	6.3	6.3
22.500	6.3	6.3	6.3	6.3	6.3
23.000	6.3	6.3	6.4	6.4	6.4
23.500	6.4	6.4	6.4	6.4	6.4
24.000	6.4	(N/A)	(N/A)	(N/A)	(N/A)

Pre Developed

Subsection: Time of Concentration Calculations
Label: DA-1

Return Event: 1 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	27.00 ft
Manning's n	0.011
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	1.08 ft/s
Segment Time of Concentration	0.007 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	502.00 ft
Is Paved?	False
Slope	0.037 ft/ft
Average Velocity	3.10 ft/s
Segment Time of Concentration	0.045 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

Pre Developed

Subsection: Time of Concentration Calculations
Label: DA-1

Return Event: 1 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc =
R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc =
Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Pre Developed

Subsection: Runoff CN-Area
Label: DA-1

Return Event: 1 years
Storm Event: 1 Year

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.160	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil D	80.000	1.000	0.0	0.0	80.000
Woods - grass combination - good - Soil B	58.000	0.600	0.0	0.0	58.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.530	0.0	0.0	61.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	2.290	(N/A)	(N/A)	71.096

Pre Developed

Subsection: Unit Hydrograph Equations

Unit Hydrograph Method (Computational Notes)
Definition of Terms

At	Total area (acres): At = Ai+Ap
Ai	Impervious area (acres)
Ap	Pervious area (acres)
CNi	Runoff curve number for impervious area
CNp	Runoff curve number for pervious area
fLoss	f loss constant infiltration (depth/time)
gKs	Saturated Hydraulic Conductivity (depth/time)
Md	Volumetric Moisture Deficit
Psi	Capillary Suction (length)
hK	Horton Infiltration Decay Rate (time^-1)
fo	Initial Infiltration Rate (depth/time)
fc	Ultimate(capacity)Infiltration Rate (depth/time)
Ia	Initial Abstraction (length)
dt	Computational increment (duration of unit excess rainfall) Default dt is smallest value of 0.1333Tc, rtm, and th (Smallest dt is then adjusted to match up with Tp)
UDdt	User specified override computational main time increment (only used if UDdt is => .1333Tc)
D(t)	Point on distribution curve (fraction of P) for time step t
K	2 / (1 + (Tr/Tp)): default K = 0.75: (for Tr/Tp = 1.67)
Ks	Hydrograph shape factor = Unit Conversions * K: = ((1hr/3600sec) * (1ft/12in) * ((5280ft)**2/sq.mi)) * K Default Ks = 645.333 * 0.75 = 484
Lag	Lag time from center of excess runoff (dt) to Tp: Lag = 0.6Tc
P	Total precipitation depth, inches
Pa(t)	Accumulated rainfall at time step t
Pi(t)	Incremental rainfall at time step t
qp	Peak discharge (cfs) for 1in. runoff, for 1hr, for 1 sq.mi. = (Ks * A * Q) / Tp (where Q = 1in. runoff, A=sq.mi.)
Qu(t)	Unit hydrograph ordinate (cfs) at time step t
Q(t)	Final hydrograph ordinate (cfs) at time step t
Rai(t)	Accumulated runoff (inches) at time step t for impervious area
Rap(t)	Accumulated runoff (inches) at time step t for pervious area
Rii(t)	Incremental runoff (inches) at time step t for impervious area
Rip(t)	Incremental runoff (inches) at time step t for pervious area
R(t)	Incremental weighted total runoff (inches)
Rtm	Time increment for rainfall table
Si	S for impervious area: Si = (1000/CNi) - 10
Sp	S for pervious area: Sp = (1000/CNp) - 10
t	Time step (row) number
Tc	Time of concentration
Tb	Time (hrs) of entire unit hydrograph: Tb = Tp + Tr
Tp	Time (hrs) to peak of a unit hydrograph: Tp = (dt/2) + Lag
Tr	Time (hrs) of receding limb of unit hydrograph: Tr = ratio of Tp

Pre Developed

Subsection: Unit Hydrograph Equations

Unit Hydrograph Method
Computational Notes
Precipitation

Column (1)	Time for time step t
Column (2)	D(t) = Point on distribution curve for time step t
Column (3)	Pi(t) = Pa(t) - Pa(t-1): Col.(4) - Preceding Col.(4)
Column (4)	Pa(t) = D(t) x P: Col.(2) x P

Pervious Area Runoff (using SCS Runoff CN Method)

Column (5)	Rap(t) = Accumulated pervious runoff for time step t
	If (Pa(t) is <= 0.2Sp) then use: Rap(t) = 0.0
	If (Pa(t) is > 0.2Sp) then use:
	
	Rap(t) = (Col.(4)-0.2Sp)**2 / (Col.(4)+0.8Sp)

Column (6)	Rip(t) = Incremental pervious runoff for time step t Rip(t) = Rap(t) - Rap(t-1) Rip(t) = Col.(5) for current row - Col.(5) for preceding row.

Impervious Area Runoff

Column (7 & 8)...	Did not specify to use impervious areas.

Incremental Weighted Runoff

Column (9)	R(t) = (Ap/At) x Rip(t) + (Ai/At) x Rii(t) R(t) = (Ap/At) x Col.(6) + (Ai/At) x Col.(8)

SCS Unit Hydrograph Method

Column (10)	Q(t) is computed with the SCS unit hydrograph method using R(t) and Qu(t).

Pre Developed

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: DA-1 | Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2.290 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.122 hours
Flow (Peak, Computed)	1.44 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.40 ft³/s

Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	2.290 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.6 in
Runoff Volume (Pervious)	0.124 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.123 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Pre Developed

Subsection: Unit Hydrograph Summary
Label: DA-1

Return Event: 1 years
Storm Event: 1 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	31.14 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Pre Developed

Subsection: Unit Hydrograph Summary | Return Event: 2 years
Label: DA-1 | Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2.290 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	2.17 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	2.14 ft³/s

Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	2.290 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.9 in
Runoff Volume (Pervious)	0.179 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.179 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Pre Developed

Subsection: Unit Hydrograph Summary
Label: DA-1

Return Event: 2 years
Storm Event: 2 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	31.14 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Pre Developed

Subsection: Unit Hydrograph Summary
Label: DA-1

Return Event: 10 years
Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2.290 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	5.08 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	5.04 ft³/s

Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	2.290 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.1 in
Runoff Volume (Pervious)	0.404 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.403 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Pre Developed

Subsection: Unit Hydrograph Summary
Label: DA-1

Return Event: 10 years
Storm Event: 10 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	31.14 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Pre Developed

Subsection: Unit Hydrograph Summary
Label: DA-1

Return Event: 25 years
Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	6.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2.290 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	7.73 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	7.70 ft³/s

Drainage Area

SCS CN (Composite)	71.000
Area (User Defined)	2.290 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	3.2 in
Runoff Volume (Pervious)	0.615 ac-ft

Hydrograph Volume (Area under Hydrograph curve)

Volume	0.615 ac-ft

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Pre Developed

Subsection: Unit Hydrograph Summary
Label: DA-1

Return Event: 25 years
Storm Event: 25 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	31.14 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Pre Developed

Subsection: Unit Hydrograph Summary
Label: DA-1

Return Event: 100 years
Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	9.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2.290 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	12.88 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	12.88 ft³/s

Drainage Area	
SCS CN (Composite)	71.000
Area (User Defined)	2.290 acres
Maximum Retention (Pervious)	4.1 in
Maximum Retention (Pervious, 20 percent)	0.8 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.5 in
Runoff Volume (Pervious)	1.042 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.041 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Pre Developed

Subsection: Unit Hydrograph Summary
Label: DA-1

Return Event: 100 years
Storm Event: 100 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	31.14 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Pre Developed

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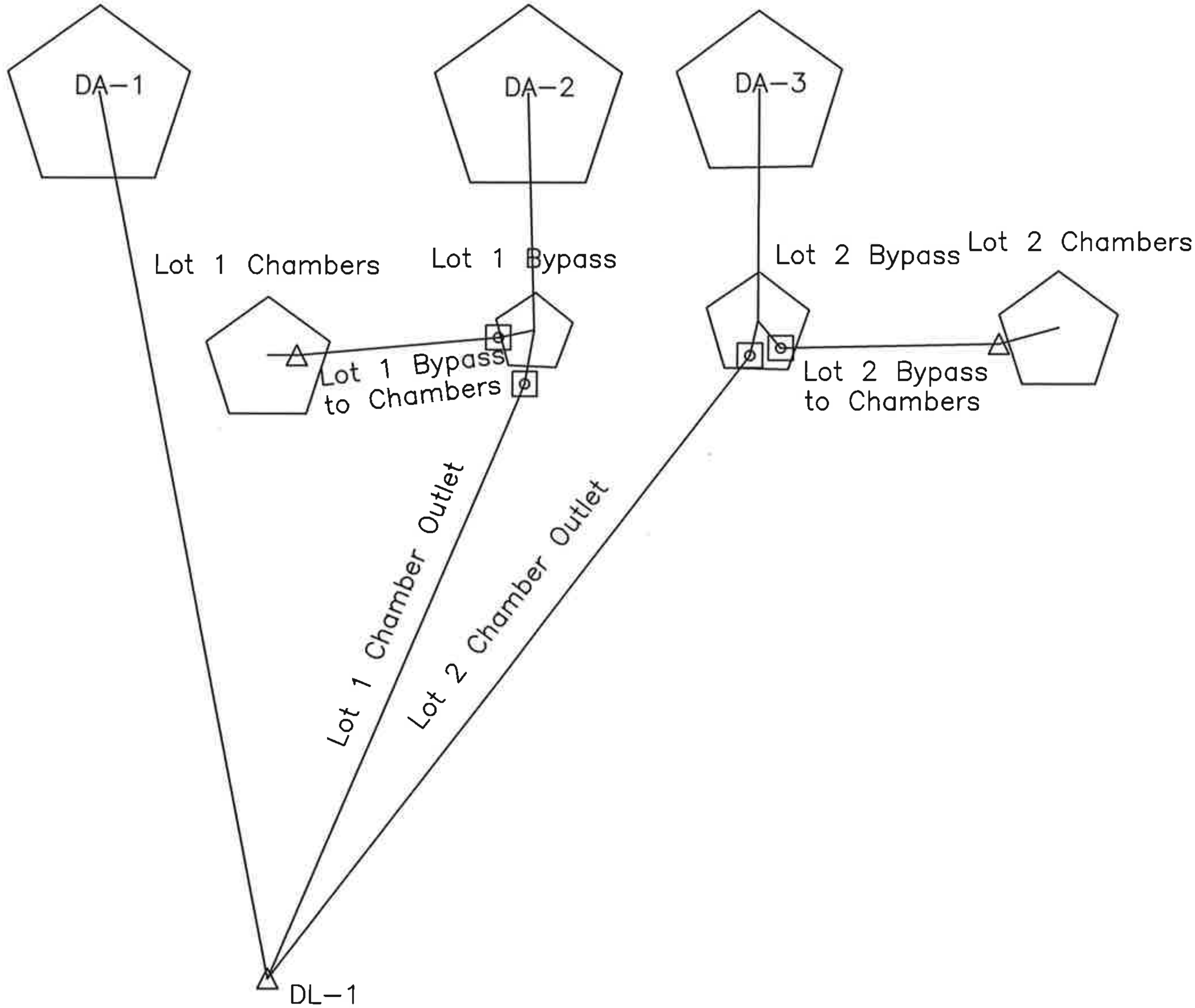

NOTE:
1. Source: NYS DEC Stormwater Design Manual - August 2010

FIG. 5.4 POST DEVELOPED SCHEMATIC

MGM DESIGN & CONSTRUCTION GROUP, LLC.

Town Of Ossining
Westchester County, NY

Site Design Consultants
Civil Engineers • Land Planners
251 F Underhill Avenue Yorktown Heights, NY 10598
(914) 962-4488 - Fax (914) 962-7386
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NOT TO SCALE
DATE:3/23/18

Post Developed

Project Summary	
Title	5 Hawkes Ave
Engineer	Joseph Riina
Company	Site Design Consultants
Date	3/12/2018

Notes

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Post Developed

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
DA-1	Post-Development 1 year	1	0.097	12.100	1.05
DA-1	Post-Development 2 year	2	0.143	12.100	1.67
DA-1	Post-Development 10 year	10	0.335	12.100	4.17
DA-1	Post-Development 25 year	25	0.518	12.100	6.49
DA-1	Post-Development 100 year	100	0.891	12.100	11.08
DA-2	Post-Development 1 year	1	0.018	12.100	0.21
DA-2	Post-Development 2 year	2	0.022	12.100	0.25
DA-2	Post-Development 10 year	10	0.035	12.100	0.39
DA-2	Post-Development 25 year	25	0.047	12.100	0.51
DA-2	Post-Development 100 year	100	0.067	12.100	0.72
DA-3	Post-Development 1 year	1	0.025	12.100	0.29
DA-3	Post-Development 2 year	2	0.031	12.100	0.35
DA-3	Post-Development 10 year	10	0.049	12.100	0.55
DA-3	Post-Development 25 year	25	0.065	12.100	0.71
DA-3	Post-Development 100 year	100	0.094	12.100	1.01

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
DL-1	Post-Development 1 year	1	0.097	12.100	1.05
DL-1	Post-Development 2 year	2	0.143	12.100	1.67
DL-1	Post-Development 10 year	10	0.335	12.100	4.17
DL-1	Post-Development 25 year	25	0.518	12.100	6.49
DL-1	Post-Development 100 year	100	0.891	12.100	11.08

Post Developed

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Lot 1 Infiltration Chambers (IN)	Post-Development 1 year	1	0.018	12.100	0.21	(N/A)	(N/A)
Lot 1 Infiltration Chambers (OUT)	Post-Development 1 year	1	0.000	0.000	0.00	87.58	0.005
Lot 1 Infiltration Chambers (IN)	Post-Development 2 year	2	0.022	12.100	0.25	(N/A)	(N/A)
Lot 1 Infiltration Chambers (OUT)	Post-Development 2 year	2	0.000	0.000	0.00	87.94	0.007
Lot 1 Infiltration Chambers (IN)	Post-Development 10 year	10	0.035	12.100	0.39	(N/A)	(N/A)
Lot 1 Infiltration Chambers (OUT)	Post-Development 10 year	10	0.000	0.000	0.00	88.25	0.008
Lot 1 Infiltration Chambers (IN)	Post-Development 25 year	25	0.047	12.100	0.51	(N/A)	(N/A)
Lot 1 Infiltration Chambers (OUT)	Post-Development 25 year	25	0.000	0.000	0.00	88.25	0.008
Lot 1 Infiltration Chambers (IN)	Post-Development 100 year	100	0.067	12.100	0.72	(N/A)	(N/A)
Lot 1 Infiltration Chambers (OUT)	Post-Development 100 year	100	0.000	0.000	0.00	88.25	0.008
Lot 1 Bypass (IN)	Post-Development 1 year	1	0.018	12.100	0.21	(N/A)	(N/A)
Lot 1 Bypass (OUT)	Post-Development 1 year	1	0.018	12.100	0.21	95.00	0.000

Post Developed

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Lot 1 Bypass (IN)	Post-Development 2 year	2	0.022	12.100	0.25	(N/A)	(N/A)
Lot 1 Bypass (OUT)	Post-Development 2 year	2	0.022	12.100	0.25	95.05	0.000
Lot 1 Bypass (IN)	Post-Development 10 year	10	0.035	12.100	0.39	(N/A)	(N/A)
Lot 1 Bypass (OUT)	Post-Development 10 year	10	0.035	12.100	0.39	95.22	0.000
Lot 1 Bypass (IN)	Post-Development 25 year	25	0.047	12.100	0.51	(N/A)	(N/A)
Lot 1 Bypass (OUT)	Post-Development 25 year	25	0.047	12.100	0.51	95.32	0.000
Lot 1 Bypass (IN)	Post-Development 100 year	100	0.067	12.100	0.72	(N/A)	(N/A)
Lot 1 Bypass (OUT)	Post-Development 100 year	100	0.067	12.100	0.72	95.47	0.000
Lot 2 Bypass (IN)	Post-Development 1 year	1	0.025	12.100	0.29	(N/A)	(N/A)
Lot 2 Bypass (OUT)	Post-Development 1 year	1	0.025	12.100	0.29	88.07	0.000
Lot 2 Bypass (IN)	Post-Development 2 year	2	0.031	12.100	0.35	(N/A)	(N/A)
Lot 2 Bypass (OUT)	Post-Development 2 year	2	0.031	12.100	0.35	88.16	0.000
Lot 2 Bypass (IN)	Post-Development 10 year	10	0.049	12.100	0.55	(N/A)	(N/A)
Lot 2 Bypass (OUT)	Post-Development 10 year	10	0.049	12.100	0.55	88.44	0.000
Lot 2 Bypass (IN)	Post-Development 25 year	25	0.065	12.100	0.71	(N/A)	(N/A)

Post Developed

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Lot 2 Bypass (OUT)	Post-Development 25 year	25	0.065	12.100	0.70	88.60	0.000
Lot 2 Bypass (IN)	Post-Development 100 year	100	0.094	12.100	1.01	(N/A)	(N/A)
Lot 2 Bypass (OUT)	Post-Development 100 year	100	0.094	12.100	1.00	88.86	0.000
Lot 2 Chambers (IN)	Post-Development 1 year	1	0.025	12.100	0.29	(N/A)	(N/A)
Lot 2 Chambers (OUT)	Post-Development 1 year	1	0.000	0.000	0.00	87.71	0.008
Lot 2 Chambers (IN)	Post-Development 2 year	2	0.031	12.100	0.35	(N/A)	(N/A)
Lot 2 Chambers (OUT)	Post-Development 2 year	2	0.000	0.000	0.00	88.11	0.010
Lot 2 Chambers (IN)	Post-Development 10 year	10	0.049	12.100	0.55	(N/A)	(N/A)
Lot 2 Chambers (OUT)	Post-Development 10 year	10	0.000	0.000	0.00	88.25	0.011
Lot 2 Chambers (IN)	Post-Development 25 year	25	0.065	12.100	0.70	(N/A)	(N/A)
Lot 2 Chambers (OUT)	Post-Development 25 year	25	0.000	0.000	0.00	88.25	0.011
Lot 2 Chambers (IN)	Post-Development 100 year	100	0.094	12.100	1.00	(N/A)	(N/A)
Lot 2 Chambers (OUT)	Post-Development 100 year	100	0.000	0.000	0.00	88.25	0.011

Post Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Time-Depth Curve: 1 Year	
Label	1 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.0	0.0	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.1	0.1	0.1
4.500	0.1	0.1	0.1	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.2	0.2
6.500	0.2	0.2	0.2	0.2	0.2
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.3	0.3	0.3
8.000	0.3	0.3	0.3	0.3	0.4
8.500	0.4	0.4	0.4	0.4	0.4
9.000	0.4	0.4	0.4	0.4	0.5
9.500	0.5	0.5	0.5	0.5	0.5
10.000	0.5	0.5	0.6	0.6	0.6
10.500	0.6	0.6	0.6	0.7	0.7
11.000	0.7	0.7	0.7	0.8	0.8
11.500	0.8	0.9	1.0	1.0	1.2
12.000	1.4	1.6	1.8	1.8	1.9
12.500	2.0	2.0	2.0	2.1	2.1
13.000	2.1	2.1	2.1	2.2	2.2
13.500	2.2	2.2	2.2	2.2	2.3
14.000	2.3	2.3	2.3	2.3	2.3
14.500	2.3	2.3	2.4	2.4	2.4
15.000	2.4	2.4	2.4	2.4	2.4
15.500	2.4	2.4	2.5	2.5	2.5
16.000	2.5	2.5	2.5	2.5	2.5
16.500	2.5	2.5	2.5	2.5	2.5

Post Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	2.5	2.6	2.6	2.6	2.6
17.500	2.6	2.6	2.6	2.6	2.6
18.000	2.6	2.6	2.6	2.6	2.6
18.500	2.6	2.6	2.6	2.6	2.6
19.000	2.6	2.6	2.6	2.7	2.7
19.500	2.7	2.7	2.7	2.7	2.7
20.000	2.7	2.7	2.7	2.7	2.7
20.500	2.7	2.7	2.7	2.7	2.7
21.000	2.7	2.7	2.7	2.7	2.7
21.500	2.7	2.7	2.7	2.7	2.7
22.000	2.7	2.7	2.8	2.8	2.8
22.500	2.8	2.8	2.8	2.8	2.8
23.000	2.8	2.8	2.8	2.8	2.8
23.500	2.8	2.8	2.8	2.8	2.8
24.000	2.8	(N/A)	(N/A)	(N/A)	(N/A)

Post Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

Time-Depth Curve: 10 Year	
Label	10 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.2	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.3	0.3	0.3	0.4
6.000	0.4	0.4	0.4	0.4	0.4
6.500	0.4	0.4	0.4	0.4	0.4
7.000	0.5	0.5	0.5	0.5	0.5
7.500	0.5	0.5	0.5	0.5	0.6
8.000	0.6	0.6	0.6	0.6	0.6
8.500	0.6	0.7	0.7	0.7	0.7
9.000	0.7	0.7	0.8	0.8	0.8
9.500	0.8	0.9	0.9	0.9	0.9
10.000	0.9	1.0	1.0	1.0	1.1
10.500	1.1	1.1	1.1	1.2	1.2
11.000	1.2	1.3	1.3	1.4	1.4
11.500	1.5	1.6	1.7	1.9	2.1
12.000	2.5	2.9	3.1	3.3	3.4
12.500	3.5	3.6	3.6	3.7	3.7
13.000	3.7	3.8	3.8	3.9	3.9
13.500	3.9	3.9	4.0	4.0	4.0
14.000	4.1	4.1	4.1	4.1	4.1
14.500	4.2	4.2	4.2	4.2	4.3
15.000	4.3	4.3	4.3	4.3	4.3
15.500	4.4	4.4	4.4	4.4	4.4
16.000	4.4	4.4	4.5	4.5	4.5
16.500	4.5	4.5	4.5	4.5	4.5

Post Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	4.5	4.6	4.6	4.6	4.6
17.500	4.6	4.6	4.6	4.6	4.6
18.000	4.6	4.6	4.7	4.7	4.7
18.500	4.7	4.7	4.7	4.7	4.7
19.000	4.7	4.7	4.7	4.7	4.7
19.500	4.8	4.8	4.8	4.8	4.8
20.000	4.8	4.8	4.8	4.8	4.8
20.500	4.8	4.8	4.8	4.8	4.8
21.000	4.8	4.9	4.9	4.9	4.9
21.500	4.9	4.9	4.9	4.9	4.9
22.000	4.9	4.9	4.9	4.9	4.9
22.500	4.9	4.9	4.9	4.9	4.9
23.000	5.0	5.0	5.0	5.0	5.0
23.500	5.0	5.0	5.0	5.0	5.0
24.000	5.0	(N/A)	(N/A)	(N/A)	(N/A)

Post Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

Time-Depth Curve: 100 Year	
Label	100 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.1	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.2	0.2	0.2
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.3	0.3
3.000	0.3	0.3	0.3	0.3	0.3
3.500	0.3	0.3	0.4	0.4	0.4
4.000	0.4	0.4	0.4	0.4	0.4
4.500	0.4	0.5	0.5	0.5	0.5
5.000	0.5	0.5	0.5	0.6	0.6
5.500	0.6	0.6	0.6	0.6	0.6
6.000	0.6	0.7	0.7	0.7	0.7
6.500	0.7	0.7	0.8	0.8	0.8
7.000	0.8	0.8	0.9	0.9	0.9
7.500	0.9	0.9	1.0	1.0	1.0
8.000	1.0	1.0	1.1	1.1	1.1
8.500	1.2	1.2	1.2	1.2	1.3
9.000	1.3	1.3	1.4	1.4	1.5
9.500	1.5	1.5	1.6	1.6	1.7
10.000	1.7	1.7	1.8	1.8	1.9
10.500	1.9	2.0	2.1	2.1	2.2
11.000	2.2	2.3	2.4	2.5	2.6
11.500	2.7	2.8	3.1	3.4	3.7
12.000	4.5	5.3	5.6	5.9	6.2
12.500	6.3	6.4	6.5	6.6	6.7
13.000	6.7	6.8	6.9	6.9	7.0
13.500	7.1	7.1	7.2	7.2	7.3
14.000	7.3	7.3	7.4	7.4	7.5
14.500	7.5	7.5	7.6	7.6	7.7
15.000	7.7	7.7	7.8	7.8	7.8
15.500	7.8	7.9	7.9	7.9	8.0
16.000	8.0	8.0	8.0	8.0	8.1
16.500	8.1	8.1	8.1	8.1	8.2

Post Developed

Subsection: Time-Depth Curve | Return Event: 100 years
Label: Westchester County 1-100 2015 | Storm Event: 100 Year
Scenario: Post-Development 100 year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	8.2	8.2	8.2	8.2	8.3
17.500	8.3	8.3	8.3	8.3	8.3
18.000	8.4	8.4	8.4	8.4	8.4
18.500	8.4	8.4	8.4	8.5	8.5
19.000	8.5	8.5	8.5	8.5	8.5
19.500	8.6	8.6	8.6	8.6	8.6
20.000	8.6	8.6	8.6	8.6	8.7
20.500	8.7	8.7	8.7	8.7	8.7
21.000	8.7	8.7	8.7	8.8	8.8
21.500	8.8	8.8	8.8	8.8	8.8
22.000	8.8	8.8	8.8	8.9	8.9
22.500	8.9	8.9	8.9	8.9	8.9
23.000	8.9	8.9	8.9	8.9	9.0
23.500	9.0	9.0	9.0	9.0	9.0
24.000	9.0	(N/A)	(N/A)	(N/A)	(N/A)

Post Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

Time-Depth Curve: 2 Year	
Label	2 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	2 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.2	0.2	0.2
4.500	0.2	0.2	0.2	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.3	0.3
6.500	0.3	0.3	0.3	0.3	0.3
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.4	0.4	0.4
8.000	0.4	0.4	0.4	0.4	0.4
8.500	0.4	0.4	0.4	0.5	0.5
9.000	0.5	0.5	0.5	0.5	0.5
9.500	0.5	0.6	0.6	0.6	0.6
10.000	0.6	0.6	0.7	0.7	0.7
10.500	0.7	0.7	0.8	0.8	0.8
11.000	0.8	0.9	0.9	0.9	0.9
11.500	1.0	1.0	1.1	1.2	1.4
12.000	1.6	1.9	2.1	2.2	2.3
12.500	2.3	2.4	2.4	2.4	2.4
13.000	2.5	2.5	2.5	2.5	2.6
13.500	2.6	2.6	2.6	2.6	2.7
14.000	2.7	2.7	2.7	2.7	2.7
14.500	2.8	2.8	2.8	2.8	2.8
15.000	2.8	2.8	2.8	2.9	2.9
15.500	2.9	2.9	2.9	2.9	2.9
16.000	2.9	2.9	2.9	2.9	3.0
16.500	3.0	3.0	3.0	3.0	3.0

Post Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	3.0	3.0	3.0	3.0	3.0
17.500	3.0	3.0	3.0	3.1	3.1
18.000	3.1	3.1	3.1	3.1	3.1
18.500	3.1	3.1	3.1	3.1	3.1
19.000	3.1	3.1	3.1	3.1	3.1
19.500	3.1	3.1	3.1	3.1	3.2
20.000	3.2	3.2	3.2	3.2	3.2
20.500	3.2	3.2	3.2	3.2	3.2
21.000	3.2	3.2	3.2	3.2	3.2
21.500	3.2	3.2	3.2	3.2	3.2
22.000	3.2	3.2	3.2	3.2	3.3
22.500	3.3	3.3	3.3	3.3	3.3
23.000	3.3	3.3	3.3	3.3	3.3
23.500	3.3	3.3	3.3	3.3	3.3
24.000	3.3	(N/A)	(N/A)	(N/A)	(N/A)

Post Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015
Scenario: Post-Development 25 year

Return Event: 25 years
Storm Event: 25 Year

Time-Depth Curve: 25 Year	
Label	25 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.3	0.3	0.3
4.000	0.3	0.3	0.3	0.3	0.3
4.500	0.3	0.3	0.3	0.3	0.4
5.000	0.4	0.4	0.4	0.4	0.4
5.500	0.4	0.4	0.4	0.4	0.5
6.000	0.5	0.5	0.5	0.5	0.5
6.500	0.5	0.5	0.5	0.6	0.6
7.000	0.6	0.6	0.6	0.6	0.6
7.500	0.7	0.7	0.7	0.7	0.7
8.000	0.7	0.7	0.8	0.8	0.8
8.500	0.8	0.8	0.9	0.9	0.9
9.000	0.9	1.0	1.0	1.0	1.0
9.500	1.1	1.1	1.1	1.1	1.2
10.000	1.2	1.2	1.3	1.3	1.3
10.500	1.4	1.4	1.5	1.5	1.6
11.000	1.6	1.6	1.7	1.8	1.8
11.500	1.9	2.0	2.2	2.4	2.7
12.000	3.2	3.7	4.0	4.2	4.4
12.500	4.5	4.6	4.6	4.7	4.8
13.000	4.8	4.8	4.9	4.9	5.0
13.500	5.0	5.1	5.1	5.1	5.2
14.000	5.2	5.2	5.3	5.3	5.3
14.500	5.3	5.4	5.4	5.4	5.4
15.000	5.5	5.5	5.5	5.5	5.6
15.500	5.6	5.6	5.6	5.6	5.7
16.000	5.7	5.7	5.7	5.7	5.7
16.500	5.7	5.8	5.8	5.8	5.8

Post Developed

Subsection: Time-Depth Curve
Label: Westchester County 1-100 2015
Scenario: Post-Development 25 year

Return Event: 25 years
Storm Event: 25 Year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	5.8	5.8	5.8	5.9	5.9
17.500	5.9	5.9	5.9	5.9	5.9
18.000	5.9	5.9	6.0	6.0	6.0
18.500	6.0	6.0	6.0	6.0	6.0
19.000	6.0	6.0	6.1	6.1	6.1
19.500	6.1	6.1	6.1	6.1	6.1
20.000	6.1	6.1	6.1	6.1	6.2
20.500	6.2	6.2	6.2	6.2	6.2
21.000	6.2	6.2	6.2	6.2	6.2
21.500	6.2	6.2	6.3	6.3	6.3
22.000	6.3	6.3	6.3	6.3	6.3
22.500	6.3	6.3	6.3	6.3	6.3
23.000	6.3	6.3	6.4	6.4	6.4
23.500	6.4	6.4	6.4	6.4	6.4
24.000	6.4	(N/A)	(N/A)	(N/A)	(N/A)

Post Developed

Subsection: Time of Concentration Calculations
Label: DA-1
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	16.50 ft
Manning's n	0.011
Slope	0.020 ft/ft
2 Year 24 Hour Depth	3.3 in
Average Velocity	0.97 ft/s
Segment Time of Concentration	0.005 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	452.50 ft
Is Paved?	False
Slope	0.037 ft/ft
Average Velocity	3.10 ft/s
Segment Time of Concentration	0.041 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

Post Developed

Subsection: Time of Concentration Calculations
Label: DA-1
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

==== SCS Channel Flow

Tc =
R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc =
Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Post Developed

Subsection: Runoff CN-Area
Label: DA-1
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.070	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil D	80.000	0.771	0.0	0.0	80.000
Woods - grass combination - good - Soil B	58.000	0.300	0.0	0.0	58.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.913	0.0	0.0	61.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	2.054	(N/A)	(N/A)	68.955

Post Developed

Subsection: Runoff CN-Area
Label: DA-2
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.087	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.009	0.0	0.0	61.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.096	(N/A)	(N/A)	94.546

Post Developed

Subsection: Runoff CN-Area
Label: DA-3
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.009	0.0	0.0	61.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.125	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.134	(N/A)	(N/A)	95.412

Unit Hydrograph Method (Computational Notes)
Definition of Terms

At	Total area (acres): At = Ai+Ap
Ai	Impervious area (acres)
Ap	Pervious area (acres)
CNi	Runoff curve number for impervious area
CNp	Runoff curve number for pervious area
fLoss	f loss constant infiltration (depth/time)
gKs	Saturated Hydraulic Conductivity (depth/time)
Md	Volumetric Moisture Deficit
Psi	Capillary Suction (length)
hK	Horton Infiltration Decay Rate (time^-1)
fo	Initial Infiltration Rate (depth/time)
fc	Ultimate(capacity)Infiltration Rate (depth/time)
Ia	Initial Abstraction (length)
dt	Computational increment (duration of unit excess rainfall) Default dt is smallest value of 0.1333Tc, rtm, and th (Smallest dt is then adjusted to match up with Tp)
UDdt	User specified override computational main time increment (only used if UDdt is => .1333Tc)
D(t)	Point on distribution curve (fraction of P) for time step t
K	2 / (1 + (Tr/Tp)): default K = 0.75: (for Tr/Tp = 1.67)
Ks	Hydrograph shape factor = Unit Conversions * K: = ((1hr/3600sec) * (1ft/12in) * ((5280ft)**2/sq.mi)) * K Default Ks = 645.333 * 0.75 = 484
Lag	Lag time from center of excess runoff (dt) to Tp: Lag = 0.6Tc
P	Total precipitation depth, inches
Pa(t)	Accumulated rainfall at time step t
Pi(t)	Incremental rainfall at time step t
qp	Peak discharge (cfs) for 1in. runoff, for 1hr, for 1 sq.mi. = (Ks * A * Q) / Tp (where Q = 1in. runoff, A=sq.mi.)
Qu(t)	Unit hydrograph ordinate (cfs) at time step t
Q(t)	Final hydrograph ordinate (cfs) at time step t
Rai(t)	Accumulated runoff (inches) at time step t for impervious area
Rap(t)	Accumulated runoff (inches) at time step t for pervious area
Rii(t)	Incremental runoff (inches) at time step t for impervious area
Rip(t)	Incremental runoff (inches) at time step t for pervious area
R(t)	Incremental weighted total runoff (inches)
Rtm	Time increment for rainfall table
Si	S for impervious area: Si = (1000/CNi) - 10
Sp	S for pervious area: Sp = (1000/CNp) - 10
t	Time step (row) number
Tc	Time of concentration
Tb	Time (hrs) of entire unit hydrograph: Tb = Tp + Tr
Tp	Time (hrs) to peak of a unit hydrograph: Tp = (dt/2) + Lag
Tr	Time (hrs) of receding limb of unit hydrograph: Tr = ratio of Tp

Post Developed

Subsection: Unit Hydrograph Equations

Unit Hydrograph Method
Computational Notes
Precipitation

Column (1)	Time for time step t
Column (2)	D(t) = Point on distribution curve for time step t
Column (3)	Pi(t) = Pa(t) - Pa(t-1): Col.(4) - Preceding Col.(4)
Column (4)	Pa(t) = D(t) x P: Col.(2) x P

Pervious Area Runoff (using SCS Runoff CN Method)

Column (5)	Rap(t) = Accumulated pervious runoff for time step t
	If (Pa(t) is <= 0.2Sp) then use: Rap(t) = 0.0
	If (Pa(t) is > 0.2Sp) then use:
	
	Rap(t) = (Col.(4)-0.2Sp)**2 / (Col.(4)+0.8Sp)

Column (6)	Rip(t) = Incremental pervious runoff for time step t Rip(t) = Rap(t) - Rap(t-1) Rip(t) = Col.(5) for current row - Col.(5) for preceding row.

Impervious Area Runoff

Column (7 & 8)...	Did not specify to use impervious areas.

Incremental Weighted Runoff

Column (9)	R(t) = (Ap/At) x Rip(t) + (Ai/At) x Rii(t) R(t) = (Ap/At) x Col.(6) + (Ai/At) x Col.(8)

SCS Unit Hydrograph Method

Column (10)	Q(t) is computed with the SCS unit hydrograph method using R(t) and Qu(t).

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-1
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2.054 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.122 hours
Flow (Peak, Computed)	1.09 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.05 ft³/s

Drainage Area

SCS CN (Composite)	69.000
Area (User Defined)	2.054 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	0.6 in
Runoff Volume (Pervious)	0.097 ac-ft

Hydrograph Volume (Area under Hydrograph curve)

Volume	0.097 ac-ft

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-1
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	27.93 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-1
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2.054 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.122 hours
Flow (Peak, Computed)	1.70 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.67 ft³/s

Drainage Area	
SCS CN (Composite)	69.000
Area (User Defined)	2.054 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.8 in
Runoff Volume (Pervious)	0.143 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.143 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-1
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	27.93 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-1
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2.054 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	4.20 ft^3/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	4.17 ft^3/s

Drainage Area	
SCS CN (Composite)	69.000
Area (User Defined)	2.054 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.0 in
Runoff Volume (Pervious)	0.335 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.335 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-1
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	27.93 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary

Label: DA-1

Scenario: Post-Development 25 year

Return Event: 25 years

Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	6.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2.054 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	6.52 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	6.49 ft³/s

Drainage Area	
SCS CN (Composite)	69.000
Area (User Defined)	2.054 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.0 in
Runoff Volume (Pervious)	0.518 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.518 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-1
Scenario: Post-Development 25 year

Return Event: 25 years
Storm Event: 25 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	27.93 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-1
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	9.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2.054 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	11.09 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	11.08 ft³/s

Drainage Area	
SCS CN (Composite)	69.000
Area (User Defined)	2.054 acres
Maximum Retention (Pervious)	4.5 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.2 in
Runoff Volume (Pervious)	0.892 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.891 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-1
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	27.93 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: DA-2 | Storm Event: 1 Year
Scenario: Post-Development 1 year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.096 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.21 ft^3/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.21 ft^3/s

Drainage Area	
SCS CN (Composite)	95.000
Area (User Defined)	0.096 acres
Maximum Retention (Pervious)	0.5 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.3 in
Runoff Volume (Pervious)	0.018 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.018 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-2
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	1.31 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-2
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.096 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.25 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.25 ft³/s

Drainage Area	
SCS CN (Composite)	95.000
Area (User Defined)	0.096 acres
Maximum Retention (Pervious)	0.5 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.7 in
Runoff Volume (Pervious)	0.022 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.022 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-2
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	1.31 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-2
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.096 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.39 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.39 ft³/s

Drainage Area	
SCS CN (Composite)	95.000
Area (User Defined)	0.096 acres
Maximum Retention (Pervious)	0.5 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.4 in
Runoff Volume (Pervious)	0.036 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.035 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-2
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	1.31 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-2
Scenario: Post-Development 25 year

Return Event: 25 years
Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	6.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.096 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.51 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.51 ft³/s

Drainage Area	
SCS CN (Composite)	95.000
Area (User Defined)	0.096 acres
Maximum Retention (Pervious)	0.5 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.8 in
Runoff Volume (Pervious)	0.047 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.047 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-2
Scenario: Post-Development 25 year

Return Event: 25 years
Storm Event: 25 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	1.31 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-2
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	9.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.096 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.72 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.72 ft³/s

Drainage Area

SCS CN (Composite)	95.000
Area (User Defined)	0.096 acres
Maximum Retention (Pervious)	0.5 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	8.4 in
Runoff Volume (Pervious)	0.067 ac-ft

Hydrograph Volume (Area under Hydrograph curve)

Volume	0.067 ac-ft

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-2
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	1.31 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-3
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Storm Event	1 Year
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.134 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.29 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.29 ft³/s

Drainage Area	
SCS CN (Composite)	95.000
Area (User Defined)	0.134 acres
Maximum Retention (Pervious)	0.5 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.3 in
Runoff Volume (Pervious)	0.025 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.025 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-3
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	1.83 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-3
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

Storm Event	2 Year
Return Event	2 years
Duration	24.000 hours
Depth	3.3 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.134 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.35 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.35 ft³/s

Drainage Area	
SCS CN (Composite)	95.000
Area (User Defined)	0.134 acres
Maximum Retention (Pervious)	0.5 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.7 in
Runoff Volume (Pervious)	0.031 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.031 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-3
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	1.83 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-3
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

Storm Event	10 Year
Return Event	10 years
Duration	24.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.134 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.55 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.55 ft³/s

Drainage Area	
SCS CN (Composite)	95.000
Area (User Defined)	0.134 acres
Maximum Retention (Pervious)	0.5 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.4 in
Runoff Volume (Pervious)	0.049 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.049 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-3
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	1.83 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-3
Scenario: Post-Development 25 year

Return Event: 25 years
Storm Event: 25 Year

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	6.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.134 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.71 ft^3/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.71 ft^3/s

Drainage Area	
SCS CN (Composite)	95.000
Area (User Defined)	0.134 acres
Maximum Retention (Pervious)	0.5 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.8 in
Runoff Volume (Pervious)	0.065 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.065 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-3
Scenario: Post-Development 25 year

Return Event: 25 years
Storm Event: 25 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	1.83 ft^3/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-3
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

Storm Event	100 Year
Return Event	100 years
Duration	24.000 hours
Depth	9.0 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.134 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	1.01 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.01 ft³/s

Drainage Area	
SCS CN (Composite)	95.000
Area (User Defined)	0.134 acres
Maximum Retention (Pervious)	0.5 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.4 in
Runoff Volume (Pervious)	0.094 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.094 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post Developed

Subsection: Unit Hydrograph Summary
Label: DA-3
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

SCS Unit Hydrograph Parameters	
Unit peak, qp	1.83 ft³/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Post Developed

Subsection: Elevation-Area Volume Curve
Label: Lot 1 Bypass
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Elevation (ft)	Planimeter (ft^2)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
94.75	0.0	0.000	0.000	0.000	0.000
97.75	0.0	0.000	0.000	0.000	0.000

Post Developed

Subsection: Volume Equations
Label: Lot 1 Bypass
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Post Developed

Subsection: Storage Chamber System
Label: Lot 1 Infiltration Chambers
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Storage Chamber

ID	47	Notes	
Label	Stormtech SC -160L		

Storage Chamber

Effective Length	7.56 ft	Manufacturer	
Section Length Varies?	False	Default Spacing	0.50 ft

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft³/ft)
0.00	0.00
0.08	0.12
0.17	0.12
0.25	0.11
0.33	0.10
0.42	0.10
0.50	0.09
0.58	0.08
0.67	0.07
0.75	0.06
0.83	0.04
0.92	0.02
1.00	0.01

Storage Chamber

Storage Chamber Type	Incremental Volume Per Unit Length	Maximum Width	1.55 ft

Storage Chamber (Pond)

Chamber System Invert	86.50 ft
Chamber System Rows	4
Chambers per Row	5
Chamber System Fill Void Space	40.0 %
Chamber System Row Spacing	0.0 in
Chamber System Side Fill	6.0 in
Chamber System Fill Cover Depth	5.0 in

Post Developed

Subsection: Storage Chamber System
Label: Lot 1 Infiltration Chambers
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Storage Chamber (Pond)	
Chamber System Fill Base Depth	4.0 in
Chamber System Fill Side Slope	1.000 H:V
Chamber System End Fill	12.0 in
Chamber System Includes Header?	False

Subsection: Elevation-Area Volume Curve
Label: Lot 2 Bypass
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Elevation (ft)	Planimeter (ft^2)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
87.67	0.0	0.000	0.000	0.000	0.000
89.67	0.0	0.000	0.000	0.000	0.000

Post Developed

Subsection: Volume Equations
Label: Lot 2 Bypass
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Pond Volume Equations
* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Post Developed

Subsection: Storage Chamber System
Label: Lot 2 Chambers
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Storage Chamber

ID	47	Notes	
Label	Stormtech SC -160L		

Storage Chamber

Effective Length	7.56 ft	Manufacturer	
Section Length Varies?	False	Default Spacing	0.50 ft

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft³/ft)
0.00	0.00
0.08	0.12
0.17	0.12
0.25	0.11
0.33	0.10
0.42	0.10
0.50	0.09
0.58	0.08
0.67	0.07
0.75	0.06
0.83	0.04
0.92	0.02
1.00	0.01

Storage Chamber

Storage Chamber Type	Incremental Volume Per Unit Length	Maximum Width	1.55 ft

Storage Chamber (Pond)

Chamber System Invert	86.50 ft
Chamber System Rows	7
Chambers per Row	4
Chamber System Fill Void Space	40.0 %
Chamber System Row Spacing	0.0 in
Chamber System Side Fill	12.0 in
Chamber System Fill Cover Depth	5.0 in

Post Developed

Subsection: Storage Chamber System
Label: Lot 2 Chambers
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Storage Chamber (Pond)	
Chamber System Fill Base Depth	4.0 in
Chamber System Fill Side Slope	1.000 H:V
Chamber System End Fill	12.0 in
Chamber System Includes Header?	False

Subsection: Outlet Input Data
Label: Lot 1 Bypass Out
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	94.75 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	97.75 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Rectangular Weir	Weir - 1	Forward	TW	97.50	97.75
Tailwater Settings	Tailwater			(N/A)	(N/A)

Post Developed

Subsection: Outlet Input Data
Label: Lot 1 Bypass Out
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Structure ID: Weir - 1
Structure Type: Rectangular Weir

Number of Openings	1
Elevation	97.50 ft
Weir Length	6.00 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Post Developed

Subsection: Outlet Input Data
Label: Lot 1 Bypass to Chambers
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	94.75 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	97.75 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular	Culvert - 1	Forward + Reverse	TW	94.75	97.75
Tailwater Settings	Tailwater			(N/A)	(N/A)

Post Developed

Subsection: Outlet Input Data
Label: Lot 1 Bypass to Chambers
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Structure ID: Culvert - 1 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	8.0 in
Length	56.10 ft
Length (Computed Barrel)	56.61 ft
Slope (Computed)	0.135 ft/ft

Outlet Control Data	
Manning's n	0.012
Ke	0.700
Kb	0.046
Kr	0.700
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0210
M	1.3300
C	0.0463
Y	0.7500
T1 ratio (HW/D)	1.245
T2 ratio (HW/D)	1.585
Slope Correction Factor	0.700

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	95.58 ft	T1 Flow	1.00 ft³/s
T2 Elevation	95.81 ft	T2 Flow	1.14 ft³/s

Post Developed

Subsection: Outlet Input Data
Label: Lot 2 Bypass Out
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	87.67 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	89.67 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Rectangular Weir Tailwater Settings	Weir - 1 Tailwater	Forward	TW	89.42 (N/A)	89.67 (N/A)

Post Developed

Subsection: Outlet Input Data
Label: Lot 2 Bypass Out
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Structure ID: Weir - 1
Structure Type: Rectangular Weir

Number of Openings	1
Elevation	89.42 ft
Weir Length	6.00 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Post Developed

Subsection: Outlet Input Data
Label: Lot 2 Bypass to Chambers
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	87.67 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	89.67 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular	Culvert - 1	Forward + Reverse	TW	87.67	89.67
Tailwater Settings	Tailwater			(N/A)	(N/A)

Post Developed

Subsection: Outlet Input Data
Label: Lot 2 Bypass to Chambers
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Structure ID: Culvert - 1 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	8.0 in
Length	63.13 ft
Length (Computed Barrel)	63.13 ft
Slope (Computed)	0.008 ft/ft

Outlet Control Data	
Manning's n	0.012
Ke	0.700
Kb	0.046
Kr	0.700
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0210
M	1.3300
C	0.0463
Y	0.7500
T1 ratio (HW/D)	1.156
T2 ratio (HW/D)	1.496
Slope Correction Factor	0.700

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	88.44 ft	T1 Flow	1.00 ft³/s
T2 Elevation	88.67 ft	T2 Flow	1.14 ft³/s

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 1 Bypass
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	94.75	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Outflow (Starting)	0.00	ft³/s	ICPM Time Step	0.050	hours

Time to Peak (hours)	Maximum Storage Elevation (ft)	Maximum Storage Volume (ac-ft)
12.100	95.00	0.000

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.21	0.000	0.00
Pond Outflow...	12.100	0.21	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.018	Forward	0.000	Reverse
Pond Outflow...	0.000	Reverse	0.018	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.018 ac-ft
Volume (Total Out ICPM)	0.018 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	94.75 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary | Return Event: 2 years
Label: Lot 1 Bypass | Storm Event: 2 Year
Scenario: Post-Development 2 year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	94.75	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Outflow (Starting)	0.00	ft³/s	ICPM Time Step	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.100	95.05	0.000

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.25	0.000	0.00
Pond Outflow...	12.100	0.25	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.022	Forward	0.000	Reverse
Pond Outflow...	0.000	Reverse	0.022	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.022 ac-ft
Volume (Total Out ICPM)	0.022 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	94.75 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 1 Bypass
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	94.75	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Outflow (Starting)	0.00	ft³/s	ICPM Time Step	0.050	hours

Time to Peak (hours)	Maximum Storage Elevation (ft)	Maximum Storage Volume (ac-ft)
12.100	95.22	0.000

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.39	0.000	0.00
Pond Outflow...	12.100	0.39	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.035	Forward	0.000	Reverse
Pond Outflow...	0.000	Reverse	0.035	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.035 ac-ft
Volume (Total Out ICPM)	0.035 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	94.75 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary | Return Event: 25 years
Label: Lot 1 Bypass | Storm Event: 25 Year
Scenario: Post-Development 25 year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	94.75	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Outflow (Starting)	0.00	ft³/s	ICPM Time Step	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.100	95.32	0.000

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.51	0.000	0.00
Pond Outflow...	12.100	0.51	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.047	Forward	0.000	Reverse
Pond Outflow...	0.000	Reverse	0.047	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.047 ac-ft
Volume (Total Out ICPM)	0.047 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	94.76 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 1 Bypass
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	94.75	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Outflow (Starting)	0.00	ft³/s	ICPM Time Step	0.050	hours

Time to Peak (hours)	Maximum Storage Elevation (ft)	Maximum Storage Volume (ac-ft)
12.100	95.47	0.000

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.72	0.000	0.00
Pond Outflow...	12.100	0.72	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.067	Forward	0.000	Reverse
Pond Outflow...	0.000	Reverse	0.067	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.067 ac-ft
Volume (Total Out ICPM)	0.067 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	94.76 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Pond Infiltration Calculations
Label: Lot 1 Infiltration Chambers (IN)
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Average Infiltration Rating Table

Elevation (Water Surface) (ft)	Area (Total) (ft^2)	Flow (Infiltration) (ft^3/s)
86.50	286.5	0.00
86.60	295.9	0.03
86.70	305.4	0.04
86.80	315.0	0.04
86.83	318.3	0.04
86.90	324.7	0.04
87.00	334.5	0.04
87.10	344.3	0.04
87.20	354.2	0.04
87.30	364.2	0.04
87.40	374.3	0.04
87.50	384.5	0.04
87.60	394.7	0.05
87.70	405.0	0.05
87.80	415.4	0.05
87.83	418.9	0.05
87.90	425.9	0.05
88.00	436.5	0.05
88.10	447.1	0.05
88.20	457.8	0.05
88.25	463.2	0.05

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 1 Infiltration Chambers
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	5.0000 in/h

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	86.50	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Infiltration (Starting ICPM)	0.00	ft³/s	ICPM Time Step	0.050	hours
Outflow (Starting)	0.00	ft³/s	Output Increment	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.550	87.58	0.005

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.21	0.000	0.00
Infiltration...	12.550	0.00	0.000	0.00
Pond Outflow...	0.000	0.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.018	Forward	0.000	Reverse
Infiltration...	0.000	Reverse	0.018	Forward
Pond Outflow...	0.000	Reverse	0.000	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.018 ac-ft
Volume (Total Out ICPM)	0.018 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	86.51 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 1 Infiltration Chambers
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	5.0000 in/h

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	86.50	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Infiltration (Starting ICPM)	0.00	ft³/s	ICPM Time Step	0.050	hours
Outflow (Starting)	0.00	ft³/s	Output Increment	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.550	87.94	0.007

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.25	0.000	0.00
Infiltration...	12.550	0.00	0.000	0.00
Pond Outflow...	0.000	0.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.022	Forward	0.000	Reverse
Infiltration...	0.000	Reverse	0.022	Forward
Pond Outflow...	0.000	Reverse	0.000	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.022 ac-ft
Volume (Total Out ICPM)	0.022 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	86.51 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 1 Infiltration Chambers
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	5.0000 in/h

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	86.50	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Infiltration (Starting ICPM)	0.00	ft³/s	ICPM Time Step	0.050	hours
Outflow (Starting)	0.00	ft³/s	Output Increment	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.150	88.25	0.008

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.39	0.000	0.00
Infiltration...	12.150	0.00	0.000	0.00
Pond Outflow...	0.000	0.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.035	Forward	0.000	Reverse
Infiltration...	0.000	Reverse	0.031	Forward
Pond Outflow...	0.000	Reverse	0.000	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.035 ac-ft
Volume (Total Out ICPM)	0.031 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	86.51 ft
Difference	0.004 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	12.5 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 1 Infiltration Chambers
Scenario: Post-Development 25 year

Return Event: 25 years
Storm Event: 25 Year

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	5.0000 in/h

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	86.50	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Infiltration (Starting ICPM)	0.00	ft³/s	ICPM Time Step	0.050	hours
Outflow (Starting)	0.00	ft³/s	Output Increment	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.050	88.25	0.008

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.51	0.000	0.00
Infiltration...	12.050	0.00	0.000	0.00
Pond Outflow...	0.000	0.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.047	Forward	0.000	Reverse
Infiltration...	0.000	Reverse	0.037	Forward
Pond Outflow...	0.000	Reverse	0.000	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.047 ac-ft
Volume (Total Out ICPM)	0.037 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	86.52 ft
Difference	0.010 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	21.2 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 1 Infiltration Chambers
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	5.0000 in/h

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	86.50	ft	Flow Tolerance (Minimum)	0.000	ft^3/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Infiltration (Starting ICPM)	0.00	ft^3/s	ICPM Time Step	0.050	hours
Outflow (Starting)	0.00	ft^3/s	Output Increment	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
11.950	88.25	0.008

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft^3/s)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Pond Inflow....	12.100	0.72	0.000	0.00
Infiltration...	11.950	0.00	0.000	0.00
Pond Outflow...	0.000	0.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.067	Forward	0.000	Reverse
Infiltration...	0.000	Reverse	0.046	Forward
Pond Outflow...	0.000	Reverse	0.000	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.067 ac-ft
Volume (Total Out ICPM)	0.046 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	86.52 ft
Difference	0.021 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	31.8 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 2 Bypass
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	87.67	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Outflow (Starting)	0.00	ft³/s	ICPM Time Step	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.100	88.07	0.000

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.29	0.000	0.00
Pond Outflow...	12.100	0.29	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.025	Forward	0.000	Reverse
Pond Outflow...	0.000	Reverse	0.025	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.025 ac-ft
Volume (Total Out ICPM)	0.025 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	87.68 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 2 Bypass
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	87.67	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Outflow (Starting)	0.00	ft³/s	ICPM Time Step	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.600	88.16	0.000

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.35	0.000	0.00
Pond Outflow...	12.100	0.35	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.031	Forward	0.000	Reverse
Pond Outflow...	0.000	Reverse	0.031	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.031 ac-ft
Volume (Total Out ICPM)	0.031 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	87.68 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary | Return Event: 10 years
Label: Lot 2 Bypass | Storm Event: 10 Year
Scenario: Post-Development 10 year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	87.67	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Outflow (Starting)	0.00	ft³/s	ICPM Time Step	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.200	88.44	0.000

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.55	0.000	0.00
Pond Outflow...	12.100	0.55	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.049	Forward	0.000	Reverse
Pond Outflow...	0.000	Reverse	0.049	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.049 ac-ft
Volume (Total Out ICPM)	0.049 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	87.68 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 2 Bypass
Scenario: Post-Development 25 year

Return Event: 25 years
Storm Event: 25 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	87.67	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Outflow (Starting)	0.00	ft³/s	ICPM Time Step	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.100	88.60	0.000

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.71	0.000	0.00
Pond Outflow...	12.100	0.70	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.065	Forward	0.000	Reverse
Pond Outflow...	0.000	Reverse	0.065	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.065 ac-ft
Volume (Total Out ICPM)	0.065 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	87.68 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 2 Bypass
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	87.67	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Outflow (Starting)	0.00	ft³/s	ICPM Time Step	0.050	hours

Time to Peak (hours)	Maximum Storage Elevation (ft)	Maximum Storage Volume (ac-ft)
12.100	88.86	0.000

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	1.01	0.000	0.00
Pond Outflow...	12.100	1.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.094	Forward	0.000	Reverse
Pond Outflow...	0.000	Reverse	0.094	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.094 ac-ft
Volume (Total Out ICPM)	0.094 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	87.69 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Pond Infiltration Calculations
Label: Lot 2 Chambers (IN)
Scenario: Post-Development 1 year

Return Event: 1 years
Storm Event: 1 Year

Average Infiltration Rating Table

Elevation (Water Surface) (ft)	Area (Total) (ft^2)	Flow (Infiltration) (ft^3/s)
86.50	414.2	0.00
86.83	444.7	0.05
87.00	460.3	0.05
87.50	508.3	0.06
87.83	541.5	0.06
88.00	558.4	0.06
88.25	584.2	0.07

Post Developed

Subsection: Interconnected Pond Routing Summary	Return Event: 1 years
Label: Lot 2 Chambers	Storm Event: 1 Year
Scenario: Post-Development 1 year	

Infiltration

Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	5.0000 in/h

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	86.50	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Infiltration (Starting ICPM)	0.00	ft³/s	ICPM Time Step	0.050	hours
Outflow (Starting)	0.00	ft³/s	Output Increment	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.550	87.71	0.008

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.29	0.000	0.00
Infiltration...	12.550	0.00	0.000	0.00
Pond Outflow...	0.000	0.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.025	Forward	0.000	Reverse
Infiltration...	0.000	Reverse	0.025	Forward
Pond Outflow...	0.000	Reverse	0.000	Forward

Mass Balance (ac-ft)

Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.025 ac-ft
Volume (Total Out ICPM)	0.025 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	86.52 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 2 Chambers
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: 2 Year

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	5.0000 in/h

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	86.50	ft	Flow Tolerance (Minimum)	0.000	ft^3/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Infiltration (Starting ICPM)	0.00	ft^3/s	ICPM Time Step	0.050	hours
Outflow (Starting)	0.00	ft^3/s	Output Increment	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.550	88.11	0.010

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft^3/s)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Pond Inflow....	12.100	0.35	0.000	0.00
Infiltration...	12.550	0.00	0.000	0.00
Pond Outflow...	0.000	0.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.031	Forward	0.000	Reverse
Infiltration...	0.000	Reverse	0.031	Forward
Pond Outflow...	0.000	Reverse	0.000	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.031 ac-ft
Volume (Total Out ICPM)	0.031 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	86.53 ft
Difference	0.000 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	0.0 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 2 Chambers
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: 10 Year

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	5.0000 in/h

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	86.50	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Infiltration (Starting ICPM)	0.00	ft³/s	ICPM Time Step	0.050	hours
Outflow (Starting)	0.00	ft³/s	Output Increment	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.150	88.25	0.011

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	0.55	0.000	0.00
Infiltration...	12.150	0.00	0.000	0.00
Pond Outflow...	0.000	0.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.049	Forward	0.000	Reverse
Infiltration...	0.000	Reverse	0.042	Forward
Pond Outflow...	0.000	Reverse	0.000	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.049 ac-ft
Volume (Total Out ICPM)	0.042 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	86.54 ft
Difference	0.008 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	15.3 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 2 Chambers
Scenario: Post-Development 25 year

Return Event: 25 years
Storm Event: 25 Year

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	5.0000 in/h

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	86.50	ft	Flow Tolerance (Minimum)	0.000	ft^3/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Infiltration (Starting ICPM)	0.00	ft^3/s	ICPM Time Step	0.050	hours
Outflow (Starting)	0.00	ft^3/s	Output Increment	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
12.050	88.25	0.011

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft^3/s)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Pond Inflow....	12.100	0.70	0.000	0.00
Infiltration...	12.050	0.00	0.000	0.00
Pond Outflow...	0.000	0.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.065	Forward	0.000	Reverse
Infiltration...	0.000	Reverse	0.049	Forward
Pond Outflow...	0.000	Reverse	0.000	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.065 ac-ft
Volume (Total Out ICPM)	0.049 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	86.55 ft
Difference	0.015 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	23.6 %

Post Developed

Subsection: Interconnected Pond Routing Summary
Label: Lot 2 Chambers
Scenario: Post-Development 100 year

Return Event: 100 years
Storm Event: 100 Year

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	5.0000 in/h

Initial Conditions			Calculation Tolerances		
Elevation (Starting Water Surface Computed)	86.50	ft	Flow Tolerance (Minimum)	0.000	ft³/s
Volume (Starting)	0.000	ac-ft	Maximum Iterations	35	
Infiltration (Starting ICPM)	0.00	ft³/s	ICPM Time Step	0.050	hours
Outflow (Starting)	0.00	ft³/s	Output Increment	0.050	hours

	Maximum Storage	
Time to Peak (hours)	Elevation (ft)	Volume (ac-ft)
11.900	88.25	0.011

	Forward Flow Peaks		Reverse Flow Peaks	
	Time to Peak (hours)	Flow (Peak) (ft³/s)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Pond Inflow....	12.100	1.00	0.000	0.00
Infiltration...	11.900	0.00	0.000	0.00
Pond Outflow...	0.000	0.00	0.000	0.00

	Total Volume In		Total Volume Out	
	Volume (ac-ft)	Direction	Volume (ac-ft)	Direction
Pond Inflow....	0.094	Forward	0.000	Reverse
Infiltration...	0.000	Reverse	0.062	Forward
Pond Outflow...	0.000	Reverse	0.000	Forward

Mass Balance (ac-ft)	
Volume (Initial ICPM)	0.000 ac-ft
Volume (Total In ICPM)	0.094 ac-ft
Volume (Total Out ICPM)	0.062 ac-ft
Volume (Ending)	0.000 ac-ft
Elevation (Ending)	86.57 ft
Difference	0.032 ac-ft
Percent of Inflow Volume (Interconnected Pond Mass Balance)	34.0 %

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APPENDIX G

SMP Selection

Green Infrastructure Planning Evaluation

Group	Practice	Description	Comments
Preservation of Natural Resources	Preservation of Undisturbed Areas	Delineate and place into permanent conservation easement undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain.	Undisturbed portions of the site will be protected and remain in natural state.
	Preservation of Buffers	Define, delineate and place in permanent conservation easement naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands.	5
	Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	The project disturbance has been minimized to the greatest extent possible.
	Locating Development in Less Sensitive Areas	Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the lease impact.	All sensitive areas have been avoided to the greatest extent possible. Improvements within floodway either provide enhancement or will have no increased impacts.
	Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	5
	Soil Restoration	Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of practices such as downspout disconnections, grass channels, filter strips, and tree clusters.	Soil restoration is proposed for this project
Reduction of Impervious Cover	Roadway Reduction	Minimize roadway widths and lengths to reduce site impervious area.	1
	Sidewalk Reduction	Minimize sidewalk lengths and widths to reduce site	3

		impervious area.	
	Driveway Reduction	Minimize driveway lengths and widths to reduce site impervious area.	3
	Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	2
	Building Footprint Reduction	Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.	3
	Parking Reduction	Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, minimizing stall dimensions, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.	2
Runoff Reduction Techniques	Conservation of natural areas	Retain the pre-development hydrologic and water quality Conservation of characteristics of undisturbed natural areas, stream and wetland natural areas buffers by restoring and/or permanently conserving these areas on a site.	This has been done. The undisturbed natural areas are beyond the project boundaries will remain in its natural state.
	Sheetflow to riparian buffers or filter strips	Undisturbed natural areas such as forested conservation areas and stream buffers or vegetated filter strips and riparian buffers can be used to treat and control stormwater runoff from some areas of a development project.	4
	Vegetated open swale	The natural drainage paths, or properly designed vegetated channels, can be used instead of constructing underground storm sewers or concrete open channels to increase time of concentration, reduce the	4

		peak discharge, and provide infiltration.	
	Tree planting/tree box	Plant or conserve trees to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Trees can be used for applications such as landscaping, stormwater management practice areas, conservation areas and erosion and sediment control.	4

	Disconnection of rooftop runoff	Direct runoff from residential rooftop areas and upland overland runoff flow to designated pervious areas to reduce runoff volumes and rates	1
	Stream daylighting for redevelopment projects	Stream daylight previously-culverted/piped streams to restore natural habitats, better attenuate runoff by increasing the storage size, promoting infiltration, and help reduce pollutant loads.	1
	Rain garden	Manage and treat small volumes of stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression.	1
	Green roof	Capture runoff by a layer of vegetation and soil installed on top of a conventional flat or sloped roof. The rooftop vegetation allows evaporation and evapotranspiration processes to reduce volume and discharge rate of runoff entering conveyance system.	1
	Stormwater planter	Small landscaped stormwater treatment devices that can be designed as infiltration or	1

		filtering practices. Stormwater planters use soil infiltration and biogeochemical processes to decrease stormwater quantity and improve water quality.	
	Rain tank/Cistern	Capture and store stormwater runoff to be used for irrigation systems or filtered and reused for non-contact activities.	1
	Porous Pavement	Pervious types of pavements that provide an alternative to conventional paved surfaces, designed to infiltrate rainfall through the surface, thereby reducing stormwater runoff from a site and providing some pollutant uptake in the underlying soils.	1
Pond	Micropool Extended Detention Pool (P-1)	Pond that treats the majority of the water quality volume through extended detention, and incorporates a micropool at the outlet of the pond to prevent sediment resuspension.	1
	Wet Pond (P-2)	Pond that provides storage for the entire water quality volume in the permanent pool.	1
	Wet Extended Detention (P-3)	Pond that treats a portion of the water quality volume by detaining storm flows above a permanent pool for a specified minimum detention time.	1
	Multiple Pond System (P-4) Pocket Pond (P-5)	A group of ponds that collectively treat the water quality volume. A stormwater wetland design adapted for the treatment of runoff from small drainage areas that has little or no baseflow available to maintain water elevations and relies on ground water to maintain a permanent pool.	1
Wetland	Shallow Wetland (W-1)	A wetland that provides water quality treatment	1

		entirely in a wet shallow marsh.	
	Extended Detention Wetland (W-2)	A wetland system that provides some fraction of the water quality volume by detaining storm flows above the marsh surface.	1
	Pond/ Wetland System (W-3)	A wetland system that provides a portion of the water quality volume in the permanent pool of a wet pond that precedes the marsh for a specified minimum detention time.	1
	Pocket Wetland (W-4)	A shallow wetland design adapted for the treatment of runoff from small drainage areas that has variable water levels and relies on groundwater for its permanent pool.	1
Infiltration	Infiltration Trench (I-1)	An infiltration practice that stores the water quality volume in the void spaces of a gravel trench before it is infiltrated into the ground.	1
	Infiltration Basin (I-2)	An infiltration practice that stores the water quality volume in a shallow depression, before it is infiltrated it into the ground.	4
	Dry Well (I-3)	An infiltration practice similar in design to the infiltration trench, and best suited for treatment of rooftop runoff.	1
Filtering Practices	Surface Sand Filter (F-1)	A filtering practice that treats stormwater by settling out larger particles in a sediment chamber, and then filtering stormwater through a sand matrix.	1
	Underground Sand Filter (F2)	A filtering practice that treats stormwater as it flows through underground settling and filtering chambers.	1
	Perimeter Sand Filter (F-3)	A filter that incorporates a sediment chamber and filer bed as parallel vaults adjacent to a parking lot.	1
	Organic Filter (F-4)	A filtering practice that uses an organic medium such as	1

		compost in the filter, in the place of sand.	
	Bioretention (F-5)	A shallow depression that treats stormwater as it flows through a soil matrix, and is returned to the storm drain system.	1
Open Channels	Dry Swale (O-1)	An open drainage channel or depression explicitly designed to detain and promote the filtration of stormwater runoff into the soil media.	1
	Wet Swale (O-2)	An open drainage channel or depression designed to retain water or intercept groundwater for water quality treatment.	1

Comment Notes:

1. This improvement is not proposed for the project and does not apply.
2. This practice cannot be applied to this project. It is either deemed (a) inappropriate by the NYS DEC; (b) does not fit the type of project; or (c) cannot be engineered because of practical difficulties such as constructability, maintenance issues, durability, stability or other cause.
3. Minimized to the greatest extent possible within applicable codes.
4. Similar type of practice used.
5. Not applicable.

APPENDIX H

Stormwater Management Practices Design:

Runoff Reductions Volume Calculations

Stormtech SC-310 Chamber System Sizing

Runoff Reduction Volume: Chapter 5 NYS DEC SWDM

As per the requirements of chapter 5 of the NYS DEC SWDM, this project must meet minimum runoff reduction volumes. These minimum volumes depend on the soil type on the site. The calculation for this is shown below. Areas of redevelopment are not included. has areas of previously impervious area. The calculations for determining the minimum RRV and the amount provided are shown below.

Runoff Reduction Volume:

RRv = Runoff Reduction Volume

Ai = Impervious Cover targeted for runoff reduction

(Aic) = total area of new impervious cover = Total Impervious area - redeveloped impervious area (see Redevelopment section of Appendix H for exact numbers)

Rv∗ = 0.05 + 0.009(I) Where I = 100% impervious = 0.95

S = Hydrologic Soil Group (HSG) reduction factor (S)
HSG A = 0.55
HSG B = 0.40
HSG C = 0.30
HSG D = 0.20

$$S = \frac{(Area\ A * 0.55) + (Area\ B * 0.40) + (Area\ C * 0.30) + (Area\ D * 0.20)}{Total\ Area}$$

P = Rainfall in inches = 1.4

Ai = (S)(Aic)

Min RRv = [(P)(Rv∗)(Ai)]/12

RRv Provided by each practice:
Practice = Total Volume Provided x % of reduction provided by practice type

Cistern: 2,366 cf x 100% = 2,366 cf
SC-310 Chambers: 4,504 cf x 90% = 4,053 cf

Design Point	Aic (ac)	S	Ai (ac)	Rv∗	Min. RRv Required (ac-ft)	Full RRv (ac-ft)	RRv Applied (ac-ft)
DL-1	0.212	0.04	0.085	0.95	0.009	0.024	0.024

Stormtech SC-160L Infiltration Chamber Sizing Calculations

The Stormtech Infiltration chambers capture drainage area 3 and infiltrate it into the ground. The following is the sizing criteria for the Infiltration chambers.

User Inputs

Chamber Model:	SC-160LP
Outlet Control Structure:	No
Project Name:	5 Hawkes Ave Lot 1
Engineer:	Thomas Kerrigan
Project Location:	New York
Measurement Type:	Imperial
Required Storage Volume:	423 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	6 in.
Stone Above Chambers:	6 in.
Average Cover Over Chambers:	14 in.
Design Constraint Dimensions:	(20 ft. x 30 ft.)

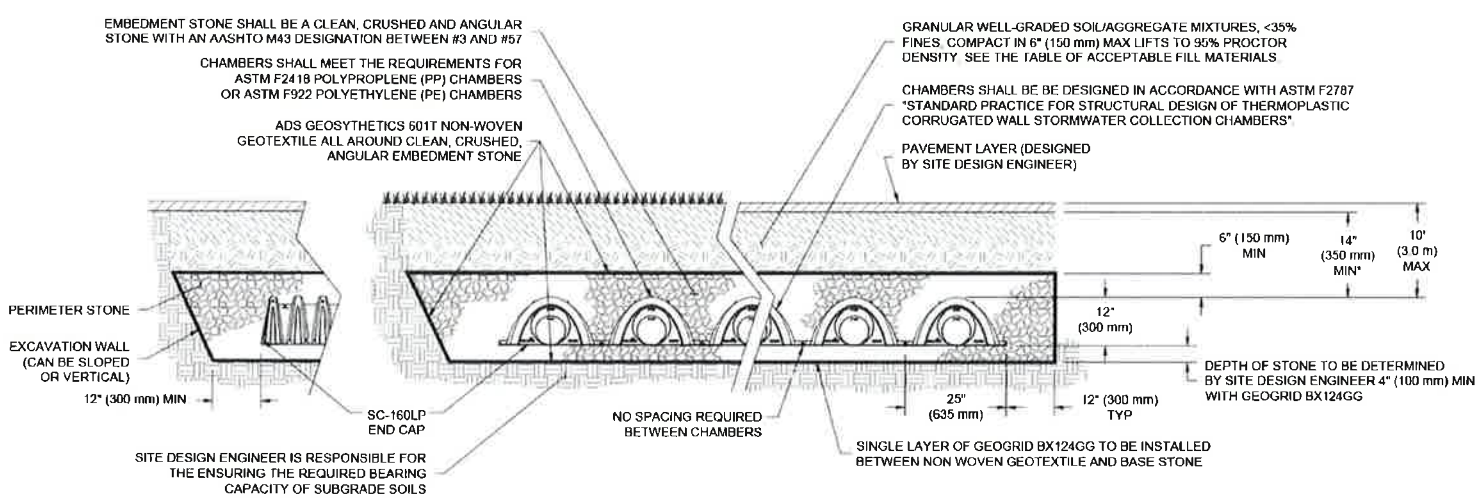
Results

System Volume and Bed Size

Installed Storage Volume:	432.14 cubic ft.
Storage Volume Per Chamber:	6.85 cubic ft.
Number Of Chambers Required:	20
Number Of End Caps Required:	14
Chamber Rows:	7
Maximum Length:	27.27 ft.
Maximum Width:	16.58 ft.
Approx. Bed Size Required:	437.43 square ft.

System Components

Amount Of Stone Required:	27.33 cubic yards
Volume Of Excavation (Not Including Fill):	32.40 cubic yards



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 20" (510 mm)

User Inputs

Chamber Model:	SC-160LP
Outlet Control Structure:	No
Project Name:	5 Hawkes Ave Lot 2
Engineer:	Thomas Kerrigan
Project Location:	New York
Measurement Type:	Imperial
Required Storage Volume:	605 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	6 in.
Stone Above Chambers:	6 in.
Average Cover Over Chambers:	14 in.
Design Constraint Dimensions:	(20 ft. x 40 ft.)

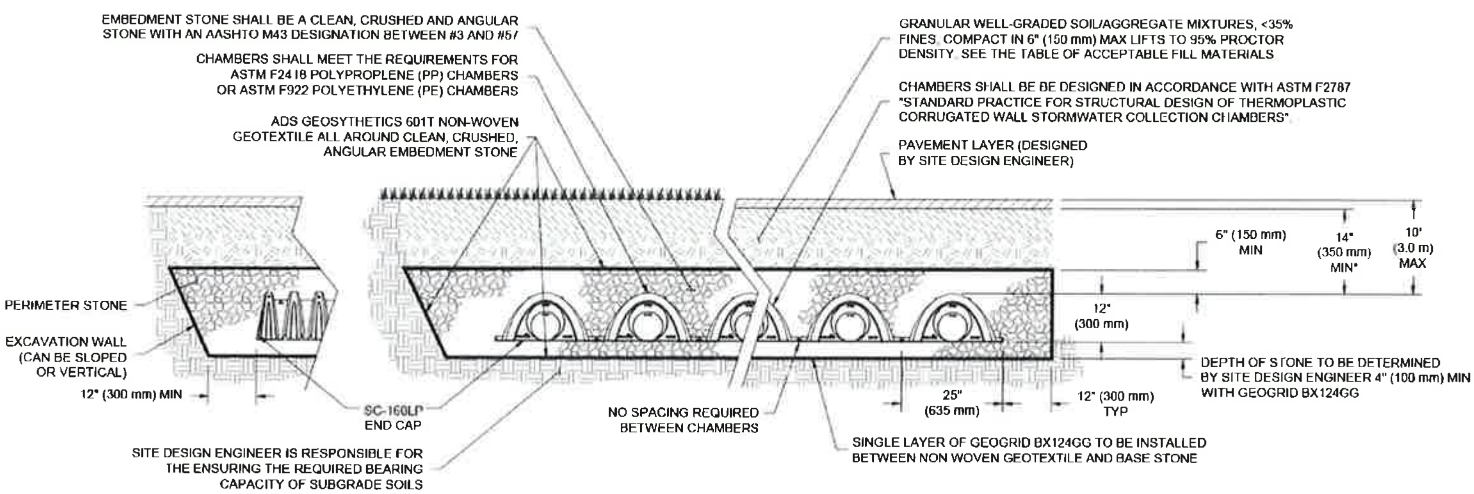
Results

System Volume and Bed Size

Installed Storage Volume:	636.29 cubic ft.
Storage Volume Per Chamber:	6.85 cubic ft.
Number Of Chambers Required:	32
Number Of End Caps Required:	15
Chamber Rows:	8
Maximum Length:	34.39 ft.
Maximum Width:	18.67 ft.
Approx. Bed Size Required:	630.96 square ft.

System Components

Amount Of Stone Required:	38.62 cubic yards
Volume Of Excavation (Not Including Fill):	46.74 cubic yards



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 20" (510 mm)

APPENDIX I

Hydraulic Storm Sewer Capacity Analysis

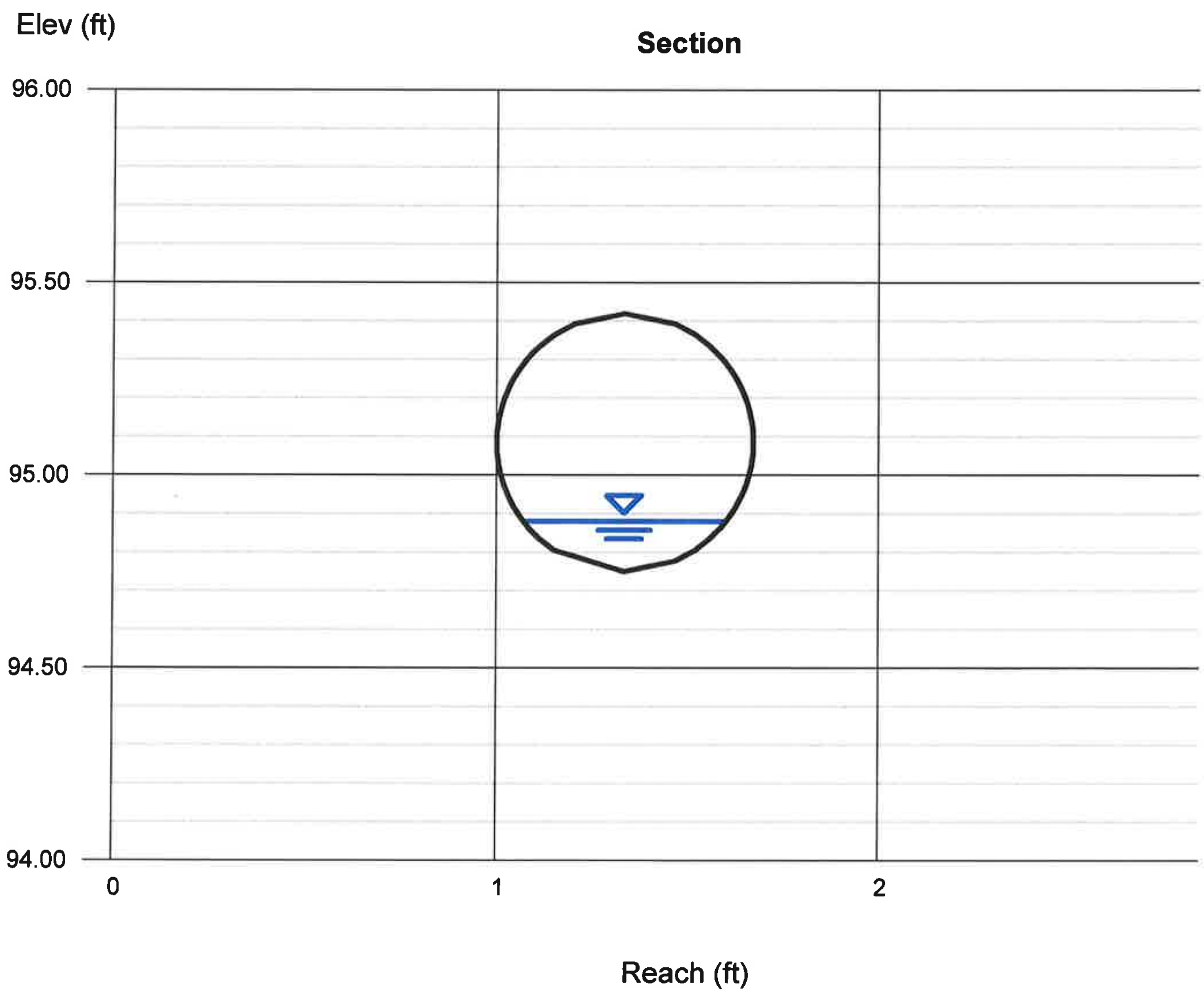
Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. — Friday, Sep 20 2019

Lot 1

Circular	
Diameter (ft)	= 0.67
Invert Elev (ft)	= 94.75
Slope (%)	= 15.50
N-Value	= 0.012
Calculations	
Compute by:	Known Q
Known Q (cfs)	= 0.39

Highlighted	
Depth (ft)	= 0.13
Q (cfs)	= 0.390
Area (sqft)	= 0.05
Velocity (ft/s)	= 8.05
Wetted Perim (ft)	= 0.61
Crit Depth, Yc (ft)	= 0.29
Top Width (ft)	= 0.53
EGL (ft)	= 1.14

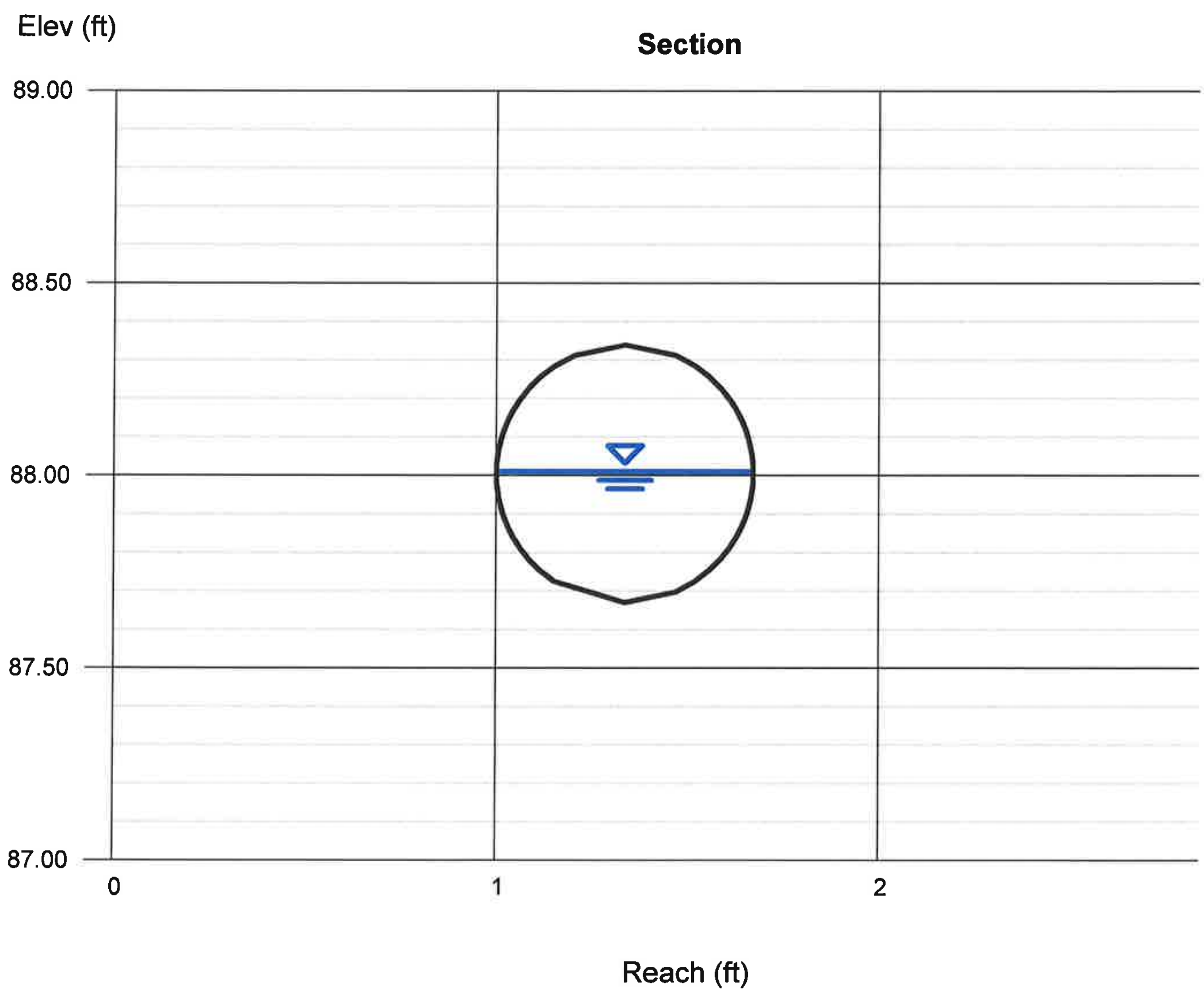


Channel Report

Lot 2

Circular	
Diameter (ft)	= 0.67
Invert Elev (ft)	= 87.67
Slope (%)	= 0.70
N-Value	= 0.012
Calculations	
Compute by:	Known Q
Known Q (cfs)	= 0.55

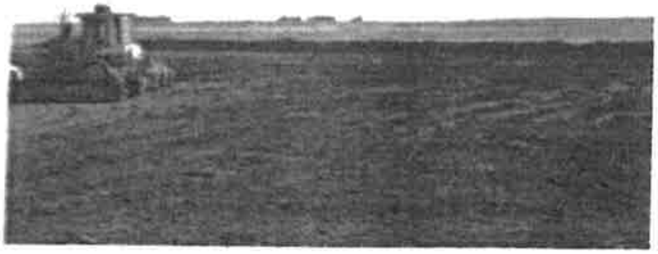
Highlighted	
Depth (ft)	= 0.34
Q (cfs)	= 0.550
Area (sqft)	= 0.18
Velocity (ft/s)	= 3.05
Wetted Perim (ft)	= 1.07
Crit Depth, Yc (ft)	= 0.35
Top Width (ft)	= 0.67
EGL (ft)	= 0.48



APPENDIX J

Standard and Specifications for Erosion and Sediment Control Measures

STANDARD AND SPECIFICATIONS FOR TOPSOILING



Definition

Spreading a specified quality and quantity of topsoil materials on graded or constructed subsoil areas.

Purpose

To provide acceptable plant cover growing conditions, thereby reducing erosion; to reduce irrigation water needs; and to reduce the need for nitrogen fertilizer application.

Conditions Where Practice Applies

Topsoil is applied to subsoils that are droughty (low available moisture for plants), stony, slowly permeable, salty or extremely acid. It is also used to backfill around shrub and tree transplants. This standard does not apply to wetland soils.

Design Criteria

1. Preserve existing topsoil in place where possible, thereby reducing the need for added topsoil.

2. Conserve by stockpiling topsoil and friable fine textured subsoils that must be stripped from the excavated site and applied after final grading where vegetation will be established.

3. Refer to USDA Soil Conservation Service (presently Natural Resource Conservation Service) soil surveys or soil interpretation record sheets for further soil texture information for selecting appropriate design topsoil depths.

Site Preparation

1. As needed, install erosion control practices such as diversions, channels, sediment traps, and stabilizing measures, or maintain if already installed.

2. Complete rough grading and final grade, allowing for depth of topsoil to be added.

3. Scarify all compact, slowly permeable, medium and fine textured subsoil areas. Scarify at approximately right angles to the slope direction in soil areas that are steeper than 5 percent. Areas that have been overly compacted shall be decompacted to a minimum depth of 12 inches with a deep ripper or chisel plow prior to topsoiling.

4. Remove refuse, woody plant parts, stones over 3 inches in diameter, and other litter.

Topsoil Materials

1. Topsoil shall have at least 6 percent by weight of fine textured stable organic material, and no greater than 20 percent. Muck soil shall not be considered topsoil.

2. Topsoil shall have not less than 20 percent fine textured material (passing the NO. 200 sieve) and not more than 15 percent clay.

3. Topsoil treated with soil sterilants or herbicides shall be so identified to the purchaser.

4. Topsoil shall be relatively free of stones over 1 1/2 inches in diameter, trash, noxious weeds such as nut sedge and quackgrass, and will have less than 10 percent gravel.

5. Topsoil containing soluble salts greater than 500 parts per million shall not be used.

Application and Grading

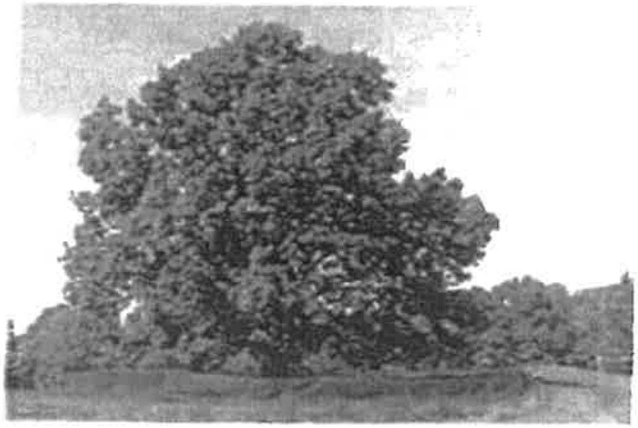
1. Topsoil shall be distributed to a uniform depth over the area. It shall not be placed when it is partly frozen, muddy, or on frozen slopes or over ice, snow, or standing water puddles.

2. Topsoil placed and graded on slopes steeper than 5 percent shall be promptly fertilized, seeded, mulched, and stabilized by "tracking" with suitable equipment.

3. Apply topsoil in the following amounts:

Site Conditions	Intended Use	Minimum Topsoil Depth
1. Deep sand or loamy sand	Mowed lawn	6 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	1 in.
2. Deep sandy loam	Mowed lawn	5 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	none
3. Six inches or more: silt loam, loam, or silt	Mowed lawn	4 in.
	Tall legumes, unmowed	1 in.
	Tall grass, unmowed	1 in.

STANDARD AND SPECIFICATIONS FOR PROTECTING VEGETATION DURING CONSTRUCTION



Definition

The protection of trees, shrubs, ground cover and other vegetation from damage by construction equipment.

Purpose

To preserve existing vegetation determined to be important for soil erosion control, water quality protection, shade, screening, buffers, wildlife habitat, wetland protection, and other values.

Condition Where Practice Applies

On planned construction sites where valued vegetation exists and needs to be preserved.

Design Criteria

1. Planning Considerations

   A. Inventory:

      1) Property boundaries, topography, vegetation and soils information should be gathered. Identify potentially high erosion areas, areas with tree windthrow potential, etc. A vegetative cover type map should be made on a copy of a topographic map which shows other natural and manmade features. Vegetation that is desirable to preserve because of its value for screening, shade, critical erosion control, endangered species, aesthetics, etc., should be identified and marked on the map.

      2) Based upon this data, general statements should be prepared about the present condition, potential problem areas, and unique features of the property.

   B. Planning:

      1) After engineering plans (plot maps) are prepared, another field review should take place and recommendations made for the vegetation to be saved. Minor adjustments in location of roads, dwellings, and utilities may be needed. Construction on steep slopes, erodible soils, wetlands, and streams should be avoided. Clearing limits should be delineated (See Section 2).

      2) Areas to be seeded and planted should be identified. Remaining vegetation should blend with their surroundings and/or provide special function such as a filter strip, buffer zone, or screen.

      3) Trees and shrubs of special seasonal interest, such as flowering dogwood, red maple, striped maple, serviceberry, or shadbush, and valuable potential shade trees should be identified and marked for special protective treatment as appropriate.

      4) Trees to be cut should be marked on the plans. If timber can be removed for salable products, a forester should be consulted for marketing advice.

      5) Trees that may become a hazard to people, personal property, or utilities should be removed. These include trees that are weak-wooded, disease-prone, subject to windthrow, or those that have severely damaged root systems.

      6) The vigor of remaining trees may be improved by a selective thinning. A forester should be consulted for implementing this practice.

2. Measures to Protect Vegetation

   A. Limit soil placement over existing tree and shrub roots to a maximum of 3 inches. Soils with loamy texture and good structure should be used.

   B. Use retaining walls and terraces to protect roots of trees and shrubs when grades are lowered. Lowered grades should start no closer than the dripline of the tree. For narrow-canopied trees and shrubs, the stem diameter in inches is converted to feet and doubled, such that a 10 inch tree should be protected to 20 feet.

C. Trenching across tree root systems should be the same minimum distance from the trunk, as in "B". Tunnels under root systems for underground utilities should start 18 inches or deeper below the normal grounds surface. Tree roots which must be severed should be cut clean. Backfill material that will be in contact with the roots should be topsoil or a prepared planting soil mixture.

D. Construct sturdy fences, or barriers, of wood, steel, or other protective material around valuable vegetation for protection from construction equipment. Place barriers far enough away from trees, but not less than the specifications in "B", so that tall equipment such as backhoes and dump trucks do not contact tree branches.

E. Construction limits should be identified and clearly marked to exclude equipment.

F. Avoid spills of oil/gas and other contaminants.

G. Obstructive and broken branches should be pruned properly. The branch collar on all branches whether living or dead should not be damaged. The 3 or 4 cut method should be used on all branches larger than two inches at the cut. First cut about one-third the way through the underside of the limb (about 6-12 inches from the tree trunk). Then (approximately an inch further out) make a second cut through the limb from the upper side. When the branch is removed, there is no splintering of the main tree trunk. Remove the stub. If the branch is larger than 5-6 inches in diameter, use the four cut system. Cuts 1 and 2 remain the same and cut 3 should be from the underside of the limb, on the outside of the branch collar. Cut 4 should be from the top and in alignment with the 3rd cut. Cut 3 should be 1/4 to 1/3 the way through the limb. This will prevent the bark from peeling down the trunk. Do not paint the cut surface.

H. Penalties for damage to valuable trees, shrubs, and herbaceous plants should be clearly spelled out in the contract.

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence placed on a slope are:

Slope Steepness	Maximum Length (ft.)
2:1	25
3:1	50
4:1	75
5:1 or flatter	100

2. Maximum drainage area for overland flow to a silt fence shall not exceed ¼ acre per 100 feet of fence, with maximum ponding depth of 1.5 feet behind the fence; and

3. Erosion would occur in the form of sheet erosion; and

4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff. All silt fences shall be placed as close to the areas as possible, but at least 10 feet from the toe of a slope to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.

Sensitive areas to be protected by silt fence may need to be reinforced by using heavy wire fencing for added support to prevent collapse.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. A detail of the silt fence shall be shown on the plan. See Figure 5A.8 on page 5A.21 for details.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682

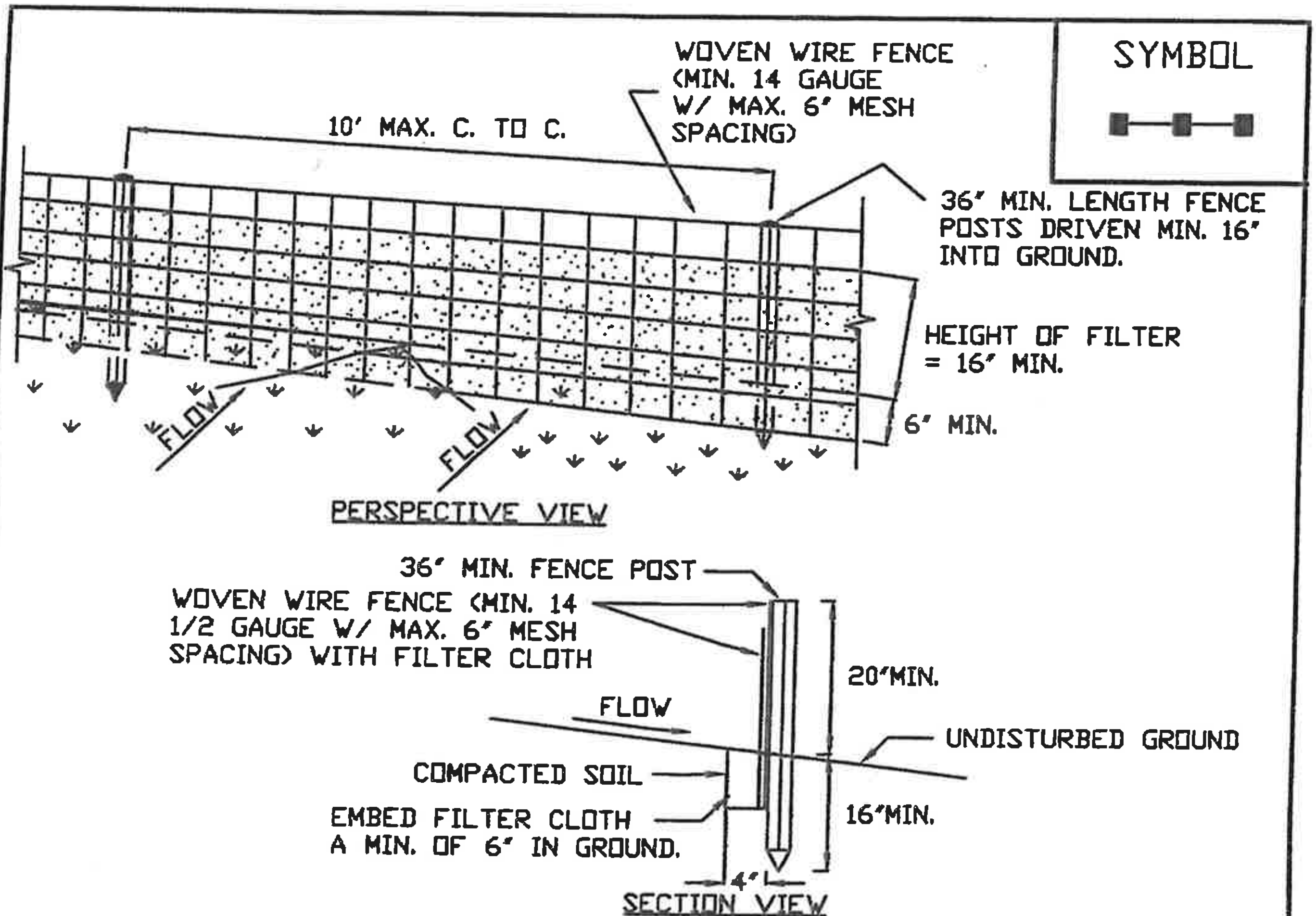
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.

3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated Units: Envirofence, Geofab, or approved equal, may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.8.

Figure 5A.8
Silt Fence

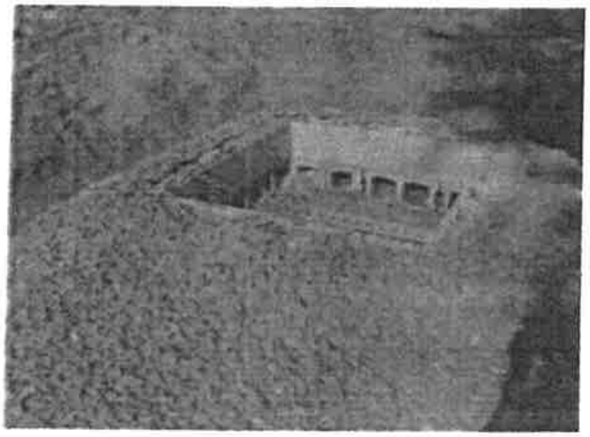


CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	SILT FENCE

STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION



Definition

A temporary, somewhat permeable barrier, installed around inlets in the form of a fence, berm or excavation around an opening, trapping water and thereby reducing the sediment content of sediment laden water by settling.

Purpose

To prevent heavily sediment laden water from entering a storm drain system through inlets.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. **It is not to be used in place of sediment trapping devices.** This may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are four (4) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

I. Excavated Drop Inlet Protection
II. Fabric Drop Inlet Protection
III. Stone & Block Drop Inlet Protection
IV. Curb Drop Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

See details for Excavated Drop Inlet Protection in Figure 5A.11 on page 5A.29.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved This material should be incorporated into the site in a stabilized manner.

Type II – Fabric Drop Inlet Protection

See Figure 5A.12 for details on Filter Fabric Drop Inlet Protection on page 5A.30.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

If straw bales are used in lieu of filter fabric, they should be placed tight with the cut edge adhering to the ground at least 3 inches below the elevation of the drop inlet. Two anchor stakes per bale shall be driven flush to bale surface. Straw bales will be replaced every 4 months until the area is stabilized.

Type III – Stone and Block Drop Inlet Protection

See Figure 5A.13 for details on Stone and Block Drop Inlet Protection on page 5A.31.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet ("doughnut"). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilized in a manner appropriate to the site.

Type IV – Curb Drop Inlet Protection

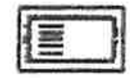
See Figure 5A. 14 for details on Curb Drop Inlet Protection on page 5A.32.

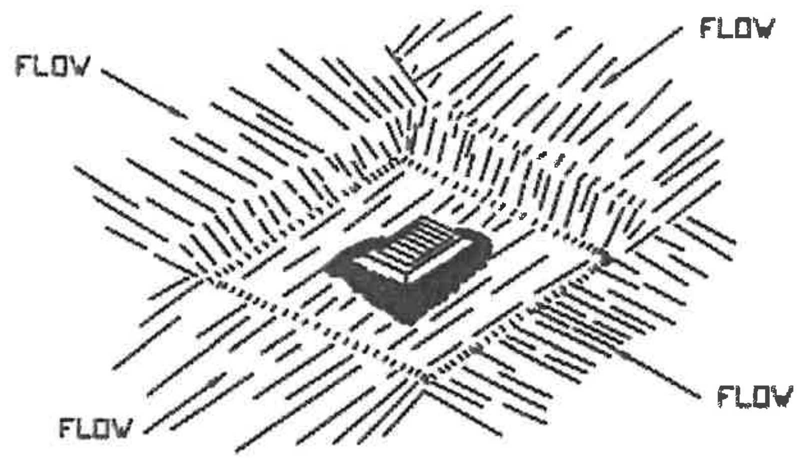
The drainage area should be limited to 1 acre at the drop inlet. The wire mesh must be of sufficient strength to support the filter fabric and stone with the water fully impounded against it. Stone is to be 2 inches in size and clean. The filter fabric must be of a type approved for this purpose with an equivalent opening size (EOS) of 40-85. The protective structure will be constructed to extend beyond the inlet 2 feet in both directions. Assure that storm flow does not bypass the inlet by installing temporary dikes (such as sand bags) directing flow into the inlet. Make sure that the overflow weir is stable. Traffic safety shall be integrated with the use of this practice.

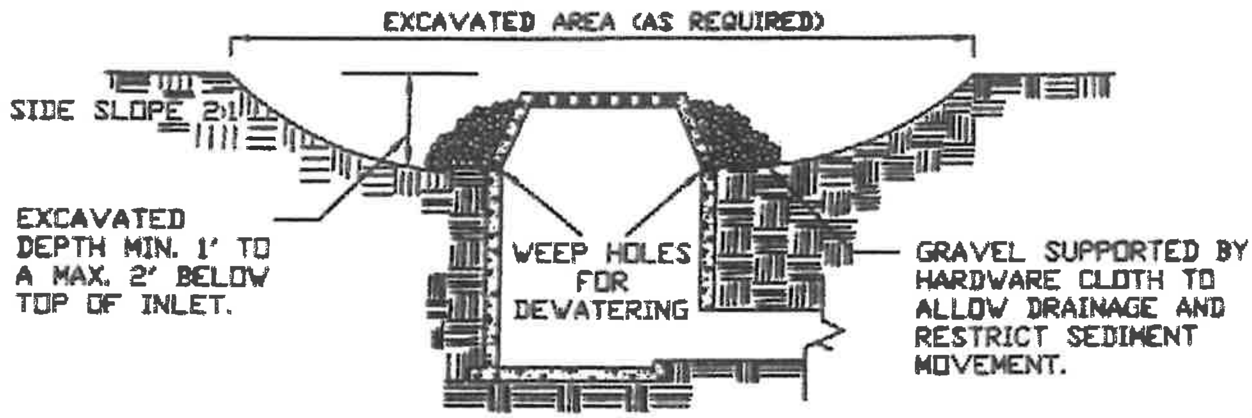
The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any stone missing should be replaced. Check materials for proper anchorage and secure as necessary.

Figure 5A.11
Excavated Drop Inlet Protection

SYMBOL







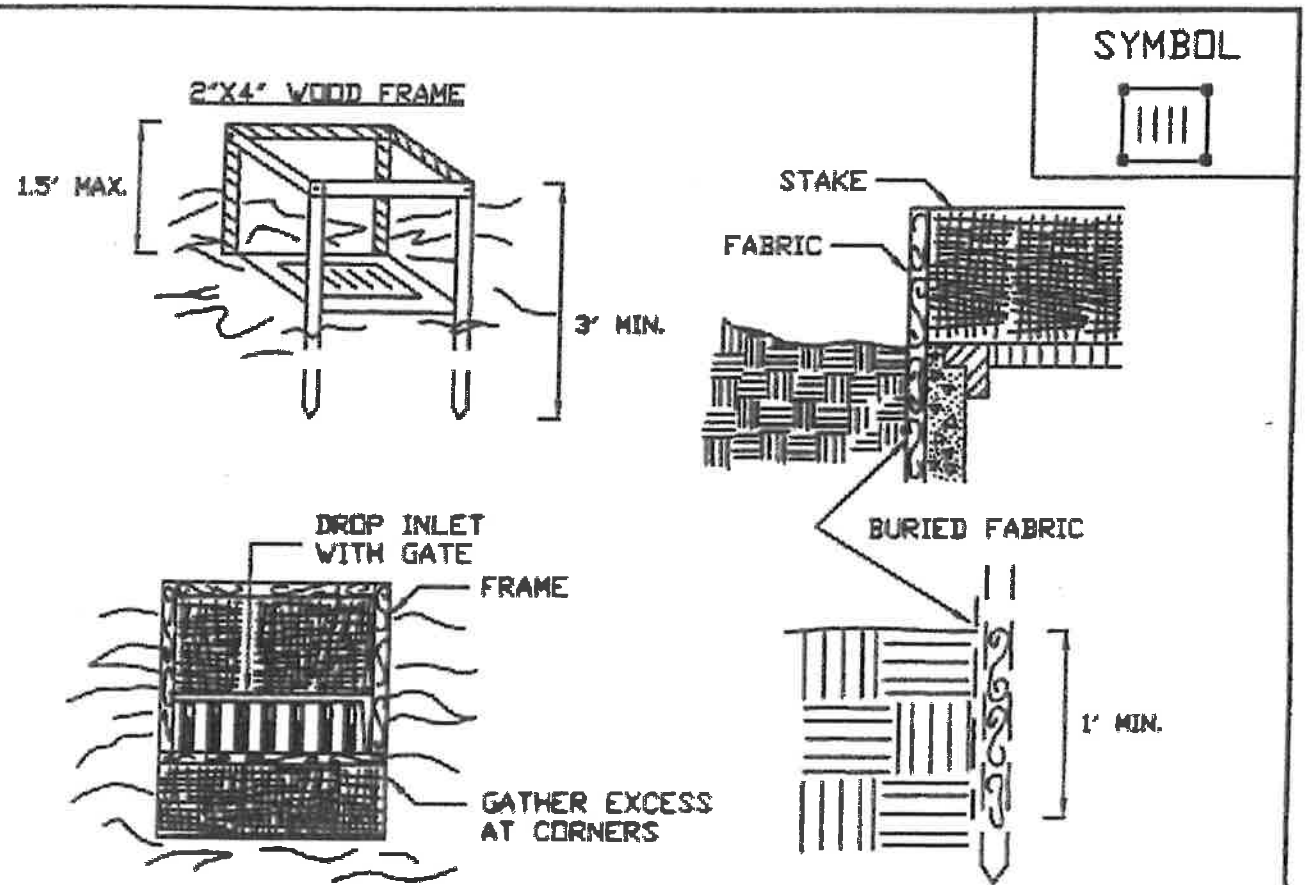
CONSTRUCTION SPECIFICATIONS

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL EXCAVATION WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	EXCAVATED DROP INLET PROTECTION

Figure 5A.12
Filter Fabric Drop Inlet Protection



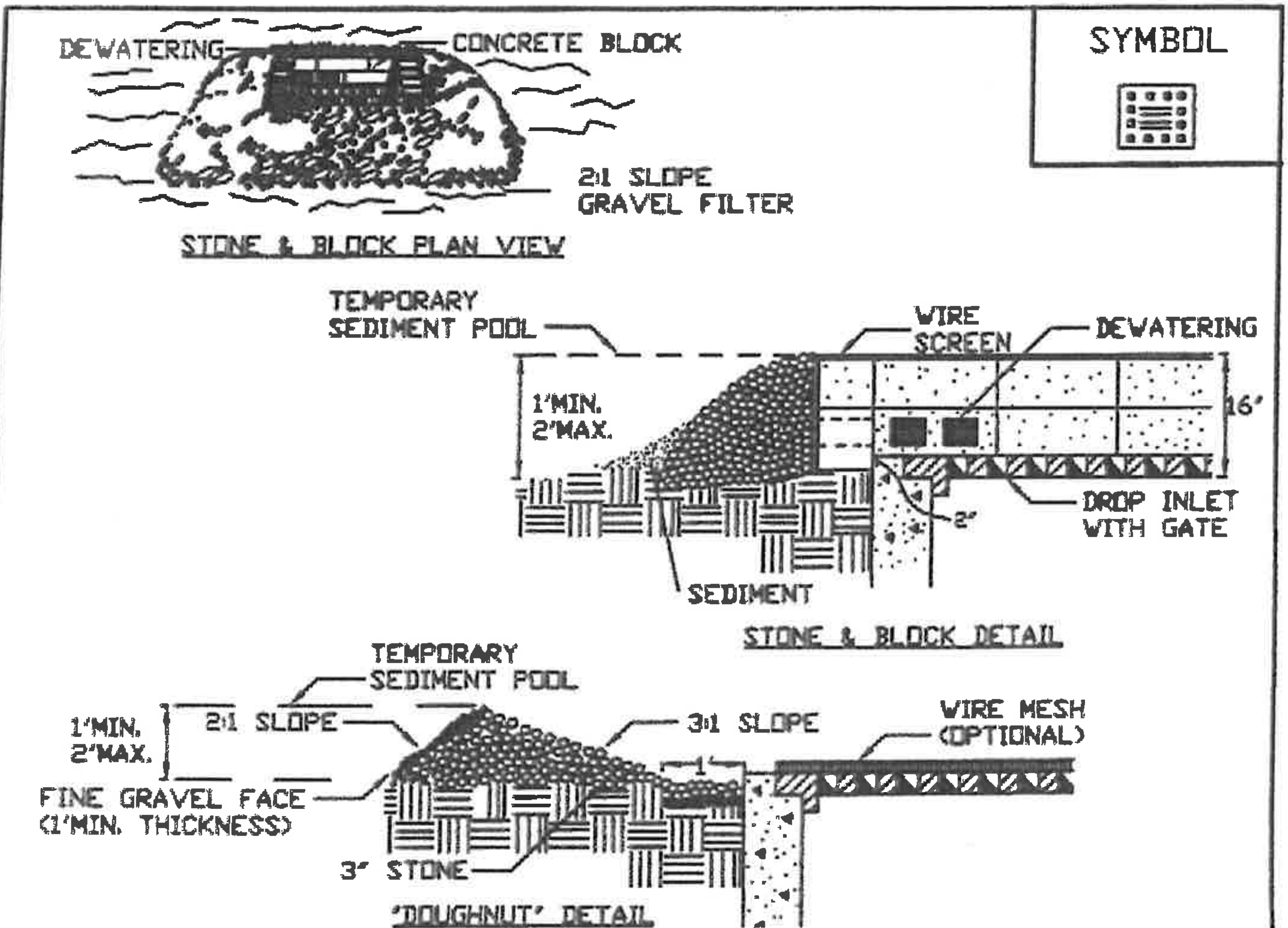
CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2" x 4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.

MAXIMUN DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	FILTER FABRIC DROP INLET PROTECTION

Figure 5A.13
Stone & Block Drop Inlet Protection



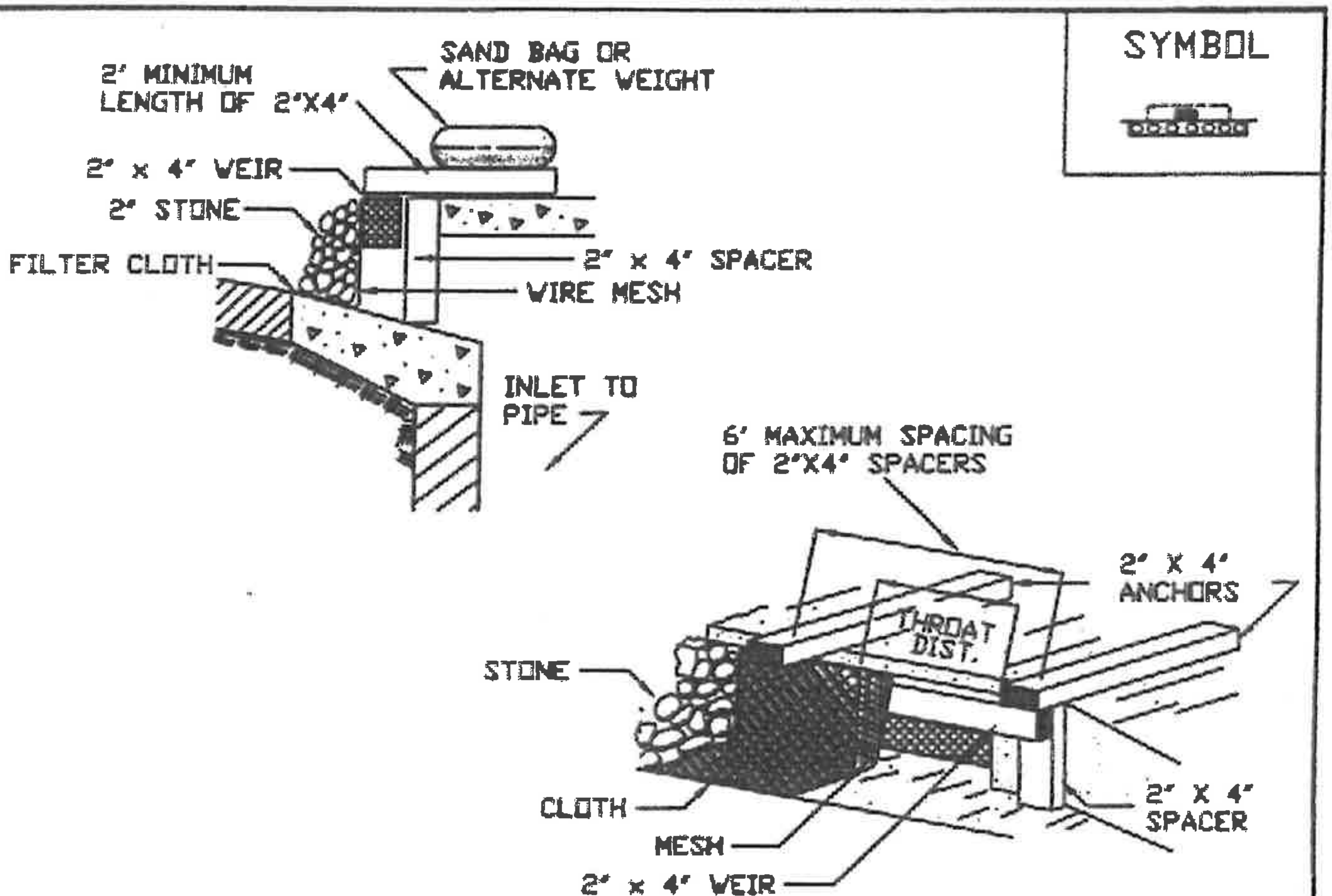
CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2-3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR STONE STRUCTURES ONLY, A 1 FOOT THICK LAYER OF THE FILTER STONE WILL BE PLACED AGAINST THE 3 INCH STONE AS SHOWN ON THE DRAWINGS.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE & BLOCK DROP INLET PROTECTION

Figure 5A.14
Curb Drop Inlet Protection



CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN AOS OF 40-85.
2. WOODEN FRAME SHALL BE CONSTRUCTED OF 2" x 4" CONSTRUCTION GRADE LUMBER.
3. WIRE MESH ACROSS THROAT SHALL BE A CONTINUOUS PIECE 30 INCH MINIMUM WIDTH WITH A LENGTH 4 FEET LONGER THAN THE THROAT. IT SHALL BE SHAPED AND SECURELY NAILED TO A 2" x 4" WEIR.
4. THE WEIR SHALL BE SECURELY NAILED TO 2" x 4" SPACERS 9 INCHES LONG SPACED NO MORE THAN 6 FEET APART.
5. THE ASSEMBLY SHALL BE PLACED AGAINST THE INLET AND SECURED BY 2" x 4" ANCHORS 2 FEET LONG EXTENDING ACROSS THE TOP OF THE INLET AND HELD IN PLACE BY SANDBAGS OR ALTERNATE WEIGHTS.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	CURB DROP INLET PROTECTION

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ENTRANCE

Definition

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area.

Purpose

The purpose of stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction entrance shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 5A.35 on page 5A.76 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile

The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Brust Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 modified
Equivalent Opening Size	40-80	40-80	US Std Sieve CW-02215
Aggregate Depth	6	10	--

[1]Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

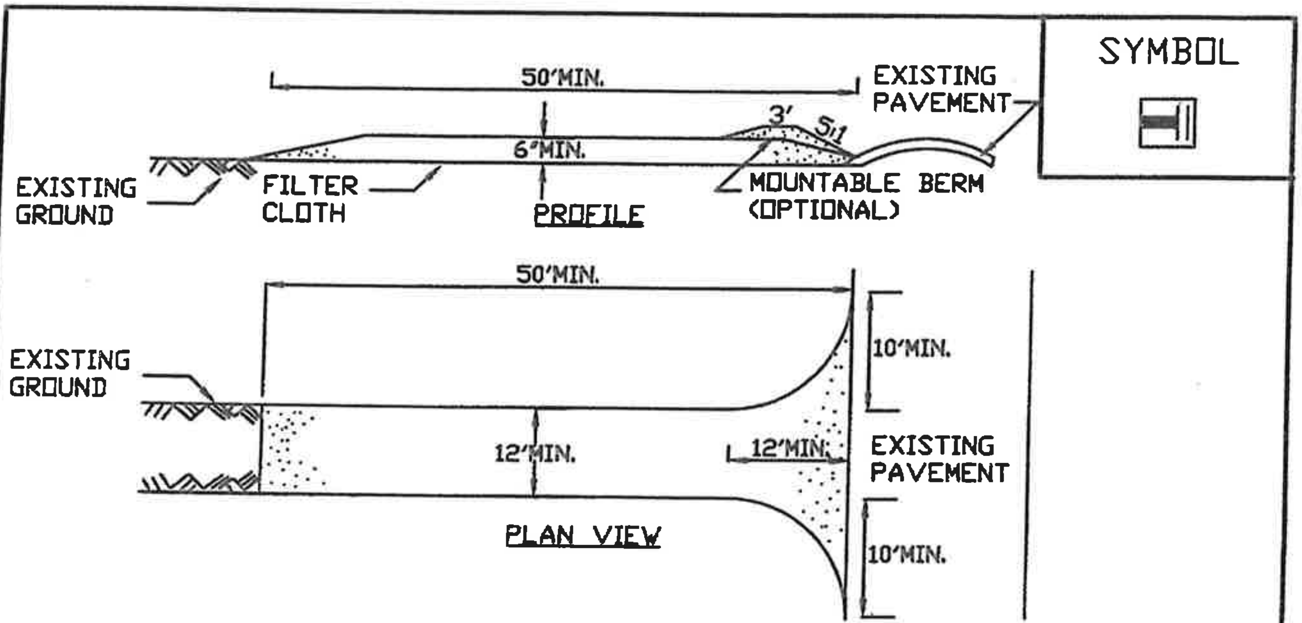
[3]Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The entrance shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

Figure 5A.35
Stabilized Construction Entrance



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACTED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STABILIZED CONSTRUCTION ENTRANCE

STANDARD AND SPECIFICATIONS FOR DUST CONTROL

Definition

The control of dust resulting from land-disturbing activities.

Purpose

To prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the local permitting authority.

Construction Specifications

A. **Non-driving Areas** – These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

Vegetative Cover – For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

B. **Driving Areas** – These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling – The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access routes.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

Barriers – Woven geotextiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

All Stormwater Pollution Prevention Plans must contain the NYS DEC issued "Conditions for Use" and "Application Instructions" for any polymers used on the site. This information can be obtained from the NYS DEC website.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

APPENDIX K

Sample Inspection Reports

Pre-Construction Site Assessment Checklist Page 1 of 2

Name of Permitted Facility:	Permit Identification #: NYR	Date of Authorization:
Location:	SDC Project No.:	
Name and Telephone Number of Owner/Operator:	Name and Telephone Number of Site Inspector:	
Today's date: Day: S M T W T F S AM or PM	Weather / Temp:	

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

Yes	No	NA	Observations
			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) on-site? Where? _______________
			Have all contractors involved with stormwater-related activities signed a contractor's certification?

2. Resource Protection:

Yes	No	NA	Observations
			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	Observations
			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 or protected.
			Appropriate practices to protect on-site or downstream surface water are installed.
			Are clearing and grading operations divided into areas < 5 acres?

Pre-Construction Site Assessment Checklist Page 2 of 2

4. Stabilized Construction Entrance:

Yes	No	NA	Observations
			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	Observations
			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 hand disturbing activity.
			Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials:

Yes	No	NA	Observations
			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 on-site. Where?_____________________________.

Note: Provide comments below as necessary:

____

____

____

____

Name of Permitted Facility:	Permit Identification #: NYR	Date of Authorization:
Location:	SDC Project No.:	
Name and Telephone Number of Owner/Operator:	Name and Telephone Number of Site Inspector:	
Today's date: Day: S M T W T F S AM or PM	Weather / Temp:	

Permit Reference: Part IV.C.2.a (page 17):

"For construction sites where soil disturbance activities are on-going, the qualified inspector shall conduct a site inspection at least once every seven (7) calendar days."

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

Immediate report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

Identify location, nature of work, by contractor and subcontractors for each operation:

PLAN / SKETCH

Inspector (print name)   Date of Inspection

Qualified Professional (print name)   Qualified Professional Signature

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

Maintaining Water Quality

Yes	No	NA	Observations
			Is there an increase in turbidity causing a substantial contrast to natural conditions?
			Is there residue from oil and floating substances, visible oil film, or globules or grease?
			All disturbances are 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	Observations
			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	Observations
			Maximum diameter pipe 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 and prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering

Yes	No	NA	Observations
			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	Observations
			Installed per plan.
			Constructed on undisturbed soil, not on fill, receiving only clean, non-sediment laden flow.
			Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

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

4. Stone Check Dam

Yes	No	NA	Observations
			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	Observations
			Installed as per Plan
			Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes	No	NA	Observations
			Stockpiles are stabilized with vegetation and/or mulch.
			Sediment control is installed at the toe of the slope.

2. Revegetation

Yes	No	NA	Observations
			Temporary seedings and mulch have been applied to idle areas.
			Four inches minimum of topsoil has been applied under permanent seedings.

Sediment Control Practices

1. Stabilized Construction Entrance

Yes	No	NA	Observations
			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 - Sediment accumulation is _____ % of design capacity.

Yes	No	NA	Observations
			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.

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices) -
Sediment accumulation ____% of design capacity.

Yes	No	NA	Observations
			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.

4. Temporary Sediment Trap - Sediment accumulation is _____% of design capacity.

Yes	No	NA	Observations
			Outlet structure is constructed per the approved plan or drawing.
			Geotextile fabric has been placed beneath rock fill.

5. Temporary Sediment Trap - Sediment accumulation is _____% of design capacity.

Yes	No	NA	Observations
			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.

Recommended maintenance or additional measures:

____

____

____

____

____

Notes or Comments:

____

____

____

____

Construction Duration Inspections: Page 6 of 6

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 SWPP 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 and Reason:

Stormwater Management Pond/Wetland
Construction Inspection Checklist

Name of Permitted Facility:	Permit Identification #: NYR	Date of Authorization:
Location:	SDC Project No.:	
Name and Telephone Number of Owner/Operator:	Name and Telephone Number of Site Inspector:	
Today's date: Day: S M T W T F S AM or PM	Weather / Temp:	

Permit Reference: Part IV.C.2.a (page 17):

"For construction sites where soil disturbance activities are on-going, the qualified inspector shall conduct a site inspection at least once every seven (7) calendar days."

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
1. Pre-Construction / Materials and Equipment		
Pre-Construction Meeting		
Pipe and appurtenances on-site prior to construction and dimensions checked.		
Material (including protective coating, if specified).		
Diameter.		
Dimensions of metal riser or pre-cast concrete outlet structure.		
Required dimensions between water control structures (orifices, weirs, etc.) are in accordance with approved plans.		
Barrel stub for prefabricated pipe structures at proper angle for design barrel slope.		

Post-Development Stormwater Management Practice
Construction Inspection Checklist

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
Number and dimensions of prefabricated anti-seep collars.		
Watertight connectors and gaskets.		
Outlet drain valve.		
Project benchmark near pond site.		
Equipment for temporary de-watering.		
2. Subgrade Preparation		
Area beneath embankment stripped of all vegetation, topsoil and organic matter.		
3. Pipe Spillway Installation		
Method of installation details on plans.		
Bed Preparation		
Installation trench excavated with specified side slopes.		
Stable, uniform, dry subgrade of relatively impervious material. (If subgrade is wet, contractor shall have defined steps before proceeding with installation.)		
Invert at proper elevation and grade.		
Pipe Placement - Metal / Plastic		
Watertight connectors and gaskets properly installed.		
Anti-seep collars properly spaced and having watertight connections to pipe.		
Backfill placed and tamped by hand under "haunches" of pipe.		

Post-Development Stormwater Management Practice
Construction Inspection Checklist

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
Remaining backfill placed in max. 8 inch lifts using small power tamping equipment until 2-feet of cover over pipe is reached.		
Pipe Placement - Concrete Pipe		
Pipe set on blocks or concrete slab for pouring of low cradle.		
Pipe installed with rubber gasket joints with no spalling in gasket interface area.		
Excavation for lower half of anti-seep collars(s) with reinforcing steel set.		
Entire area where anti-seep collars(s) will come in contact with pipe coated with mastic or other approved waterproof sealant.		
Low cradle and bottom half of anti-seep collar installed as monolithic pour and of an approved mix.		
Upper half of anti-seep collars(s) formed with reinforcing steel set.		
Concrete for collar of an approved mix and vibrated into place (protected from freezing while curing, if necessary).		
Forms stripped and collar inspected for honeycomb prior to backfilling. Purge if necessary.		

Post-Development Stormwater Management Practice
Construction Inspection Checklist

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
C. Backfilling		
Fill placed in maximum 8-inch lifts.		
Backfill taken minimum 2-feet above top of anti-seep collar elevation before traversing with heavy equipment.		
4. Riser / Outlet /Structure Installation		
Riser located within embankment.		
A. Metal riser		
Rise base excavated or formed on stable subgrade to design dimensions.		
Set on blocks to design elevations and plumbed.		
Reinforcing bars placed at right angles and projecting into sides of riser.		
Concrete poured as to fill inside of riser to invert of barrel.		
B. Pre-Cast Concrete Structure		
Dry and stable elevation.		
Riser base set to design elevation.		
If more than one section, no spalling in gasket interface area; gasket or approved caulking material placed securely.		
Watertight and structurally sound collar or gasket joint where structure connects to pipe spillway.		

Post-Development Stormwater Management Practice
Construction Inspection Checklist

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
C. Poured Concrete Structure		
Footing excavated or formed on stable subgrade, to design dimensions with reinforcing steel set.		
Structure formed to design dimensions, with reinforcing steel set as per Plan.		
Concrete of an approved mix and vibrated into place (protect from freezing while curing, if necessary).		
Forms stripped and inspected for "honeycomb" prior to backfilling; parge if necessary.		
5. Embankment Construction		
Fill Material		
Compaction		
Embankment		
Fill placed in specified lifts and compacted with appropriate equipment.		
Constructed to design cross-section , side slopes and top width.		
Constructed to design elevation plus allowance for settlement.		
6. Impounded Area Construction		
Excavated / graded to design contours and side slopes.		
Inlet pipes have adequate outfall protection.		
Forebay(s).		
Pond benches.		

Post-Development Stormwater Management Practice
Construction Inspection Checklist

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
7. Earth Emergency Spillway Construction		
Spillway located in cur or structurally stabilized with riprap, gabions, concrete, etc.		
Excavated to proper cross-section, side slopes and bottom width.		
Entrance channel, crest, and exit channel constructed to design grades and elevations.		
8. Outlet Protection		
A. End Section		
Securely in place and properly backfilled.		
B. Endwall		
Footing excavated or formed on stable subgrade, to design dimensions and reinforcing steel set, if specified.		
Endwall formed to design dimensions with reinforcing steel set as per Plan.		
Concrete of an approved mix and vibrated into place (protected from freezing, if necessary).		
Forms stripped and structure inspected for "honeycomb" prior to backfilling; parge if necessary.		
C. Riprap Apron / Channel		
Apron / Channel excavated to design cross-section with proper transition to existing ground.		

Post-Development Stormwater Management Practice
Construction Inspection Checklist

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
Filter fabric in place.		
Stone sized as per Plan and uniformly placed at the thickness specified.		
9. Vegetative Stabilization		
Approved seed mixture or sod.		
Proper surface preparation and required soil amendments.		
Excelsior mat or other stabilization, as per Plan.		
10. Miscellaneous		
Drain for ponds having a permanent pool.		
Trash rack / anti-vortex device secured to outlet structure.		
Trash protection for low flow pipes, orifices, etc.		
Fencing (when required).		
Access road.		
Set aside for clean-out maintenance.		
11. Stormwater Wetlands		
Adequate water balance.		
Variety of depth zones present.		
Approved pondscaping plan in place. Reinforcement budget for additional plantings.		
Plants and materials ordered 6 months prior to construction.		
Construction planned to allow for adequate planting and establishment of plant community (April-June planting window).		
Wetland buffer area preserved to maximum extent possible.		

Post-Development Stormwater Management Practice Construction Inspection Checklist

Comments:

Actions to be Taken:

APPENDIX L

Schedule "B"

Schedule B

Stormwater Control Facility Maintenance Agreement

MGM Design & Construction Group, LLC.
5 Hawkes Avenue
Ossining, NY 10562

Whereas, the Municipality of Town of Ossining ("Municipality") and the MGM Design & Construction Group, LLC. ("Facility Owner") want to enter into an agreement to provide for the long term maintenance and continuation of stormwater control measures approved by the Municipality for the below named project, and

Whereas, the Municipality and the Facility Owner desire that the stormwater control measures be built in accordance with the approved project plans and thereafter be maintained, cleaned, repaired, replaced and continued in perpetuity in order to ensure optimum performance of the components. Therefore, the Municipality and the Facility Owner agree as follows:

1. This agreement binds the Municipality and the Facility Owner, its successors and assigns, to the maintenance provision depicted in the approved project plans which are attached as Schedule A of this agreement.

2. The Facility Owner shall maintain, clean, repair, replace and continue the stormwater control measures depicted in Schedule A as necessary to ensure optimum performance of the measures to design specifications. The stormwater control measures shall include, but shall not be limited to, the following: drainage, ditches, swales, dry wells, infiltrators, drop inlets, pipes, culverts, soil absorption devices and retention ponds.

3. The Facility Owner shall be responsible for all expenses related to the maintenance of the stormwater control measures and shall establish a means for the collection and distribution of expenses among parties for any commonly-owned facilities.

4. The Facility Owner shall provide for the periodic inspection of the stormwater control measures, not less than once in every five-year period, to determine the condition and integrity of the measures. Such inspection shall be performed by a Professional Engineer licensed by the State of New York. The inspecting engineer shall prepare and submit to the Municipality within 30 days of the inspection, a written report of the findings including recommendations for those actions necessary for the continuation of the stormwater control measures.

5. The Facility Owner shall not authorize, undertake or permit alteration, abandonment, modification or discontinuation of the stormwater control measures except in accordance with written approval of the Municipality.

6. The Facility Owner shall undertake necessary repairs and replacement of the stormwater control measures at the direction of the Municipality or in accordance with the recommendations of the inspecting engineer.

7. The Facility Owner shall provide to the Municipality within 30 days of the date of this agreement, a security for the maintenance and continuation of the stormwater control measures in the form of (a Bond, letter of credit or escrow account).

8. This agreement shall be recorded in the Office of the County Clerk, County of Westchester together with the deed for the common property and shall be included in the offering plan and/or prospectus approved pursuant to ______________________________.

9. If ever the Municipality determines that the Facility Owner has failed to construct or maintain the stormwater control measures in accordance with the project plan or has failed to undertake corrective action specified by the Municipality or by the inspecting engineer, the Municipality is authorized to undertake such steps as reasonably necessary for the preservation, continuation or maintenance of the stormwater control measures and to affix the expenses thereof as a lien against the property.

10. This agreement is effective ____________________.

11. By certifying this document the Facility Owner acknowledges that he/she understands and has agreed to and will comply with the approved Stormwater Management Plan and associated construction documents referenced herein for this site.

State of New York)
)ss:
County of Westchester)

On this ___________ day of ______________ in the year _______, before me, the undersigned, a Notary Public in and for said State, personally appeared ____________________________, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual or the person upon behalf of which the individual acted, executed the instrument.

______________________________ ______________________________
Name of Facility Owner Signature of Facility Owner

____
Notary Public

• •

State of New York)
)ss:
County of Westchester)

On this ___________ day of ______________ in the year _______, before me, the undersigned, a Notary Public in and for said State, personally appeared ____________________________, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual or the person upon behalf of which the individual acted, executed the instrument.

______________________________ ______________________________
Name of Town Official Signature of Town Official

____
Notary Public

APPENDIX M

Project Plans